Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

कक्षा बी.एस.सी. कम्प्यूटर विज्ञान नियमित छात्रों हेतु

प्रथम वर्ष	आन्तरिक			सैद्धांतिक	योग	प्रायोगिक	कुल योग
	Three Months	**Six Months**	योग				
Fundamentals of Computers	5	10	15	42.5	85	50	150
Programming in C				42.5			
द्वितीय वर्ष							
Object Oriented Programming Concept using C++	5	10	15	42.5	85	50	150
Data structures				42.5			
तृतीय वर्ष							
Database Management System	5	10	15	42.5	85	50	150
Operating System Concepts				42.5			
कुल योग							**450**

Remark : (i)Each theory paper will contain five objective type question of 1 mark and
(ii) Five short answer type question of 2.5 marks and
(iii) Five long answer type question of 5 marks, with internal choice in (ii) and (iii)

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(A. Rajiyadav)

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(A. Dasgupta)

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Rajesh Pandey 28.4

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18
बी.एस.सी. प्रथम कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र
फंडामेण्टल ऑफ कम्प्यूटर्स

अधिकतम अंक : 42.5 **न्यूनतम अंकः 15**

इकाई– प्रथम

कम्प्यूटर का ब्लॉक डायग्रामः इनपुट इकाई, आउटपुट इकाई, सी.पी.यू.,मेमोरी यूनिट, कम्प्यूटर के चरण, कम्प्यूटर के प्रकार : डेस्कटॉप, लेपटॉप, पॉमटाप, वर्कस्टेशन्स एवं सुपर कम्प्यूटर, सभी प्रकार की इनपुट एवं आउटपुट डिवाईस, हार्डवेयर,साफ्टवेयर एवं फर्मवेयर की अवधारणा

विन्डोज : विन्डोज के गुणधर्म– डेसकटॉप,स्टार्ट मेन्यू,कन्ट्रोल पेनल, माय कम्प्यूटर, विन्डोज एक्सप्लोरर, एसेसरीज,मैनेजिंग मल्टीपल विन्डोज, डेस्कटॉप में आईकोन व्यवस्थित करना, फोल्डर को बनाना एवं व्यवस्थित करना, फाईल एवं ड्राईव को व्यवस्थित करना, लोगिंग ऑफ एवं विन्डोज शटडाउन

इकाई– द्वितीय

वर्डः वर्ड प्रोसेसिंग क्या है, एम.एस. वर्ड में डाक्यूमेन्ट बनाना, एम.एस. वर्ड के फामेटिंग फीचर्स, स्टेण्डर्ड टूलवार, ड्राईंग टूलवार, टेबल्स एवं अन्य फीचर्स, मेलमर्ज, फाईल्स का इन्सर्शन, पिक्चर, क्लिप वोर्ड, ग्राफ, प्रिंट फार्मेटिंग, पेज नम्बरिंग एवं प्रिंटिंग डाक्यूमेन्ट्स।

एक्सेल : वर्कशीट एवं एक्सेल का परिचय, वर्कशीट में जानकारी को प्रविष्ट करना, नंबर्स, फार्मूला इत्यादी। वर्कबुक को सेव करना, एडिटिंग सेल्स, कमाण्ड एवं फंक्शन का उपयोग, मूविंग एवं कापिंग, रोज एवं कालम्स को इन्सर्ट एवं डीलिट करना, चार्ट बनाना, पेज सेटअप : मार्जिन, हेडर एवं फुटर को प्रिंटिंग से पहले जोड़ना, वर्कशीट का प्रिंट प्रिव्यू, प्रिंटआउट से ग्रिडलाईन अलग करना, टाईटल रो को प्रिन्ट करना।

इकाई– तृतीय

संख्या पद्धतिः डेसिमल,वायनरी,ऑक्टेल, हेक्साडेसिमल, संख्या पद्धति में एक आधार से दूसरे आधार में परिवर्तन करना।

कोड्स : ASCII कोड, EBCDIC कोड,ग्रे कोड,बूलियन एल्जेब्रा,डी मार्गन प्रमेय, वायनरी एर्थमेटिकः एडीशन, सब्सट्रेक्शन, मल्टीप्लीकेशन एवं डिवीजन, अनसाईन्ड बायनरी संख्यायें,साईन्ड मेग्नीट्यूड संख्यायें, संख्याओं का 1's काम्प्लीमेन्ट एवं 2's काम्प्लीमेन्ट में प्रदर्शन , 2's काम्प्लीमेन्ट अर्थमेटिक, बूलियन फण्शन एवं सत्यता सारणी, SOP,POS Form minterms/maxterms, बूलियन एलजेब्रा एवं karnaugh map के उपयोग से लाजिक सर्किट का सरलीकरण करना।

Logic Gates: - AND. OR, NOT, NAND, NOR, X -OR एवं X -NOR gates व उनके चिन्ह एवं truth tables, gates से सर्किट डिजाइन: एडर/सब्ट्रॅक्टर।

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(Raj Yadav)

Rajesh Pandey 28-4.

इकाई– चतुर्थ

मेमोरी सेल, प्राईमरी मेमोरी : RAM, स्टेटिक एवं डायनामिक RAM, ROM, PROM, EPROM, EEPROM Cache मेमोरी, सेकेण्ड्री मेमोरी एवं उनके प्रकार, वर्चुअल मेमोरी की संधारणा, मेमोरी एक्सेसिंग मेथर्डः सीरियल एवं रेन्डम एक्सेस ।

डेटाबस, कन्ट्रोल बस एवं एड्रेस बस, कम्प्यूटर की वर्ड लेन्थ,एक सीपीयू की मेमोरी एड्रेसिंग क्षमता, एक कम्प्यूटर की प्रोसेसिंग स्पीड, माईक्रो प्रोसेसर, सिंगलचिप माईक्रो कम्प्यूटर(माईक्रो कन्ट्रोलर)

इकाई– पंचम

सीपीयू की सामान्य संरचना, इन्सट्रक्शन फार्मेट एवं डेटा ट्रान्सफर इन्सट्रक्शन, डेटा मेनीप्यूलेशन इन्सट्रक्शन्स एवं प्रोग्राम कन्ट्रोल इन्सट्रक्शन। प्रोसेसर के प्रकार : अक्यूम्लेटर आधारित मशीन, स्टेक आधारित मशीन एवं जनरल परपज रजिस्टर आधारित मशीन। एड्रेसिंग मोड्स।

डाटा ट्रान्सफर स्कीन्स :(1) प्रोग्राम्स डाटा ट्रान्सफर : synchronous, asynchronous एवं interrupt driven data transfer :(2) Direct memory access Data transfer: Cycle stealing block transfer and burst mode of data transfer.

Text book

1. Digital logic and Computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K.Taxali
4. Fundamentals of computers by P.K.Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K.Basandra

7.Computers Fundamentals and Architecture by B.Ram

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
बी.एस.सी. प्रथम कम्प्यूटर विज्ञान

द्वितीय प्रश्न पत्र
प्रोग्रामिंग इन सी

अधिकतम अंक : 42.5 **न्यूनतम अंकः 15**

इकाई– प्रथम

प्रोग्राम लेग्वेज का वर्गीकरण : प्रोसीजरल लेग्वेज, प्रोवलम ओरियन्टेड लेग्वेज, नान प्रोसीजरल लेंग्वेज। स्टेक्चर्स प्रोग्रामिंग की अवधारणा – माड्यूलर प्रोग्राम : टाप डाऊन विशलेषण, बॉटम अप विशलेषण स्ट्रेक्चर प्रोग्रामिंग । कम्प्यूटर के द्वारा प्रोवलम को हल करना– प्रोवलम की परिभाषा एवं विश्लेषण , प्रोवलम डिजाईन, कोडिंग, कम्पाईलेशन, डीबगिंग एवं टेस्टिंग, डाक्यूमेन्टेशन, इम्प्लीमेन्टेशन एवं रखरखाव।

इकाई– द्वितीय

सी लेग्वेज का परिचय– कान्सटेन्ट, वेरियेवल्स, कीवर्डस, डाटा टाईप्स, ऑपरेटर्स, एक्सप्रेशन्स, ऑपरेटर प्रेसीडेन्स एवं एसोसिएटिविटी। सी प्रोग्राम का प्रारूप–वेरिवल को परिभाषित करना एवं वेरिवल को स्थिरांक के रूप में परिभाषित करना।

इकाई– तृतीय

इनपुट आउटपुट आपरेटर्स का रखरखाव–फार्मेटेड एवं अन फार्मेटेड, कन्ट्रोल स्टेटमेन्टस, ब्रान्चिंग, जम्पिंग एवं लूपिंग, स्कोप के नियम, स्टोरेज क्लास।

इकाई– चतुर्थ

एरै (सिंग्ल एवं डबल डाईमेन्शनल), फंक्शन– यूजा द्वारा परिभाषित फंक्शन, स्टेन्डर्ड फंक्शन, फक्शन के प्रकार। फंक्शन में अरग्यूमेन्ट पास करना , रिकर्शन, पाईन्टर : आपरेटर्स डिक्लेरेशन, पाईन्टर अर्थमेटिक, एरै आफ पाईन्टर। स्ट्रेक्चर्स–डिक्लरिंग, एक्सेसिंग, इनिशियलाईजिंग, एरै आफ स्ट्रेक्चर्स।

इकाई– पंचम

सी में फाईल हेण्डलिंगः डाटा फाईल को ओपन एवं क्लोज करना, डाटा फाईल में डाटा प्रविष्ट करना, ग्राफिक्स प्रोग्रामिंग– परिचय, फंक्शन्स, स्टायलिस लाईन्स, ड्राइंग एवं फिलिंग इमेजस, पैलेट्स एवं कलर, जस्टीफाईग टेक्स, बिट आफ एनीमेशन।

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Text Books-

Let us C by YashwantKanetkar IV Edition
ANSI C by E. Balagurusamy
Programming in C by S.S. Bhatia

Reference Books-

How to design Programs-An Introduction to programming and computing- Felleisen, et,al, PHI Publication
Introduction to Algorithms by Cormen.PHI
Programming in C: Denis Ritchie

Suggested list of programs for practical

1.Write a program to print digits of entered number in reverse order.
2.Write a program to print sum of two matrices.
3.Write a program to print subtraction of two matrices.
4.Write a program to print multiplication of two matrices.
5.Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation .
7. Write a program for Marksheet.
8. Write a programme for finding the sum of given matrices of order m x n
9. Write a programme for finding the multiplication of given matrices of order m x n
10.Write a program to generate even/odd series from 1 to 100.
11.Write a program to find area of a circle, rectangle, square using case.
12.Write a program to check whether a given number is even or odd.
13.Write a program whether a given number is prime or not.
14.Write a program for call by value and call by reference.
15.Write a recursive program to calculate factorial of a given number.
16.Write a program to generate a series

```
1+1/1!+2/2!+3/3!+-------------+n/n!
```

17.Write a program to create a pyramid structure

```
*
**
***
****
```

18.Write a program to create a pyramid structure

```
1
12
123
1234
```

19.Write a program to create a pyramid structure

```
1
22
333
4444
```

20.Write a program to reverse a string.
21.Write a program to find whether a given string is PALINDROME or not.
22.Write a program to input 10 numbers add it and find it's average.

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23. Write a program to generate series
    1+1/2!+1/3!+----------+1/n!
24. WAP to print table of any number.
25. WAP to print Fibonacci series
26. WAP to find length of string without using function.
27. WAP to perform all arithmetic operations using case statement.
28. WAP to check entered number is Armstrong or not.

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18

बी.एस.सी. द्वितीय कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र
ऑवजेक्ट ओरियन्टेड प्रोग्रामिंग कन्सेप्ट यूजिंग C++

अधिकतम अंक : 42.5 **न्यूनतम अंकः 15**

इकाई– प्रथम

C++ का परिचय : प्रोग्रामिंग पेराडिम, ऑवजेक्ट ओरियन्टेड प्रोग्रामिंग के मूल अवधारणा, ऑवजेक्ट ओरियन्टेड प्रोग्रामिंग के लाभ। C++ में इनपुट एवं आउटपुट : प्री डिफाईन्ड स्ट्रीम, अन फार्मेटेड कन्सोल इनपुट/आउटपुट संक्रियाऐं, फार्मेटेड कन्सोल इनपुट/आउटपुट संक्रियाऐं

इकाई– द्वितीय

C++ के डिक्लेरेशन्स : C++ प्रोग्राम के घटक, टोकन के प्रकार, कीवर्डस, आईडेन्टीफायर, डाटा टाईप्स, कान्सटेन्ट, आपरेटर, आपरेटर की प्राथमिकता, रिफ्रेंशिंग एवं डीरिफ्रेंशिंग आपरेटर्स, स्कोप एक्सेस आपरेटर। कन्ट्रोल स्ट्रक्चर : डिसिजन मेकिंग स्टेटमेन्ट, लूपिंग स्टेटमेन्ट।

इकाई– तृतीय

फक्शंनः main(),फंशन के घटक, पासिंग आर्गूमेन्ट[वेल्यू, एड्रेस, रिफरेन्श],इन लाईन फंक्शनस, फंक्शन ओवर लोडिंग [सावधानी, सिद्धांत], लायब्रेरी फंक्शन।

क्लासेस एवं आवजेक्टः डिक्लेरिंग [क्लासेस, आवजेक्ट], एक्सेसिंग क्लास मेमवर्स, कीवर्ड [पब्लिक, प्राईवेट,प्रोटेक्टेड], डिफाईनिंग मेम्बर फंक्शन[मेम्बर फंक्शन इनसाईड द क्लास, मेम्बर फंक्शन आउटसाईड द क्लास], स्टेटिंक मेम्बर फंक्शन्स एवं वेरियेवल, फ्रेन्ड फंक्शन, फ्रेन्ड क्लास, ओवर लोडिंग मेम्बर फंक्शन।

इकाई– चतुर्थ

कन्सट्रक्टर्स एवं डिस्ट्रक्टर्स : गुणधर्म, अनुप्रयोग, कन्सट्रक्टर्स आरगुमेन्ट के साथ, ओवर लोडिंग कन्सट्रक्टर, कन्सट्रक्टर्स के प्रकार।

आपरेटर ओवरलोडिंगःओवरलोडिंग यूनरी आपरेटर, वायनरी आपरेटर।

इनहेरीटेन्सः एक्सेस स्पेसीफायर, पब्लिक इनहेरीटेन्स, प्राईवेट इनहेरीटेन्स, प्रोटेक्टेड डाटा प्राईवेट इनहेरीटेन्स के साथ, इनहेरीटेन्स के प्रकार[सिंगल, मल्टीपल,हिरारचिकल,मल्टीलेवल,हाईब्रिड, मल्टीपाथ],वर्चुअल वेस क्लास।

इकाई– पंचम

पाईन्टर एवं एरेः पाईन्टर डिक्लेरेशन पाईन्टर टू क्लास एवं आव्जेक्ट।

28/4/17

R. K. Kaler
28-4-2017

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28.4.17

एरैः डिक्लेरेशन एवं इनीसिलाईजेशन, एरै आफ क्लासेस।

पालीमोरफिजमः स्टेटिक(अर्ली) बाईडिंग, डायनामिक(लेट) बाईडिंग, बर्चुअल फंक्शन, प्योर बर्चुअल फंक्शन

Text books:

Object-Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane.

E. Balagurusamy: object oriented programming in C++

Reference Books:

Herbert Schildt: C++ the complete Reference- TMH publication.

Robert Lafore: Object Oriented Programming in C++.

Suggested list of programs for practical

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is Prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix.
9. Write a program to print :

```
*
**
***
****
```

10. Write a program to print :

```
1
2 2
3 3 3
```

11. Write a program to print :

```
1
2 3
4 5 6
```

12. Write a program to check whether entered string is palindrome or not.
13. Write a program to print Fibonacci series.
14. Write a program to find factorial of a given number.
15. Write a program to demonstrate use of static data member.
16. Write a program to demonstrate use of a static member function.
17. Write a program to create array of objects.
18. Write a program to demonstrate use of friend function.

Approved 28-4.17 28/4/17

R.K. Kaler
28-4-017

19. Write a program to illustrate use of copy constructor.
20. Write a program to demonstrate constructor overloading.
21. Write a program to illustrate use of destructor.
22. Write a program to overload a unary operator.
23. Write a program to overload a binary operator.
24. Write a program to demonstrate single Inheritance.
25. Write a program to demonstrate multiple Inheritance.
26. Write a program to demonstrate multilevel Inheritance.
27. Write a program to demonstrate hierarchical inheritance.
28. Write a program to demonstrate hybrid Inheritance.
29. Write a program to demonstrate the use of function overloading.
30. Write a program to demonstrate the use of inline member function.
31. Write a program to demonstrate the use of parameterized constructor.

R.K. Katare
28-4-2017

28.4.17

A. Dubey
28.4.17

(Rozi Yadav)

28/4/17 Rajiv Pandey 28/4 28.4.17 28/4/17

28/4

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
बी.एस.सी. द्वितीय कम्प्यूटर विज्ञान
द्वितीय प्रश्न पत्र
डाटा स्ट्रक्चर्स

अधिकतम अंक : 42.5 **न्यूनतम अंक: 15**

इकाई– प्रथम

डाटा स्ट्रक्चर की अवधारणा एवं एल्गोरिथम, एब्सट्रेक्ट डाटा स्ट्रक्चर, स्टेक से परिचय एवं स्टेक पर प्राथमिक संक्रिया, स्टेक एक एब्सट्रेक्ट डाटा टाईप, स्टेक का अनुप्रयोग(infix,prefx,postfix & recursion) Queue से परिचय, Queue पर प्राथमिक संक्रिया, circular Queue, De Queue, Priority Queue & Queue के अनुप्रयोग

इकाई– द्वितीय

linked list का परिचय, linked list पर प्राथमिक संक्रिया, linked list के प्रयोग से स्टेक एवं Queue का निर्माण, Doubly linked list एवं सरक्यूलर लिंक लिस्ट, लिंक लिस्ट का अनुप्रयोजन

इकाई– तृतीय

Tree: प्राथमिक शब्दाबली,बायनरी ट्री, ट्री को एरै एवं लिंक्ड लिस्ट में प्रदर्शित करना, बायनरी ट्री में प्राथमिक संक्रीयाऐं, बायनरी ट्री ट्रवर्सलः इनऑडर, प्रीऑडर, पोस्टऑडर, बायनरी ट्री के अनुप्रयोग, Threaded Binary Tree ,AVL Tree, ट्री का बायनरी ट्री के रूप में प्रदर्शन।

इकाई– चतुर्थ

सीक्वेन्शियल सर्च, वाईनरी सर्च, इन्सर्शन सार्ट, सिलेक्शन सार्ट , क्विकसार्ट, बबल सार्ट,हीप सार्ट, सॉटिंग विधियों में तुलना ।

इकाई– पंचम

हेश टेबल, कॉलीजन रिसाल्यूशन तकनीक, ग्राफ का परिचय, परिभाषा, शब्दाबली, डायरेक्टेड, अनडायरेक्टेड एवं वेटेडग्राफ, ग्राफ का प्रस्तुतीकरण, ग्राफ ट्रवर्सल– डेप्थ फर्स्ट, ब्रेडथ फर्स्ट सर्च, स्पेनिंग ट्री, न्यूनतम स्पेनिंग ट्री, सार्टेस्ट पाथ एलगोरेथम।

Text Books-

Data Structures through C(A Practical Approach) G.S. Baluja

Data Structure: By Lipschuists (Schaum"s Outline Series)

Data Structure: By Trembley &Sorrenson

Reference Books-

Fundamental of Data Structure ByS.Sawhney& E. Horowitz

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R.K. Kale
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Yadav

Chaubey

28.4.17

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of Programs for practical

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting,
6. Write a program for quick sorting.
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in the singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.

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28-4-2017

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
बी.एस.सी. तृतीय वर्ष कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र
डाटाबेस मैनेजमेन्ट सिस्टम

अधिकतम अंक : 42.5 **न्यूनतम अंकः 15**

इकाई– प्रथम

डाटाबेस सिस्टम का उद्देश्य, डाटा के व्यूह, डाटा मॉडल्स : रिलेशनल्स, नेटवर्क,हिराचिकल, इन्शटेन्सेस एवं स्कीमा, डाटा डिकस्नरी, डाटावेज लेग्वेज के प्रकारः डीडीएल,डीएमएल,डीबीएमएस की संरचना, डीबीएमएस के लाभ एवं हानी, 3– स्तरीय आरकिटेक्चरल संरचना : एक्टनल,कन्सेक्चुअल एवं इन्टर्नल लेवल्स

इकाई– द्वितीय

एन्टिटी रिलेशनशिप मॉडल के कन्सेक्चुअल डिजाईन टूल्स के रूप में : एन्टिटी एवं एन्टीटी सेट, रिलेशनशिप एवं रिलेशनशिप सेट, एट्रीब्यूट एवं मेपिंग कन्शट्रेन्ट, कुन्जी, ईआर डायग्रामः स्ट्रॉग एवं वीक एनट्रीस, जनरलाईजेशन, स्पेसिलाईजेशन एवं एग्रीकेशन, रिड्यूसिंग ईआर डायग्राम टू टेबलस

इकाई– तृतीय

सेट थ्योरेटिक नोटेशन के मूलरूप सिद्धांत : रिलेशन,डोमेन्स, एट्रीब्यूटस, ट्यूपल्स, कुन्जी की अवधारणा– प्राईमरी कुन्जी,सुपर कुन्जी, आल्टर्नेट कुन्जी, केन्डीडेट कुन्जी, फारेन कुन्जी, समग्रता के मूलभूत नियम– एन्टीटी एवं रेफरेसियल समग्रता, एक्सटेंशन एवं इनटेंशन,रिलेशनल एलजेब्राः सिलेक्ट, प्रोजेक्ट,कारटीशियन प्रोडक्ट, ज्वाईन के विभिन्न प्रकारः थीटा, इक्यू, नेचुरल,आउटर ज्वाईनस, सेट ऑपरेशन।

इकाई– चतुर्थ

फंक्शन डिपेन्डेंसी, गुड एवं बेड डिकम्पोजिशन एवं डाटावेज एक एनार्मलाईस जैसा : बेड डिजाईन के प्रभाव, यूनीवर्सल रिलेशन,नार्मलाईजेशन : 1NF, 2NF,3NF&BCNF नार्मल फार्म, मल्टीवेल्यूड डिपेन्डेन्सी, ज्वाईन डिपेन्डेन्सी, 4NF, 5NF

इकाई– पंचम

मूल अवधारणाः इनडेक्सिंग एवं हेस्हिंग, बी–ट्री इन्डेक्स फाईल, हेसिंगः स्टेटिक एवं डायनामिक हेश फलन, एसक्यूएल में इन्डेक्स की परिभाषाः मल्टीपल की एक्सेस।

Text Books-

Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication
Database System Concepts by Henry Korth and A. Silberschatz.

Reference Books- An Introduction to Database System by Bipin Desai

An Introduction to Database System by C.J.Date.

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28-4-17

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.

15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation'. Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.

20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'newsalary'
24. List the employee number of employee who belone to department 10,20.
25. List the employye no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two 'aa' in the name
29. Print the name , emp no. sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

28/4/17

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28-4-2017

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28/4

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

बी.एस.सी. तृतीय वर्ष कम्प्यूटर विज्ञान
द्वितीय प्रश्न पत्र
ऑपरेटिंग सिस्टम कन्सेप्ट्स

अधिकतम अंक : 42.5 **न्यूनतम अंकः 15**

इकाई– प्रथम

आपरेटिंग सिस्टम : परिभाषा, इसके अवयव, आपरेटिंग सिस्टम की उत्पत्ती, इसके प्रकार : बैच, मल्टीप्रोग्रामिंग, मल्टीटास्किंग, मल्टी प्रोसेसर, रियल टाइम,क्लाइंट सर्वर, पियर टू पियर , डिस्ट्रीब्यूटेड, क्लस्टर्ड, आपरेटिंग सिस्टम सर्विसेज, सिस्टम कॉल, I/O का प्रोटेक्शन, मेमोरी और सीपीयू।

इकाई– द्वितीय

प्रोसेस सेड्यूलिंग : प्रोसेस के सिद्धांत , प्रोसेस की अवस्था, पीसीबी, प्रोसेस लाइफ सायकल, आपरेशन आन प्रोसेस, कांटेक्स्ट स्विच, शेडयूलर के प्रकार CPU burst-I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue, निर्धारण माडलिंग के द्वारा एल्गोरिथम का मूल्यांकन।

इकाई– तृतीय

मेमोरी मैनेजमेन्टः एड्रेस वाइंडिंग, लाजिकल एवं फिजिकल ऐड्रेस स्पेस, डायनामिक लोडिंग और लिंकिंग। कन्टीन्यूअस मेमोरी एलोकेशन : स्टेटिक और डायनामिक पार्टीशन मेमोरी, फ्रेगमेंटेशन, स्वेपिंग रिलोकेशन, कम्पेक्शन, प्रोटेक्शन। नॉन कन्टीन्यूअस मेमोरी एलोकेशन : पेजिंग, सिग्मेन्टेशन। वर्चुअल मेमोरी : डिमांड पेजिंग, पेज फाल्ट, पेज रिप्लेशमेन्ट एल्जोरिथम्स– FIFO, LRU, Optimal. थ्रासिंग, पेज फाल्ट फ्रिक्वेन्सी।

इकाई– चतुर्थ

इंटरप्रोसेस कम्यूनिकेशनः सिंक्रोनाइजेशन की आवश्यकता, डेडलॉक– परिभाषा, एवायडेंश, प्रिवेन्शन, डिटेक्शन और रिकवूरी, डिस्क आर्गनाईजेशन, डायरेक्ट्री स्ट्रक्चर, डिस्क स्पेस मैनेजमेंट– कंटिग्यूअस और नॉन कंटिन्यूअस एलोकेशन स्ट्रेटजी, डिस्क एड्रेस ट्रांसलेशन, डिस्क कैचिंग, डिस्क सेडयूलिंग एल्गोरिथम, डिवाईस मैनेजमेंट : डेडीकेटेड डिवाईस, शेयर डिवाईस, सिक्योरिटी और प्रोटेक्शनः सिक्योरिटी– थ्रेट्स और गोल, प्रवेश का प्रयास, सिक्योरिटी नितियॉ और तंत्र, प्रमाणीकरण , प्रोटेक्शन एक्सेस कन्ट्रोल।

इकाई– पंचम

Linux: Linux का इतिहास और विशेषताऐं Linux संरचना, Linux फाईल सिस्टम, हार्डवेयर आवश्यकता, Linux स्टेण्डर्ड डायरेक्ट्रीज, Linux Kernel. Linux की किया विधि : KDE एवं Gnome, ग्राफिकल इन्टरफेस, Linux में शेल के प्रकार, Vi एडीटर, Linux कमाण्ड्स, Linux में फाईल की सुरक्षा।

R. K. Katare 28-4-2017

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TEXT BOOKS AND REFERENCE BOOKS

1. Operating system Concepts: by Silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

Suggested Practical

Basic Linux Commands and vi editor

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Rajesh Pandey
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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

Class: B.Sc (Computer Science) for Private

I Year	Theory	Total	Practical	Grand Total
Fundamentals of Computers	50	100	50	150
Programming in C	50			
II Year	50			
Object Oriented Programming Concept using C++	50	100	50	150
Data structures	50			
III Year	50			
Database Management System	50	100	50	150
Operating System Concepts	50			
Grand Total				**450**

Remark : (i)Each theory paper will contain five objective type question of 1 mark and
(ii) Five short answer type question of 3 marks and
(iii) Five long answer type question of 6 marks, with internal choice in (ii) and (iii)

R.K. Katare
28-4-2017

Chandel
28/4/2017

28.4.17

Chaubey
28.4.17

Rajesh Pandey
28.4.17

28.4.17

(Raji Yadav)
28.04.17

28/4/17

(Dr. S. Kurariya)
29/4/17

28/4/17

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. I YEAR COMPUTER SCIENCE
PAPER I: FUNDAMENTALS OF COMPUTERS

Max Marks : 50 **Min Marks:17**

UNIT I

Block diagram of computer: input unit, output unit, CPU, memory unit, generations of computers, types of Computers: desktop, laptop, palmtop, and workstations & super computers. All types of input and output devices. hardware, software and firmware.

Windows: features of windows – desktop, start menu, control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows.

UNIT II

Word: What is word processing, creating documents in MS-Word, formatting features of MS-Word, standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures, clipboard, graphs, print formatting, page numbering and printing documents.

Excel - Introduction to workbook and worksheet. Entering information in a worksheet - numbers, formula, etc., saving a workbook, editing cells, using commands and functions, moving and copying, inserting and deleting rows and columns, creating charts. Page setup: margins, adding headers & footers before printing, print preview of worksheet, removing grid lines from printout, printing the title rows.

UNIT III

Number system: decimal, binary, octal, hexadecimal, conversions from one base to another base. Codes: ASCII code, EBCDIC code, Gray code. Boolean algebra, de -morgan's theorem, binary arithmetic: - addition, subtraction, multiplication & division, unsigned binary numbers, signed magnitude numbers, 1's complement & 2's complement representation of numbers, 2's complement arithmetic. Boolean functions & truth tables, SOP, POS form, minterms/maxterms, simplification of logic circuits using boolean algebra and karnaugh maps. Logic gates: - AND, OR, NOT, NAND, NOR, X -OR and X -NOR gates, their symbols and truth tables, circuit design with gates: adder/subtractor circuit.

UNIT IV

Memory cell, primary memory: RAM, static and dynamic RAM, ROM, PROM, EPROM, EEPROM, cache memory, secondary memory and its types, virtual memory concept, memory accessing methods: serial and random access. Data bus, control bus &address bus. Word length of a computer, memory addressing capability of a cpu, processing speed of a computer, microprocessors, single chip microcomputers (microcontrollers).

UNIT V

General architecture of a CPU, instruction format, and data transfer instructions, data manipulation instructions and program control instructions. Types of CPU organization: accumulator based machine, stack based machine and general- purpose register based machine, addressing modes, data transfer schemes: (i) programmed data transfer: synchronous, asynchronous and interrupt driver data transfer (ii) direct memory access data transfer: Cycle stealing block transfer and burst mode of data transfer.

R.K. Kater
28-4-2017

Chandel
28.4.2017

Rajput
28.4.17

Chaubey
28.4.17

Rajesh Pandey

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Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
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Session 2017-18

Text book

1. Digital logic and Computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K.Taxali
4. Fundamentals of computers by P.K.Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K.Basandra
7. Computers Fundamentals and Architecture by B.Ram

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table

R.K. Kataria
28-4-2017

Chandel
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Rajput
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Chaubey
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Rajesh Pandey
28.4.17

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(Rashi Yadav)

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. I YEAR COMPUTER SCIENCE
PAPER II: PROGRAMMING IN C

Max Marks : 50 **Min Marks:17**

UNIT-I

Classification of programming language: procedural languages, problem oriented languages, non-procedural languages. Structured programming concepts: modular programming: top-down analysis, bottom-up analysis, structured programming. Problem solving using computers: problem definition and analysis, problem design, coding, compilation, debugging and testing, documentation, implementation and maintenance.

UNIT-II

Introduction to C language: constants, variables, keywords, data types, operators, expressions, operator precedence and associativity. Structure of C program: variable declaration, declaration of variable as constant.

UNIT-III

Managing Input/Output Operators: Formatted and Unformatted. Control Statements: Branching, Jumping & Looping. Scope Rules, Storage Classes.

UNIT-IV

Arrays (one and two dimensional). Functions: user defined function, standard function, categories in functions, passing arguments to a function, recursion. Pointers: operators, declaration, pointer to arithmetic, array of pointers. Structures: declaring, accessing, initializing, array of structures.

UNIT-V

File handling in c: opening and closing a data file, inserting data to data file. **Graphics programming** - introduction, functions, stylish lines, drawing and filling images, palettes and colours, justifying text, bit of animation.

Text Books-

How to solve it by Computers by R. G. Dromy, PHI
Let us C by Yashwant Kanetkar IV Edition
ANSI C by E. Balagurusamy
Programming in C by S.S. Bhatia

Reference Books-

How to design Programs-An Introduction to programming and computing- Felleisen, et,al, PHI Publication
Introduction to Algorithms by Cormen.PHI
Programming in C: Denis Richie

R.K. Katare 28-4-2017
Chandel 28.4.17
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Rajesh Pandey 28.4.17
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Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

1.Write a program to print digits of entered number in reverse order.
2.Write a program to print sum of two matrices.
3.Write a program to print subtraction of two matrices.
4.Write a program to print multiplication of two matrices.
5.Write a program to demonstrate concept of structure.
6.Write a program for finding the root of a Quadratic Equation .
7.Write a program for Marksheet.
8.Write a programme for finding the sum of given matrices of order m x n
9.Write a programme for finding the multiplication of given matrices of order m x n
10.Write a program to generate even/odd series from 1 to 100.
11.Write a program to find area of a circle, rectangle, square using case.
12.Write a program to check whether a given number is even or odd.
13.Write a program whether a given number is prime or not.
14.Write a program for call by value and call by reference.
15.Write a recursive program to calculate factorial of a given number.
16.Write a program to generate a series
1+1/1!+2/2!+3/3!+-------------+n/n!
17.Write a program to create a pyramid structure

```
*
**
***
****
```

18.Write a program to create a pyramid structure

```
1
12
123
1234
```

19.Write a program to create a pyramid structure

```
1
22
333
4444
```

20.Write a program to reverse a string.
21.Write a program to find whether a given string is PALINDROME or not.
22.Write a program to input 10 numbers add it and find it's average.
23.Write a program to generate series
1+1/2!+1/3!+----------+1/n!
24.WAP to print table of any number.
25.WAP to print Fibonacci series
26.WAP to find length of string without using function.
27.WAP to perform all arithmetic operations using case statement.
28.WAP to check entered number is Armstrong or not.

R.K. Ketare 28-4-2017
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Chandel 28.4.17
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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

B.Sc. II YEAR COMPUTER SCIENCE

PAPER I: OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

Max Marks : 50 **Min Marks:17**

UNIT I

Introduction to C++: Programming paradigms, Key concepts of Object-oriented Programming, Advantages of OOP's. Input and Output in C++: Pre-defined streams, Unformatted console I/O operations, formatted console I/O operations.

UNIT-II

C++ Declarations: Parts of C++ Program, types of Tokens, Keywords, Identifiers, data types, constants, Operators, Precedence of operators, referencing and dereferencing operators, scope access operator. Control structures: Decision Making Statements, looping statement.

UNIT-III

Functions: main (), parts of function, passing arguments: value, address, reference, inline functions, function overloading: principles, precautions, library functions. Classes and objects: declaring classes and objects, accessing class members, keyword: public, private, protected, defining member functions: member function inside the class, member function outside the class, static member variables and functions, friend function, friend classes, overloading member functions.

UNIT-IV

Constructors and Destructors: characteristics, applications, constructors with arguments, overloading constructors, types of constructors. Operator overloading: overloading unary operator, binary operator. Inheritance: access specifiers: public inheritance, private inheritance, protected data with private inheritance, Types of inheritances: single, multiple, hierarchical, multilevel, hybrid, multipath, virtual base class.

UNIT-V

Pointers & arrays: pointer declaration, pointer to class & object, Array: declarations & initialization, arrays of classes. Polymorphism: Static(Early) binding, Dynamic (Late) Binding, virtual function, pure virtual function.

Text books:

Object-Oriented Programming with ANSI & Turbo C++ by Ashok N. Kamthane.
Object Oriented Programming in C++ by E. Balagurusamy

Reference Books:

C++ The complete Reference by Herbert Schildt, TMH publication.
Object Oriented Programming in C++ by Robert Lafore.

R.K. Katare 28-4-2017 N Dubey 28.4.17 Chander 28.4.17 28.4.17

(Ram Yadav) 28.4.17 28.04.17 28/4

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is Prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix.
9. Write a program to print :

```
*
**
***
****
```

10. Write a program to print :

```
1
2 2
3 3 3
```

11. Write a program to print :

```
1
2 3
4 5 6
```

12. Write a program to check whether entered string is palindrome or not.
13. Write a program to print Fibonacci series.
14. Write a program to find factorial of a given number.
15. Write a program to demonstrate use of static data member.
16. Write a program to demonstrate use of a static member function.
17. Write a program to create array of objects.
18. Write a program to demonstrate use of friend function.
19. Write a program to illustrate use of copy constructor.
20. Write a program to demonstrate constructor overloading.
21. Write a program to illustrate use of destructor.
22. Write a program to overload a unary operator.
23. Write a program to overload a binary operator.
24. Write a program to demonstrate single Inheritance.
25. Write a program to demonstrate multiple Inheritance.
26. Write a program to demonstrate multilevel Inheritance.

27. Write a program to demonstrate hierarchical inheritance.
28. Write a program to demonstrate hybrid Inheritance.
29. Write a program to demonstrate the use of function overloading.
30. Write a program to demonstrate the use of inline member function.
31. Write a program to demonstrate the use of parameterized constructor.

R.K. Katare 28-4-2017 Chaubey 28.4.17 Chandel 28.4.17 Rajput 28.4.17 28/4/17

Priyanka Pandey 28.4.17 Kumar 28.4.17 R. K. Yadav

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

B.Sc. II YEAR COMPUTER SCIENCE
PAPER II: DATA STRUCTURES

Max Marks : 50 **Min Marks:17**

UNIT-I
Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack and primitive operations on stack, stack as an abstract data type, stack application: infix, prefix, postfix and recursion, introduction to queues, primitive operation on queues, circular queue, dequeue , priority queue and applications of queue.

UNIT-II
Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.

UNIT-III
Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, binary tree representations of trees.

UNIT-IV
Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.

UNIT-V
Hash Table, Collision resolution technique, Introduction to graphs, Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.

Text Books-

Data Structure: By Lipschultz (Schaums Outline Series)
Data Structures through C (A Practical Approach) by G.S. Baluja
Data Structure: By Trembley & Sorrenson

Reference Books-

Fundamental of Data Structure By S.Sawhney & E. Horowitz

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Rajesh Pandey 28.4.17
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(Rossi Yadav) 28.4.17
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Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of Programs for practical

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting,
6. Write a program for quick sorting.
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in the singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.

R.K. Katare 28-4-2017

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. III YEAR COMPUTER SCIENCE
PAPER I: DATABASE MANAGEMENT SYSTEM

Max Marks : 50 **Min Marks:17**

UNIT-I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:-DDL, DML, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:-external, conceptual & internal levels.

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship and relationship set, attributes and mapping constraints, keys, ER diagram:-strong and weak entities, generalization, specialization & aggregation, reducing ER diagram to tables

UNIT-III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity ,extension and intention, relational algebra :select ,project, cartesian product, different types of joins: theta, equi, natural, outer joins, set operations.

UNIT-IV

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF &BCNF normal forms, Multivalued dependency, Join dependency, 4NF, 5NF.

UNIT-V

Basic concepts: -Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses.

Text Books-

Database System Concepts by Henry Korth and A. Silberschatz.
Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication

Reference Books-

An Introduction to Database System by Bipin Desai
An Introduction to Database System by C.J.Date.

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Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not ‘ford’, ‘jams’ or ‘jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from ‘a’
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having ‘d’ as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype ‘number’ & having size ‘5’ with default value 1000.

15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for ‘first bank corporation’. Display the record of employee whose name start with ‘s’ & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for ‘fbc’
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for ‘fbc’ and who earn more than 1000.

20. WAQ to increase the salary by 2000 and rename the column as “newsalary”
21. WAQ to find the name, street and city of all employee who works for ‘fbc’ and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as ‘newsalary’
24. List the employee number of employee who belone to department 10,20.
25. List the employye no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two ‘aa’ in the name
29. Print the name , emp no, sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. III YEAR COMPUTER SCIENCE
PAPER II: OPERATING SYSTEM CONCEPTS

Max Marks : 50 **Min Marks:17**

UNIT I

Operating system definitions, its components, evolution of operating system, types of operating systems: batch, multiprogramming, multitasking, multiprocessor, real time, client-server, peer-to-peer, distributed, clustered, operating system services, system calls, protection of I/O, memory and CPU.

UNIT II

Process scheduling: concept of a process, process states, PCB, process life cycle, operations on processes, context switch, types of schedulers, CPU burst- I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue. Performance evaluation of algorithms through deterministic modelling.

UNIT III

Memory Management: address binding, logical and physical address space, dynamic loading and linking. Contiguous memory allocation: static and dynamic partitioned memory, fragmentation, swapping relocation, compaction, protection. Non-contiguous memory allocation: Paging Segmentation. Virtual Memory: demand paging, page fault, page replacement algorithms- FIFO, LRU, optimal. Thrashing, page fault frequency.

UNIT IV

Interprocess communication need for synchronization, Deadlocks- definition, avoidance, prevention, detection and recovery. Disk organization, Directory structure, disk space management- contiguous and non-contiguous allocation strategies, disk address translation, disk caching, disk scheduling algorithms. Device Management: dedicated devices, shared devices. Security and proctection : security threats and goals, penetration attempts. Security policies and mechanisms, authentication, protection and access control.

UNIT V

Linux: History and features of Linux, Linux architecture, file system of Linux, hardware requirements, Linux standard directories, Linux Kernel.

Working with Linux: KDE and Gnome graphical interface, various types of shells available in Linux. Vi editor, Linux commands. File security in Linux.

TEXT BOOKS AND REFERENCE BOOKS

1. Operating system Concepts: by Silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

Suggested Practical

Basic Linux Commands and vi editor

R.K. Katare 28-4-2017 Chhuben 28.4.17 Chandel 28.4.17 Rajput 28.4.17 Chhuben 28.4.17

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Class: B.Sc (Computer Science) for Regular Student

I Year				**Theory**	**Total**	**Practical**	**Grand Total**
	Three Months	**Six Months**	**Total**				
Fundamentals of Computers	5	10	15	42.5	85	50	150
Programming in C				42.5			
II Year							
Object Oriented Programming Concept using C++	5	10	15	42.5	85	50	150
Data structures				42.5			
III Year							
Database Management System	5	10	15	42.5	85	50	150
Operating System Concepts				42.5			
Grand Total							**450**

Remark : (i) Each theory paper will contain five objective type question of 1 mark and
(ii) Five short answer type question of 2.5 marks and
(iii) Five long answer type question of 5 marks, with internal choice in (ii) and (iii)

R.K. Katere
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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18

B.Sc. I YEAR COMPUTER SCIENCE
PAPER I: FUNDAMENTALS OF COMPUTERS

Max Marks : 42.5

Min Marks:15

UNIT I
Block diagram of computer: input unit, output unit, CPU, memory unit, generations of computers, types of Computers: desktop, laptop, palmtop, and workstations & super computers. All types of input and output devices. hardware, software and firmware.

Windows: features of windows – desktop, start menu, control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows.

UNIT II
Word: What is word processing, creating documents in MS-Word, formatting features of MS-Word, standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures, clipboard, graphs, print formatting, page numbering and printing documents.

Excel - Introduction to workbook and worksheet. Entering information in a worksheet - numbers, formula, etc., saving a workbook, editing cells, using commands and functions, moving and copying, inserting and deleting rows and columns, creating charts. Page setup: margins, adding headers & footers before printing, print preview of worksheet, removing grid lines from printout, printing the title rows.

UNIT III
Number system: decimal, binary, octal, hexadecimal, conversions from one base to another base. Codes: ASCII code, EBCDIC code, Gray code. Boolean algebra, de -morgan's theorem, binary arithmetic: - addition, subtraction, multiplication & division, unsigned binary numbers, signed magnitude numbers, 1's complement & 2's complement representation of numbers, 2's complement arithmetic. Boolean functions & truth tables, SOP, POS form, minterms/maxterms, simplification of logic circuits using boolean algebra and karnaugh maps. Logic gates: - AND, OR, NOT, NAND, NOR, X -OR and X -NOR gates, their symbols and truth tables, circuit design with gates: adder/subtractor circuit.

UNIT IV
Memory cell, primary memory: RAM, static and dynamic RAM, ROM, PROM, EPROM, EEPROM, cache memory, secondary memory and its types, virtual memory concept, memory accessing methods: serial and random access. Data bus, control bus &address bus. Word length of a computer, memory addressing capability of a cpu, processing speed of a computer, microprocessors, single chip microcomputers (microcontrollers).

UNIT V
General architecture of a CPU, instruction format, and data transfer instructions, data manipulation instructions and program control instructions. Types of CPU organization: accumulator based machine, stack based machine and general- purpose register based machine, addressing modes, data transfer schemes: (i) programmed data transfer: synchronous, asynchronous and interrupt driver data transfer (ii) direct memory access data transfer: Cycle stealing block transfer and burst mode of data transfer.

R.K. Katare
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(Rani Yadav)

Kumar

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Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Text book

1. Digital logic and Computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K.Taxali
4. Fundamentals of computers by P.K.Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K.Basandra
7. Computers Fundamentals and Architecture by B.Ram

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table

R. K. Katare
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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

B.Sc. I YEAR COMPUTER SCIENCE
PAPER II: PROGRAMMING IN C

Max Marks : 42.5

Min Marks:15

UNIT-I
Classification of programming language: procedural languages, problem oriented languages, non-procedural languages. Structured programming concepts: modular programming: top-down analysis, bottom-up analysis, structured programming. Problem solving using computers: problem definition and analysis, problem design, coding, compilation, debugging and testing, documentation, implementation and maintenance.

UNIT-II
Introduction to C language: constants, variables, keywords, data types, operators, expressions, operator precedence and associativity. Structure of C program: variable declaration, declaration of variable as constant.

UNIT-III
Managing input/output operators: formatted and unformatted. Control statements: branching, jumping & looping, scope rules, storage classes.

UNIT-IV
Arrays (one and two dimensional). Functions: user defined function, standard function, categories in functions, passing arguments to a function, recursion. Pointers: operators, declaration, pointer to arithmetic, array of pointers. Structures: declaring, accessing, initializing, array of structures.

UNIT-V
File handling in C: opening and closing a data file, inserting data to data file. Graphics programming-introduction, functions, stylish lines, drawing and filling images, palettes and colours, justifying text, bit of animation.

Text Books-

How to solve it by Computers by R. G. Dromy, PHI
Let us C by Yashwant Kanetkar
ANSI C by E. Balagurusamy
Programming in C by S.S. Bhatia

Reference Books-

How to design Programs-An Introduction to programming and computing- Felleisen, et,al, PHI Publication
Introduction to Algorithms by Cormen, PHI
Programming in C: Denis Richie

R.K. Katare 28-4-2017
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Rajeev Pandey 28.4.17
Chanda 28.4.17
S Kumar 28/4/17
(Ranji Yadav)
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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices.
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation .
7. Write a program for Marksheet.
8. Write a programme for finding the sum of given matrices of order m x n
9. Write a programme for finding the multiplication of given matrices of order m x n
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series
    1+1/1!+2/2!+3/3!+-------------+n/n!
17. Write a program to create a pyramid structure
```
*
**
***
****
```
18. Write a program to create a pyramid structure
```
1
12
123
1234
```
19. Write a program to create a pyramid structure
```
1
22
333
4444
```
20. Write a program to reverse a string.
21. Write a program to find whether a given string is PALINDROME or not.
22. Write a program to input 10 numbers add it and find it's average.
23. Write a program to generate series
    1+1/2!+1/3!+----------+1/n!
24. WAP to print table of any number.
25. WAP to print Fibonacci series
26. WAP to find length of string without using function.
27. WAP to perform all arithmetic operations using case statement.
28. WAP to check entered number is Armstrong or not.

R.K. Katare 28-4-2017
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Chaubey 28.4.17
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Chandel 28.4.17
28.4.17
(Ranjit Yadav)
28/4/17
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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. II YEAR COMPUTER SCIENCE
PAPER I: OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

Max Marks : 42.5 **Min Marks:15**

UNIT I

Introduction to C++: programming paradigms, key concepts of object-oriented programming, advantages of Oop's. Input and output in C++: pre-defined streams, unformatted console I/O operations, formatted console I/O operations.

UNIT-II

C++ declarations: parts of C++ program, types of tokens, keywords, identifiers, data types, constants, operators, precedence of operators, referencing and dereferencing operators, scope access operator. Control structures: decision making statements, looping statement.

UNIT-III

Functions: main(), parts of function, passing arguments: value, address, reference, inline functions, function overloading: principles, precautions, library functions. Classes and objects: declaring classes and objects, accessing class members, keyword: public, private, protected, defining member functions: member function inside the class, member function outside the class, static member variables and functions, friend function, friend classes, overloading member functions.

UNIT-IV

Constructors and Destructors: characteristics, applications, constructors with arguments, overloading constructors, types of constructors. Operator overloading: overloading unary operator, binary operator. Inheritance: access specifiers: public inheritance, private inheritance, protected data with private inheritance, Types of inheritances: single, multiple, hierarchical, multilevel, hybrid, multipath, virtual base class.

UNIT-V

Pointers & arrays: pointer declaration, pointer to class & object, Array: declarations & initialization, arrays of classes. Polymorphism: Static(Early) binding, Dynamic (Late) Binding, virtual function, pure virtual function.

Text books:

Object-Oriented Programming with ANSI & Turbo C++ by Ashok N. Kamthane.
Object Oriented Programming in C++ by E. Balagurusamy

Reference Books:

C++ The complete Reference by Herbert Schildt, TMH publication.
Object Oriented Programming in C++ by Robert Lafore.

R.K. Katare 28-4-2017
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Chandel 28.4.17
28/4/17
(Rajni Yadav)
Chaubey 28.4.17
Kumar 28/4/17

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is Prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix.
9. Write a program to print :

```
*
**
***
****
```

10. Write a program to print :

```
1
2 2
3 3 3
```

11. Write a program to print :

```
1
2 3
4 5 6
```

12. Write a program to check whether entered string is palindrome or not.
13. Write a program to print Fibonacci series.
14. Write a program to find factorial of a given number.
15. Write a program to demonstrate use of static data member.
16. Write a program to demonstrate use of a static member function.
17. Write a program to create array of objects.
18. Write a program to demonstrate use of friend function.
19. Write a program to illustrate use of copy constructor.
20. Write a program to demonstrate constructor overloading.
21. Write a program to illustrate use of destructor.
22. Write a program to overload a unary operator.
23. Write a program to overload a binary operator.
24. Write a program to demonstrate single Inheritance.
25. Write a program to demonstrate multiple Inheritance.
26. Write a program to demonstrate multilevel Inheritance.
27. Write a program to demonstrate hierarchical inheritance.
28. Write a program to demonstrate hybrid Inheritance.
29. Write a program to demonstrate the use of function overloading.
30. Write a program to demonstrate the use of inline member function.
31. Write a program to demonstrate the use of parameterized constructor.

R.K. Katare 28-4-2017

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. II YEAR COMPUTER SCIENCE
PAPER II: DATA STRUCTURES

Max Marks : 42.5 **Min Marks:15**

UNIT-I

Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack and primitive operations on stack, stack as an abstract data type, stack application: infix, prefix, postfix and recursion, introduction to queues, primitive operation on queues, circular queue, dequeue , priority queue and applications of queue.

UNIT-II

Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.

UNIT-III

Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, binary tree representations of trees.

UNIT-IV

Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.

UNIT-V

Hash Table, Collision resolution technique, Introduction to graphs, Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.

Text Books-

Data Structure: By Lipschultz (Schaums Outline Series)
Data Structures through C (A Practical Approach) by G.S. Baluja
Data Structure: By Trembley & Sorrenson

Reference Books-

Fundamental of Data Structure By S.Sawhney& E. Horowitz

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of Programs for practical

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting,
6. Write a program for quick sorting.
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in the singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. III YEAR COMPUTER SCIENCE
PAPER I: DATABASE MANAGEMENT SYSTEM

Max. Marks : 42.5 **Min. Marks:15**

UNIT-I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:-DDL, DML, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:-external, conceptual & internal levels.

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship and relationship set, attributes and mapping constraints, keys, ER diagram:-strong and weak entities, generalization, specialization & aggregation, reducing ER diagram to tables

UNIT-III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity ,extension and intention, relational algebra: select, project, cartesian product, different types of joins: theta, equi, natural, outer joins, set operations.

UNIT-IV

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF &BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF.

UNIT-V

Basic concepts: -Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses.

Text Books-

Database System Concepts by Henry Korth and A. Silberschatz.
Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication

Reference Books-

An Introduction to Database System by Bipin Desai
An Introduction to Database System by C.J.Date.

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28/4/17

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.
15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation'. Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'newsalary'
24. List the employee number of employee who belone to department 10,20.
25. List the employyе no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two 'aa' in the name
29. Print the name , emp no, sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18

B.Sc. III YEAR COMPUTER SCIENCE

PAPER II: OPERATING SYSTEM CONCEPTS

Max. Marks : 42.5 **Min. Marks:15**

UNIT I

Operating system definitions, its components, evolution of operating system, types of operating systems: batch, multiprogramming, multitasking, multiprocessor, real time, client-server, peer-to-peer, distributed, clustered, operating system services, system calls, protection of I/O, memory and CPU.

UNIT II

Process scheduling: concept of a process, process states, PCB, process life cycle, operations on processes, context switch, types of schedulers, CPU burst- I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue. Performance evaluation of algorithms through deterministic modelling.

UNIT III

Memory Management: address binding, logical and physical address space, dynamic loading and linking. Contiguous memory allocation: static and dynamic partitioned memory, fragmentation, swapping relocation, compaction, protection. Non-contiguous memory allocation: Paging Segmentation. Virtual Memory: demand paging, page fault, page replacement algorithms- FIFO, LRU, optimal. Thrashing, page fault frequency.

UNIT IV

Interprocess communication need for synchronization, Deadlocks- definition, avoidance, prevention, detection and recovery. Disk organization, Directory structure, disk space management- contiguous and non-contiguous allocation strategies, disk address translation, disk caching, disk scheduling algorithms. Device Management: dedicated devices, shared devices. Security and proctection : security threats and goals, penetration attempts. Security policies and mechanisms, authentication, protection and access control.

UNIT V

Linux: History and features of Linux, Linux architecture, file system of Linux, hardware requirements, Linux standard directories, Linux Kernel.

Working with Linux: KDE and Gnome graphical interface, various types of shells available in Linux. Vi editor, Linux commands. File security in Linux.

TEXT BOOKS AND REFERENCE BOOKS

1. Operating system Concepts: by Silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

Suggested Practical
Basic Linux Commands and vi editor

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28/4

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
कक्षा बी.एस.सी. कम्प्यूटर विज्ञान स्वाध्यायी छात्रों हेतु

प्रथम वर्ष	सैद्धांतिक	योग	प्रायोगिक	कुल योग
Fundamentals of Computers	50	100	50	150
Programming in C	50			
द्वितीय वर्ष	50			
Object Oriented Programming Concept using C++	50	100	50	150
Data structures	50			
तृतीय वर्ष	50			
Database Management System	50	100	50	150
Operating System Concepts	50			
कुल योग				**450**

Remark : (i)Each theory paper will contain five objective type question of 1 mark and
(ii) Five short answer type question of 3 marks and
(iii) Five long answer type question of 6 marks, with internal choice in (ii) and (iii)

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18
बी.एस.सी. प्रथम कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र
फंडामेण्टल ऑफ कम्प्यूटर्स

अधिकतम अंक : 50 न्यूनतम अंकः 17

इकाई– प्रथम

कम्प्यूटर का ब्लॉक डायग्रामः इनपुट इकाई, आउटपुट इकाई, सी.पी.यू.,मेमोरी यूनिट, कम्प्यूटर के चरण, कम्प्यूटर के प्रकार : डेस्कटॉप, लेपटॉप, पॉमटाप, वर्कस्टेशन्स एवं सुपर कम्प्यूटर, सभी प्रकार की इनपुट एवं आउटपुट डिवाईस, हार्डवेयर,साफ्टवेयर एवं फर्मवेयर की अवधारणा

विन्डोज : विन्डोज के गुणधर्म– डेस्कटॉप,स्टार्ट मेन्यू,कन्ट्रोल पेनल, माय कम्प्यूटर, विन्डोज एक्सप्लोरर, एसेसरीज,मैनेजिंग मल्टीपल विन्डोज, डेस्कटॉप में आईकोन व्यवस्थित करना, फोल्डर को बनाना एवं व्यवस्थित करना, फाईल एवं ड्राईव को व्यवस्थित करना, लोगिंग ऑफ एवं विन्डोज शटडाउन

इकाई– द्वितीय

वर्डः वर्ड प्रोसेसिंग क्या है, एम.एस. वर्ड में डाक्यूमेन्ट बनाना, एम.एस. वर्ड के फामेटिंग फीचर्स, स्टेण्डर्ड टूलवार, ड्राईग टूलवार, टेबल्स एवं अन्य फीचर्स, मेलमर्ज, फाईल्स का इन्सर्शन, पिक्चर, क्लिप वोर्ड, ग्राफ, प्रिंट फार्मेटिंग, पेज नम्बरिंग एवं प्रिंटिंग डाक्यूमेन्ट्स।

एक्सेल : वर्कशीट एवं एक्सेल का परिचय, वर्कशीट में जानकारी को प्रविष्ट करना, नंबर्स, फार्मूला इत्यादी। वर्कबुक को सेव करना, एडिटिंग सेल्स, कमाण्ड एवं फंक्शन का उपयोग, मूविंग एवं कापिंग, रोज एवं कालम्स को इन्सर्ट एवं डीलिट करना, चार्ट बनाना, पेज सेटअप : मार्जिन, हेडर एवं फुटर को प्रिंटिंग से पहले जोड़ना, वर्कशीट का प्रिंट प्रिव्यू, प्रिंटआउट से ग्रिडलाईन अलग करना, टाईटल रो को प्रिन्ट करना।

इकाई– तृतीय

संख्या पद्धतिः डेसिमल,वायनरी,ऑक्टेल, हेक्साडेसिमल, संख्या पद्धति में एक आधार से दूसरे आधार में परिवर्तन करना।

कोड्स : ASCII कोड, EBCDIC कोड,ग्रे कोड,बूलियन एल्जेब्रा,डी मार्गन प्रमेय, वायनरी एर्थमेटिकः एडीशन, सब्सट्रेक्शन, मल्टीप्लीकेशन एवं डिवीजन, अनसाईन्ड बायनरी संख्यायें,साईन्ड मेग्नीट्यूड संख्यायें, संख्याओं का $1^{'s}$ काम्प्लीमेन्ट एवं $2^{'s}$ काम्प्लीमेन्ट में प्रदर्शन , $2^{'s}$ काम्प्लीमेन्ट अर्थमेटिक, बूलियन फण्शन एवं सत्यता सारणी, SOP,POS Form minterms/maxterms, बूलियन एलजेब्रा एवं karnaugh map के उपयोग से लाजिंक सर्किट का सरलीकरण करना।

Logic Gates: - AND, OR, NOT, NAND, NOR, X -OR एवं X -NOR gates व उनके चिन्ह एवं truth tables, gates से सर्किट डिजाइन: एडर/सब्ट्रेक्टर।

R.K. Kalare 28-4-2017

28.4.17

Dubey 28.4.17

Rajan Pandey 28/4

28/4

इकाई– चतुर्थ

मेमोरी सेल, प्राईमरी मेमोरी : RAM, स्टेटिक एवं डायनामिक RAM, ROM, PROM, EPROM, EEPROM Cache मेमोरी, सेकेण्ड्री मेमोरी एवं उनके प्रकार, वर्चुअल मेमोरी की संधारणा, मेमोरी एक्सेसिंग मेथर्ड: सीरियल एवं रेन्डम एक्सेस ।

डेटाबस, कन्ट्रोल बस एवं एड्रेस बस, कम्प्यूटर की वर्ड लेन्थ,एक सीपीयू की मेमोरी एड्रेसिंग क्षमता, एक कम्प्यूटर की प्रोसेसिंग स्पीड, माईको प्रोसेसर, सिंगलचिप माईको कम्प्यूटर(माईको कन्ट्रोलर)

इकाई– पंचम

सीपीयू की सामान्य संरचना, इन्सट्रक्शन फार्मेट एवं डेटा ट्रान्सफर इन्सट्रक्शन, डेटा मेनीप्यूलेशन इन्सट्रक्शन्स एवं प्रोग्राम कन्ट्रोल इन्सट्रक्शन। प्रोसेसर के प्रकार : अक्यूम्लेटर आधारित मशीन, स्टेक आधारित मशीन एवं जनरल परपज रजिस्टर आधारित मशीन। एड्रेसिंग मोड्स।

डाटा ट्रान्सफर स्कीन्स :(1) प्रोग्राम्स डाटा ट्रान्सफर : synchronous, asynchronous एवं interrupt driven data transfer :(2) Direct memory access Data transfer: Cycle stealing block transfer and burst mode of data transfer.

Text book

1. Digital logic and Computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K.Taxali
4. Fundamentals of computers by P.K.Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K.Basandra

7.Computers Fundamentals and Architecture by B.Ram

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table

Yadav

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28-4-2017

28.4.17

Dubey
28-4.17

Rajni Pandey
28/4

28/4/17

28/4

Department of Higher Education, Government of Madhya Pradesh
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Session 2017-18
बी.एस.सी. प्रथम कम्प्यूटर विज्ञान

द्वितीय प्रश्न पत्र
प्रोग्रामिंग इन सी

अधिकतम अंक : 50 **न्यूनतम अंकः 17**

इकाई– प्रथम

प्रोग्राम लेंग्वेज का वर्गीकरण : प्रोसीजरल लेंग्वेज, प्रोवलम ओरियन्टेड लेंग्वेज, नान प्रोसीजरल लेंग्वेज। स्टेक्चर्स प्रोग्रामिंग की अवधारणा – माड्यूलर प्रोग्राम : टाप डाऊन विशलेषण, बॉटम अप विशलेषण स्ट्रेक्चर प्रोग्रामिंग । कम्प्यूटर के द्वारा प्रोवलम को हल करना– प्रोवलम की परिभाषा एवं विश्लेषण , प्रोवलम डिजाईन, कोडिंग, कम्पाईलेशन, डीबगिंग एवं टेस्टिंग, डाक्यूमेन्टेशन, इम्प्लीमेन्टेशन एवं रखरखाव।

इकाई– द्वितीय

सी लेंग्वेज का परिचय– कान्सटेन्ट, वेरियेवल्स, कीवर्डस, डाटा टाईप्स, ऑपरेटर्स, एक्सप्रेशन्स, ऑपरेटर प्रेसीडेन्स एवं एसोसिएटिविटी। सी प्रोग्राम का प्रारूप–वेरिवल को परिभाषित करना एवं वेरिवल को स्थिरांक के रूप में परिभाषित करना।

इकाई– तृतीय

इनपुट आउटपुट आपरेटर्स का रखरखाव–फार्मेटेड एवं अन फार्मेटेड, कन्ट्रोल स्टेटमेन्टस, ब्रान्चिंग, जम्पिंग एवं लूपिंग, स्कोप के नियम, स्टोरेज क्लास।

इकाई– चतुर्थ

एरै (सिंग्ल एवं डबल डाईमेन्शनल), फंक्शन– यूजा द्वारा परिभाषित फंक्शन, स्टेन्डर्ड फंक्शन, फक्शन के प्रकार। फंक्शन में अरग्यूमेन्ट पास करना , रिकर्शन, पाईन्टर : आपरेटर्स डिक्लेरेशन, पाईन्टर अर्थमेटिक, एरै आफ पाईन्टर। स्ट्रेक्चर्स–डिक्लरिंग, एक्सेसिंग, इनिशियलाईजिंग, एरै आफ स्ट्रेक्चर्स।

इकाई– पंचम

सी में फाईल हेण्डलिंगः डाटा फाईल को ओपन एवं क्लोज करना, डाटा फाईल में डाटा प्रविष्ट करना, ग्राफिक्स प्रोग्रामिंग– परिचय, फंक्शन्स, स्टायलिस लाईन्स, ड्राइंग एवं फिलिंग इमेजस, पैलेट्स एवं कलर, जस्टीफाईग टेक्स, बिट आफ एनीमेशन।

R.K. Kelar 28-4-2017 28.4.17 Dubey 28-4-17

Text Books-

Let us C by YashwantKanetkar IV Edition
ANSI C by E. Balagurusamy
Programming in C by S.S. Bhatia

Reference Books-

How to design Programs-An Introduction to programming and computing- Felleisen, et,al, PHI Publication
Introduction to Algorithms by Cormen.PHI
Programming in C: Denis Ritchie

Suggested list of programs for practical

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices.
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation .
7. Write a program for Marksheet.
8. Write a programme for finding the sum of given matrices of order m x n
9. Write a programme for finding the multiplication of given matrices of order m x n
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series
    1+1/1!+2/2!+3/3!+-------------+n/n!
17. Write a program to create a pyramid structure

```
*
**
***
****
```

18. Write a program to create a pyramid structure

```
1
12
123
1234
```

19. Write a program to create a pyramid structure

```
1
22
333
4444
```

20. Write a program to reverse a string.
21. Write a program to find whether a given string is PALINDROME or not.
22. Write a program to input 10 numbers add it and find it's average.

R.K. Katare
28-4-2017

28.4.17

28.4.17

28/4

23. Write a program to generate series
    1+1/2!+1/3!+----------+1/n!
24. WAP to print table of any number.
25. WAP to print Fibonacci series
26. WAP to find length of string without using function.
27. WAP to perform all arithmetic operations using case statement.
28. WAP to check entered number is Armstrong or not.

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28-4-2017

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28-4-17

Yadav

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प्रथम प्रश्न पत्र
ऑवजेक्ट ओरियन्टेड प्रोग्रामिंग कन्सेप्ट यूजिंग C++

अधिकतम अंक : 50 **न्यूनतम अंकः 17**

इकाई– प्रथम

C++ का परिचय : प्रोग्रामिंग पेराडिम, ऑवजेक्ट ओरियन्टेड प्रोग्रामिंग के मूल अवधारणा, ऑवजेक्ट ओरियन्टेड प्रोग्रामिंग के लाभ। C++ में इनपुट एवं आउटपुट : प्री डिफाईन्ड स्ट्रीम, अन फार्मेटेड कन्सोल इनपुट/आउटपुट संकियाऐं, फार्मेटेड कन्सोल इनपुट/आउटपुट संकियाऐं

इकाई– द्वितीय

C++ के डिक्लेरेशन्स : C++ प्रोग्राम के घटक, टोकन के प्रकार, कीवर्डस, आईडेन्टीफायर, डाटा टाईप्स, कान्सटेन्ट, आपरेटर, आपरेटर की प्राथमिकता, रिफ्रेंशिंग एवं डीरिफ्रेंशिंग आपरेटर्स, स्कोप एक्सेस आपरेटर। कन्ट्रोल स्ट्रक्चर : डिसिजन मेकिंग स्टेटमेन्ट, लूपिंग स्टेटमेन्ट।

इकाई– तृतीय

फक्शनः main(),फंशन के घटक, पासिंग आर्गूमेन्ट[वेल्यू, एड्रेस, रिफरेन्श],इन लाईन फंक्शनस, फंक्शन ओवर लोडिंग [सावधानी, सिद्धांत], लायब्रेरी फंक्शन।

क्लासेस एवं आवजेक्टः डिक्लेरिंग [क्लासेस, आवजेक्ट], एक्सेसिंग क्लास मेमवर्स, कीवर्ड [पब्लिक, प्राईवेट,प्रोटेक्टेड], डिफाईनिंग मेम्बर फंक्शन[मेम्बर फंक्शन इनसाईड द क्लास, मेम्बर फंक्शन आउटसाईड द क्लास], स्टेटिंक मेम्बर फंक्शन्स एवं वेरियेवल, फ्रेन्ड फंक्शन, फ्रेन्ड क्लास, ओवर लोडिंग मेम्बर फंक्शन।

इकाई– चतुर्थ

कन्सट्रक्टर्स एवं डिस्ट्रक्टर्स : गुणधर्म, अनुप्रयोग, कन्सट्रक्टर्स आरगुमेन्ट के साथ, ओवर लोडिंग कन्सट्रक्टर, कन्सट्रक्टर्स के प्रकार।

आपरेटर ओवरलोडिंगःओवरलोडिंग यूनरी आपरेटर, वायनरी आपरेटर।

इनहेरीटेन्सः एक्सेस स्पेसीफायर, पब्लिक इनहेरीटेन्स, प्राईवेट इनहेरीटेन्स, प्रोटेक्टेड डाटा प्राईवेट इनहेरीटेन्स के साथ, इनहेरीटेन्स के प्रकार[सिंगल, मल्टीपल,हिरारचिकल,मल्टीलेवल,हाईब्रिड, मल्टीपाथ],वर्चुअल वेस क्लास।

इकाई– पंचम

पाईन्टर एवं एरैः पाईन्टर डिक्लेरेशन पाईन्टर टू क्लास एवं आव्जेक्ट।

एरैः डिक्लेरेशन एवं इनीसिलाईजेशन, एरै आफ क्लासेस।

Chaubey 28-4-17

28.4.17

28-4-2017

पालीमोरफिजमः स्टेटिक(अर्ली) बाईडिंग, डायनामिक(लेट) बाईडिंग, बर्चुअल फंक्शन, प्योर बर्चुअल फंक्शन

Text books:

Object-Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane.

E. Balagurusamy: object oriented programming in C++

Reference Books:

Herbert Schildt: C++ the complete Reference- TMH publication.

Robert Lafore: Object Oriented Programming in C++.

Suggested list of programs for practical

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is Prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix.
9. Write a program to print :
   ```
   *
   **
   ***
   ****
   ```
10. Write a program to print :
    ```
    1
    2 2
    3 3 3
    ```
11. Write a program to print :
    ```
    1
    2 3
    4 5 6
    ```
12. Write a program to check whether entered string is palindrome or not.
13. Write a program to print Fibonacci series.
14. Write a program to find factorial of a given number.
15. Write a program to demonstrate use of static data member.
16. Write a program to demonstrate use of a static member function.
17. Write a program to create array of objects.
18. Write a program to demonstrate use of friend function.
19. Write a program to illustrate use of copy constructor.
20. Write a program to demonstrate constructor overloading.

R.K.Kater
28-4-2017

28.4.17

28.4.17

28/4

21. Write a program to illustrate use of destructor.
22. Write a program to overload a unary operator.
23. Write a program to overload a binary operator.
24. Write a program to demonstrate single Inheritance.
25. Write a program to demonstrate multiple Inheritance.
26. Write a program to demonstrate multilevel Inheritance.
27. Write a program to demonstrate hierarchical inheritance.
28. Write a program to demonstrate hybrid Inheritance.
29. Write a program to demonstrate the use of function overloading.
30. Write a program to demonstrate the use of inline member function.
31. Write a program to demonstrate the use of parameterized constructor.

R.K. Katare 28-4-2017

28.4.17

Rajesh 28/4

28/4

Kumar 28/4/17

Dubey 28.4.17

28.4.17

28/4/17

Yadav

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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बी.एस.सी. द्वितीय कम्प्यूटर विज्ञान
द्वितीय प्रश्न पत्र
डाटा स्ट्रक्चर्स

अधिकतम अंक : 50 न्यूनतम अंक: 17

इकाई– प्रथम

डाटा स्ट्रक्चर की अवधारणा एवं एल्गोरिथम, एब्सट्रेक्ट डाटा स्ट्रक्चर, स्टेक से परिचय एवं स्टेक पर प्राथमिक संक्रिया, स्टेक एक एब्सट्रेक्ट डाटा टाईप, स्टेक का अनुप्रयोग(infix,prefx,postfix & recursion) Queue से परिचय, Queue पर प्राथमिक संक्रिया, circular Queue, De Queue, Priority Queue & Queue के अनुप्रयोग

इकाई– द्वितीय

linked list का परिचय, linked list पर प्राथमिक संक्रिया, linked list के प्रयोग से स्टेक एवं Queue का निर्माण, Doubly linked list एवं सरक्यूलर लिंक लिस्ट, लिंक लिस्ट का अनुप्रयोजन

इकाई– तृतीय

Tree: प्राथमिक शब्दाबली,बायनरी ट्री, ट्री को एरै एवं लिंक्ड लिस्ट में प्रदर्शित करना, बायनरी ट्री में प्राथमिक संक्रीयाऐं, बायनरी ट्री ट्रवर्सलः इनऑडर, प्रीऑडर, पोस्टऑडर, बायनरी ट्री के अनुप्रयोग, Threaded Binary Tree ,AVL Tree, ट्री का बायनरी ट्री के रूप में प्रदर्शन।

इकाई– चतुर्थ

सीक्वेन्शियल सर्च, वाईनरी सर्च, इन्सर्शन सार्ट, सिलेक्शन सार्ट , क्विकसार्ट, बबल सार्ट,हीप सार्ट, सॉटिंग विधियों में तुलना ।

इकाई– पंचम

हेश टेबल, कॉलीजन रिसाल्यूशन तकनीक, ग्राफ का परिचय, परिभाषा, शब्दाबली, डायरेक्टेड, अनडायरेक्टेड एवं वेटेडग्राफ, ग्राफ का प्रस्तुतीकरण, ग्राफ ट्रवर्सल– डेप्थ फर्स्ट, ब्रेडथ फर्स्ट सर्च, स्पेनिंग ट्री, न्यूनतम स्पेनिंग ट्री, सार्टेस्ट पाथ एलगोरेथम।

Text Books-

Data Structures through C(A Practical Approach) G.S. Baluja

Data Structure: By Lipschuists (Schaum‟s Outline Series)

Data Structure: By Trembley &Sorrenson

Reference Books-

Fundamental of Data Structure ByS.Sawhney& E. Horowitz

28/4/17

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28-4-17

Rajesh Pandey 28/4

R.K. Katare 28-4-2017

28-4-17

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of Programs for practical

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting,
6. Write a program for quick sorting.
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in the singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.

R.K. Katare
28-4-2017

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(Rajendra Yadav)
28.04.17

Department of Higher Education, Government of Madhya Pradesh
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As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18
बी.एस.सी. तृतीय वर्ष कम्प्यूटर विज्ञान
प्रथम प्रश्न पत्र
डाटाबेस मैनेजमेन्ट सिस्टम

अधिकतम अंक : 50 न्यूनतम अंकः 17

इकाई– प्रथम

डाटाबेस सिस्टम का उद्देश्य, डाटा के व्यूह, डाटा मॉडल्स : रिलेशनल्स, नेटवर्क,हिराचिकल, इन्शटेन्सेस एवं स्कीमा, डाटा डिकस्नरी, डाटावेज लेग्वेज के प्रकारः डीडीएल,डीएमएल,डीबीएमएस की संरचना, डीबीएमएस के लाभ एवं हानी, 3– स्तरीय आरकिटेक्चरल संरचना : एक्टनल,कन्सेक्चुअल एवं इन्टर्नल लेवल्स

इकाई– द्वितीय

एन्टिटी रिलेशनशिप मॉडल के कन्सेक्चुअल डिजाईन टूल्स के रूप में : एन्टिटी एवं एन्टीटी सेट, रिलेशनशिप एवं रिलेशनशिप सेट, एट्रीव्यूट एवं मेपिंग कन्शट्रेन्ट, कुन्जी, ईआर डायग्रामः स्ट्रॉग एवं वीक एनट्रीस, जनरलाईजेशन, स्पेसिलाईजेशन एवं एग्रीकेशन, रिड्यूसिंग ईआर डायग्राम टू टेबलस

इकाई– तृतीय

सेट थ्योरेटिक नोटेशन के मूलरूप सिद्धांत : रिलेशन,डोमेन्स, एट्रीब्यूटस, ट्यूपल्स, कुन्जी की अवधारणा– प्राईमरी कुन्जी,सुपर कुन्जी, आल्टर्नेट कुन्जी, केन्डीडेट कुन्जी, फारेन कुन्जी, समग्रता के मूलभूत नियम– एन्टीटी एवं रेफरेसियल समग्रता, एक्सटेंशन एवं इनटेंशन,रिलेशनल एलजेब्राः सिलेक्ट, प्रोजेक्ट,कारटीशियन प्रोडक्ट, ज्वाईन के विभिन्न प्रकारः थीटा, इक्यू, नेचुरल,आउटर ज्वाईनस, सेट ऑपरेशन।

इकाई– चतुर्थ

फंक्शन डिपेन्डेंसी, गुड एवं बेड डिकम्पोजिशन एवं डाटावेज एक एनार्मलाईस जैसा : बेड डिजाईन के प्रभाव, यूनीवर्सल रिलेशन,नार्मलाईजेशन : 1NF, 2NF,3NF&BCNF नार्मल फार्म, मल्टीवेल्यूड डिपेन्डेन्सी, ज्वाईन डिपेन्डेन्सी, 4NF, 5NF

इकाई– पंचम

मूल अवधारणाः इनडेक्सिंग एवं हेस्हिंग, बी–ट्री इन्डेक्स फाईल, हेसिंगः स्टेटिक एवं डायनामिक हेश फलन, एसक्यूएल में इन्डेक्स की परिभाषाः मल्टीपल की एक्सेस।

Text Books-

Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication
Database System Concepts by Henry Korth and A. Silberschatz.

Reference Books- An Introduction to Database System by Bipin Desai

An Introduction to Database System by C.J.Date.

(Raj Yadav)

R.K.Kaler 28-4-2017

28.4.17

Rajeem Pandey 28/4/17

Chhuben 28-4-17

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Department of Higher Education, Government of Madhya Pradesh
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As recommended by Central Board of Studies of Computer Science and Approved by H E the Governor of M.P.
Session 2017-18

Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.

15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation'. Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.

20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'newsalary'
24. List the employee number of employee who belone to department 10,20.
25. List the employye no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two 'aa' in the name
29. Print the name , emp no, sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

(Raj Yadav)

28/4/17

R.K. Katare
28-4-2017

28.04.17

Chhubey
28.4.17

Department of Higher Education, Government of Madhya Pradesh
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Session 2017-18

बी.एस.सी. तृतीय वर्ष कम्प्यूटर विज्ञान
द्वितीय प्रश्न पत्र
ऑपरेटिंग सिस्टम कन्सेप्ट्स

अधिकतम अंक : 50 **न्यूनतम अंकः 17**

इकाई– प्रथम

आपरेटिंग सिस्टम : परिभाषा, इसके अवयव, आपरेटिंग सिस्टम की उत्पत्ती, इसके प्रकार : बैच, मल्टीप्रोग्रामिंग, मल्टीटास्किंग, मल्टी प्रोसेसर, रियल टाइम,क्लाइंट सर्वर, पियर टू पियर , डिस्ट्रीब्यूटेड, क्लस्टर्ड, आपरेटिंग सिस्टम सर्विसेज, सिस्टम कॉल, I/O का प्रोटेक्शन, मेमोरी और सीपीयू।

इकाई– द्वितीय

प्रोसेस सेड्यूलिंग : प्रोसेस के सिद्धांत , प्रोसेस की अवस्था, पीसीबी, प्रोसेस लाइफ सायकल, आपरेशन आन प्रोसेस, कांटेक्स्ट स्विच, शेडयूलर के प्रकार CPU burst-I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue, निर्धारण माडलिंग के द्वारा एल्गोरिथम का मूल्यांकन।

इकाई– तृतीय

मेमोरी मैनेजमेन्टः एड्रेस वाइंडिंग, लाजिकल एवं फिजिकल ऐड्रेस स्पेस, डायनामिक लोडिंग और लिंकिंग। कन्टीन्यूअस मेमोरी एलोकेशन : स्टेटिक और डायनामिक पार्टीशन मेमोरी, फ्रेगमेंटेशन, स्वेपिंग रिलोकेशन, कम्पेक्शन, प्रोटेक्शन। नॉन कन्टीन्यूअस मेमोरी एलोकेशन : पेजिंग, सिग्मेन्टेशन। वर्चुअल मेमोरी : डिमांड पेजिंग, पेज फाल्ट, पेज रिप्लेशमेन्ट एल्जोरिथम्स– FIFO, LRU, Optimal. थ्रासिंग, पेज फाल्ट फ्रिक्वेन्सी।

इकाई– चतुर्थ

इंटरप्रोसेस कम्यूनिकेशनः सिंक्रोनाइजेशन की आवश्यकता, डेडलॉक– परिभाषा, एवायडेंश, प्रिवेन्शन, डिटेक्शन और रिकवूरी, डिस्क आर्गनाईजेशन, डायरेक्ट्री स्ट्रक्चर, डिस्क स्पेस मैनेजमेंट– कंटिग्यूअस और नॉन कंटिन्यूअस एलोकेशन स्ट्रेटजी, डिस्क एड्रेस ट्रांसलेशन, डिस्क कैचिंग, डिस्क सेडयूलिंग एल्गोरिथम, डिवाईस मैनेजमेंट : डेडीकेटेड डिवाईस, शेयर डिवाईस, सिक्योरिटी और प्रोटेक्शनः सिक्योरिटी– थ्रेट्स और गोल, प्रवेश का प्रयास, सिक्योरिटी नितियॉ और तंत्र, प्रमाणीकरण , प्रोटेक्शन एक्सेस कन्ट्रोल।

इकाई– पंचम

Linux: Linux का इतिहास और विशेषताऐं Linux संरचना, Linux फाईल सिस्टम, हार्डवेयर आवश्यकता, Linux स्टेण्डर्ड डायरेक्ट्रीज, Linux Kernel. Linux की किया विधि : KDE एवं Gnome, ग्राफिकल इन्टरफेस, Linux में शेल के प्रकार, Vi एडीटर, Linux कमाण्ड्स, Linux में फाईल की सुरक्षा।

R.K. Kalere
28-4-2017

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TEXT BOOKS AND REFERENCE BOOKS

1. Operating system Concepts: by Silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

Suggested Practical

Basic Linux Commands and vi editor

R.K. Kalra
28-4-2017

28.4.17

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Rajesh Pandey
28/4

उच्च शिक्षा विभाग म.प्र. शासन

बी.एससी./बी.ए. कक्षाओ के लिये बार्षिक परीक्षा पद्धति के अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department Of Higher Education, Govt. of M. P.

Scheme of Examination and Syllabus for Annual Exam System

B. Sc./B.A. I Year

Academic Session : 2017-2018

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assessment Maximum Marks.	Minimum Passing Marks in Internal Assessment	Practical Maximum Marks	Practical Passing Marks	Total
I- Algebra and Trigonometry	42.5	127.5	42	Ist term-(3 Months) 7.5 IInd term-(6 Months) 15 Total-22.5	8	---	---	150
II- Calculus and Differential Equations	42.5							
III- Vector Analysis and Geometry	42.5							

Note : There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks) :This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (12.5 Marks) : This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2.5 marks.

Section C (25 Marks) : This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory + 6 Period Practical)

(Dr. Geeta Modi)
M.Dube (Dr. Mridula Dube)
KNRajeswari (Dr. K.N. Rajeshwari)
(Dr. V.H. Badshah)
(Dr. Sanjay Jain)
Vyas (Dr. Uma Vyas)
(Dr.Praveen Patil)
(Dr. Pariksha Wagle)
28.4.17 (Dr. Piyush Bhatnagar)
(Dr. P.L. Sanodia)
28/4/17 (Dr.Rajesh Shrivastava)
(Dr. Vandana Gupta)
(Dr. Lal Chandra Rajput)
28.4.17 (Dr. Arvind Bohare)

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र / Session : 2017-18

Max. Marks/अधिकतम अंक : 42.5
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : First/ प्रथम
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : First / प्रथम
Title/शीर्षक : Algebra and Trigonometry
बीजगणित एवं त्रिकोणमिति

Unit-1	Rank of a matrix, Normal & Echelon form of a matrix. Characteristic equations of a matrix. Eigen values. Eigen vectors. Linear Independence of row and column matrix.
ईकाई–1	आव्यूह की जाति, आव्यूह का प्रासामान्य एवं ऐसेलॉन रूप, आव्यूह का अभिलाक्षणिक समीकरण, आयगेन मान, आयगेन सदिश, पंक्ति एवं स्तम्भ आव्यूह की स्वतंत्रता।
Unit-2	Cayley Hamilton theorem and its use in finding inverse of a matrix. application of matrix to solve a system of linear (homogenous and non-homogenous) equations, theorems on consistency and inconsistency of a system of linear equations. solving linear equations upto three unknowns.
ईकाई–2	केली –हैमिल्टन प्रमेय एवं आव्यूह का व्युत्क्रम आव्यूह (समघात एवं असमघात) ज्ञात करने में इसका उपयोग, रैखिक समीकरणों के निकाय के हल के लिये आव्यूह का प्रयोग, रैखिक समीकरणों के निकाय की संगतता एवं असंगतता पर प्रमेय, तीन अज्ञात राशियों तक के रैखिक समीकरणों के हल।
Unit-3	Relation between the roots and coefficients of a general polynomial equation in one variable. transformation of equations. Reciprocal equations. Descarte's rule of signs.
ईकाई–3	एक चर के सामान्य बहुपदों के समीकरण के गुणांकों एवं मूलों के वीच संबंध, समीकरणों का रूपांतरण, व्युत्क्रम समीकरण, चिन्हों का दिकार्ते नियम।
Unit-4	Logic- Logical connectives. Truth Tables. Tautology. Contradiction, Logical Equivalence, Algebra of propositions. Boolean Algebra -definition and properties, switching circuits and its applications, logic gates and circuits.
ईकाई–4	तर्कशास्त्र– तर्क संयोजक, सत्यता सारणी, पुनरुक्ति और व्याघात, तार्किक तुल्यता, साध्यों का बीजगणित। बूलीय बीजगणित– परिभाषा एवं उसके गुणधर्म। स्विचन परिपथ एवं उसके अनुप्रयोग, तर्कद्वार एवं परिपथ।
Unit-5	De – Moivre's theorem and its applications. direct and inverse circular and hyperbolic functions. expansion of trignometric functions. logarithm of complex quantities. Gregory's series. summation of trignometrical series.

LVyas Chan 28.4.17 M. Dube

Prof K Rajeswari 28.4.17 28/4/17 28.4.17

ईकाई–5	डी–मोइवर्स प्रमेय एवं इसके अनुप्रयोग, प्रत्यक्ष एवं व्युत्क्रम वृत्तीय एवं अतिपरवलयिक फलन। त्रिकोणमितीय फलनों का विस्तार, सम्मिश्र संख्याओं का लघुगणक, ग्रीगोरी श्रेणी त्रिकोणमितीय श्रेणियों का योग।

Text Books:

1. S.L. Loney – Plane Trigonometry Part-II.
2. K.B. Datta – Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi 2000.
3. Chandrika Prasad – A Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd. Allahabad.
4. C. L. Liu- Elements of Discrete Mathematics(Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.
5. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. H.S. Hall and S.R. Knight- Higher Algebra H.M Publication. 1994.
2. N. Jocobson- Basic Algebra Vol. I and II, W. H. Freeman.
3. I. S. Luther and I. B. S. Passi- Algebra Vol I and II. Narosa Publishing House.
4. N. Saran and R. S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad.

28/4/17 M. Dube

(Dr. Geeta Modi) (Dr. Mridula Dube) (Dr. K.N. Rajeshwari) (Dr. V.H. Badshah) (Dr. Sanjay Jain)

Vyas

(Dr. Uma Vyas) (Dr. Praveen Patil) (Dr. Pariksha Wagle) (Dr. Piyush Bhatnagar) (Dr. P.L. Sanodia)

28/4/17

(Dr. Rajesh Shrivastava) (Dr. Vandana Gupta) (Dr. Lal Chandra Rajput) (Dr. Arvind Bohare)

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित
Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र / Session : 2017-18

Max. Marks/अधिकतम अंक : 42.5
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : First / प्रथम
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : Second / द्वितीय
Title/शीर्षक : Calculus and Differential Equations
कलन एवं अवकल समीकरण

Unit-1	Successive differentiation. Leibnitz theorem. Maclaurin's and Taylor's series expansions. Asymptotes.
ईकाई–1	उत्तरोत्तर अवकलन, लैबनीज प्रमेय, मैक्लारिन एवं टेलर श्रेणी मे विस्तार। अनंतस्पर्शी।
Unit-2	Curvature, tests for concavity and convexity. points of inflexion. multiple points. tracing of curves in cartesian and polar coordinates.
ईकाई–2	वक्रता, उत्तलता एवं अवतलता का परीक्षण, नति परिवर्तन बिन्दु, बहुबिन्दु, कार्तीय एवं ध्रुवीय निर्देशांको में वक्रो का अनुरेखण।
Unit-3	Integration of transcendental functions. Definite Integrals. Reduction formulae. Quadrature. Rectification.
ईकाई–3	अबीजीय फलनों का समाकलन, निश्चित समाकलन समानयन सूत्र, क्षेत्रकलन एवं चापकलन।
Unit-4	Linear differential equations and equations reducible to the linear form. Exact differential equations. first order and higher degree equations solvable for x, y and p, Clairaut's equation and singular solutions. geometrical meaning of a differential equation. Orthogonal trajectories.
ईकाई–4	रैखिक अवकल समीकरण एवं रैखिक समीकरण में समानेय अवकल समीकरण, यथातथ अवकल समीकरण, गए ल और च में हल होने योग्य प्रथम कोटि एवं उच्च धातीय अवकल

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	समीकरण, क्लेरो का समीकरण और विचित्र हल। अवकल समीकरण का ज्यामितीय अर्थ, लांबिक संछेदियां।
Unit-5	Linear differential equation with constant coefficients, Homogeneous linear ordinary differential equations, Linear differential equations of second order, transformation of equations by changing the dependent variable/ independent variable, method of variation of parameters.
ईकाई–5	अचर गुणांको वाले रैखिक अवकल समीकरण, साधारण रैखिक समघात अवकल समीकरण, द्वितीय कोटि के रैखिक अवकल समीकरण, स्वतंत्र चर/ परतंत्र चर के परिवर्तन द्वारा समीकरणों का रुपांतरण, प्राचल विचरण विधि।

Text Books:

1. Gorakh Prasad- Differential Calculus, Pothishala Private Ltd., Allahabad.
2. Gorakh Prasad- Integral Calculus, Pothishala Private Ltd., Allahabad.
3. D. A. Murray- Introductory Course in Differential Equations, Orient Longman (India) 1967.
4. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Books:

1. G. F. Simmons- Differential Equations, Tata McGraw Hill, 1972.
2. E. A. Codington- An Introduction to ordinary differential Equation, Prentice Hall of India, 1961.
3. H. T. H. Piaggio- Elementary Treatise on Differential Equations and their Application, C. B.S. Publisher & Distributors, Delhi, 1985.
4. S. G. Deo- Differential Equations, Narosa Publishing House.
5. N. Piskunov – Differential and Integral Calculus, Peace Publishers, Moscow.

28.4.17 M.Dube KNRajeswari
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Department of Higher Education, Govt. of M.P.

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Class/कक्षा : B.Sc./B.A.
Year/वर्ष : First /प्रथम
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : Third / तृतीय
Title/शीर्षक : Vector Analysis and Geometry
सदिश विश्लेषण एवं ज्यामिति

Unit-1	Scalar and vector product of three vectors, product of four vectors. Reciprocal vectors, vector differentiation. Gradient. Divergence and curl.
ईकाई–1	तीन सदिशों का अदिश एवं सदिश गुणन, चार सदिशों का गुणन, व्युत्क्रम सदिश, सदिश अवकलन, ग्रेडियंट, डायवरजेन्स एवं कर्ल।
Unit-2	Vector Integration, Theorems of Gauss. Green, Stoke (without proof) and problems based on them.
ईकाई–2	सदिश समाकलन, गॉस, ग्रीन एवं स्टोकको प्रमेय (बिना उपपत्ति) एवं इन पर आधारित प्रश्न।
Unit-3	General equation of second degree, tracing of conics, system of conics, polar equation of a conic.
ईकाई–3	द्वितीय घात के व्यापक समीकरण, शांकवो का अनुरेखण, शांकव निकाय, शांकव का ध्रुवीय समीकरण
Unit-4	Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators. Right circular cone, equation of cylinder and its properties.
ईकाई–4	दिए गए आधार पर शंकु का समीकरण, शंकु के जनक, तीन परस्पर लम्बवत जनको हेतु प्रतिबंध, लम्बवृत्तीय शंकु, बेलन का समीकरण और इसके प्रगुण।
Unit-5	Central conicoids, Paraboloids, plane sections of conicoids, Generating lines.
ईकाई–5	केन्द्रीय शांकवज, परवलयज, शांकवज के समतल प्रच्छेद, जनक रेखाऐं।

Text Books:

1. N. Saran and S. N. Nigam- Introduction to Vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H. C. Gupta-Text Book on Coordinate Geometry, Pothishala Pvt. Ltd. Allahabad.
3. N. Saran and R.S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad (Unit IV).

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Reference Books:

1. R. J. T. Bell- Elementary Treatise on Coordinate Geometry of Three Dimensions, Macmillan India Ltd., 1994(Unit-V).
2. Murray R. Spiegel-Theory and Problems of Advance Calculus, Schaum Publishing Company, New York.
3. Murray R.Spiegel-Vector Analysis, Schaum Publishing Company, New York.
4. Shanti Narayan-A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
5. Shanti Narayan- A Text Book of Vector Algebra, S. Chand & Co., New Delhi.
6. S. L. Loney-The Elements of Coordinate Geometry, Macmillan and Company, London.
7. P. K. Jain and Khalil Ahmad- A text book of Analytical Geometry of Two Dimensions, Macmillan Indian Ltd., 1994
8. P. K. Jain and Khalil Ahmad- A text book of Analytical Geometry of Three Dimensions, Willey Eastern Ltd., 1999.

28.4.17 M.Dubey
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28/4/17

Vyas 28.4.17
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28-4-17
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उच्च शिक्षा विभाग म.प्र. शासन

बी.एससी. / बी.ए. कक्षाओ के लिये बार्षिक परीक्षा पद्धति के अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department Of Higher Education, Govt. of M. P.

Scheme of Examination and Syllabus for Annual Exam System

B. Sc./B.A. II Year

Academic Session : 2018-2019

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assessment Maximum Marks.	Minimum Passing Marks in Internal Assessment	Practical Maximum Marks	Practical Passing Marks	Total
I- Abstract Algebra	42.5	127.5	42	Ist term- (3 Months) 7.5 IInd term- (6 Months) 15 Total=22.5	8	---	---	150
II- Advanced calculus	42.5							
III- Differential Equations	42.5							

Note : There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks) :This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (12.5 Marks) : This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2.5 marks.

Section C (25 Marks) : This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory + 6 Period Practical)

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Max. Marks/अधिकतम अंक	:	42.5
Class/कक्षा	:	B.Sc./B.A.
Year/वर्ष	:	Second /द्वितीय
Subject/विषय	:	Mathematics/गणित
Paper / प्रश्नपत्र	:	First/प्रथम
Title/शीर्षक	:	Abstract Algebra अमूर्त बीजगणित

Unit-1	Definition and basic properties of groups, subgroups, subgroups generated by a subset, Cyclic groups and simple properties.
ईकाई–1	समूह की परिभाषा एवं सामान्य प्रगुण, उपसमूह, उपसमुच्चय से जनित उपसमूह, चक्रीय समूह एवं सामान्य प्रगुण
Unit-2	.Coset decomposition, Lagrange's theorem and its corollaries including Fermat's theorem, Normal subgroups, Quotient groups.
ईकाई–2	सहसमुच्चय वियोजन, लैग्रांज प्रमेय एवं इसकी उपप्रमेय फर्मा प्रमेय, प्रसामान्य उपसमूह, विभाग समूह।
Unit-3	Homomorphism and Isomorphism of groups. Fundamental theorem of homomorphism. Transformation and Permutation group. S_n (various subgroups of S_n, $n<5$ to be studied), Cayley's theorem.
ईकाई–3	समूहों की समाकारिता एवं तुल्याकारिता, समाकारिता का मूलभूत प्रमेय, रुपान्तरण एवं क्रमचय समूह S_n(S_n के विभिन्न उपसमूह, संकल्पित है कि $n<5$), कैली प्रमेय।
Unit-4	Group Automorphism, Inner Automorphism, group of Automorphisms, Conjugacy relation and Centraliser, Normaliser, Counting principle and class equation of a finite group, Cauchy's theorem for finite abelian groups and non-abelian groups.

28.4.17 Vyas 28.4.17 Chan 28.4.17 M. Dube

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ईकाई–4	समूह स्वकारिता, अंतः स्वकारिता, स्वकारिताओं का समूह, संयुग्मिता संबंध और केन्द्रीयकारक, प्रसामान्यक, गणना सिद्धांत एवं परिमित समूह का वर्ग समीकरण। परिमित आबेली एवं अन–आबेली समूह के लिए कौशी का प्रमेय।
Unit-5	Definition and basic properties of rings, Ring homomorphism subrings, Ideals and Quotient rings, Polynomial rings & its properties, Integral domain and Field.
ईकाई–5	वलय की परिभाषा एवं सामान्य प्रगुण, वलय समाकारिता, उपवलय, गुणजावली एवं विभाग वलय, बहुपद वलय एवं उसके प्रगुण, पूर्णांकीय प्रांत एवं क्षेत्र।)

Text Books:

1. I. N. Herstein-Topics in Algebra, Wiley Eastern Ltd. New Delhi. 1977.
2. PB Bhattacharya, S. K. Jain and S R Nagpaul-Basic Abstract Algebra. Wiley Eastern, New Delhi, 1997
3. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Books:

1. Shantinarayan-A text Book of Modern Abstract Algebra, S.Chand and Company, New Delhi.
2. Surjeet Singh- A Text Book of Modern Algebra.
3. N. Jacobson- Basic Algebra, Vol. I and II, W. H. Freeman.
4. I. S. Luther and I. B. S. Passi- Algebra., Vol I and II, Narosa Publishing House.

28.4.17 (Dr. Geeta Modi)
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KNRajeswari (Dr. K.N. Rajeshwari)
Badshah 28/4/17 (Dr. V.H. Badshah)
(Dr. Sanjay Jain)

Vyas 28.4.17 (Dr. Uma Vyas)
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28.4.17 (Dr. Pariksha Wagle)
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(Dr. P.L. Sanodia)

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Class/कक्षा : B.Sc./B.A.
Year/वर्ष : Second/ द्वितीय
Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Second/द्वितीय
Title/शीर्षक : Advanced calculus
उच्च कलन

Unit-1	Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. series of non-negative terms. comparison test. Cauchy's intergral test. Cauchy's root test. ratio tests. Raabe's tests. logarithmic tests. Alternating series. Leibnitz's test. Absolute and conditional convergence.
ईकाई–1	अनुक्रम की परिभाषा, अनुक्रम की सीमा पर प्रमेय, परिबद्ध एवं एकदिष्ट अनुक्रम कॉशी का अभिसरण मापदण्ड, अऋणात्मक पदों की श्रेणी, तुलना परीक्षण, कॉशी का समाकल परीक्षण, कॉशी का मूल परीक्षण, अनुपात परीक्षण, राबी का परीक्षण, लघुगणकीय परीक्षण, एकान्तर श्रेणी, लिबनीज परीक्षण, निरपेक्ष एवं प्रतिबंधी अभिसरण।
Unit-2	Continuity of functions of single variable. sequential continuity. Properties of continuous functions. Uniform continuity. chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives.
ईकाई–2	सांतत्य (एक चर फलन), अनुक्रमणीय सांतत्या, संतत फलनों के गुणधर्म, एक समान सांतत्य, अवकलनीयता का श्रृंखला नियम, मध्यमान प्रमेय एवं उनका ज्यामीतीय अर्थ, अवकलों के लिए डार्बू का मध्यवर्ती मान प्रमेय।
Unit-3	Limit and continuity of functions of two variables. Partial differentiation, Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

28.4.17 Vyas 28/4/17 Chan 28.4.17 M. Dube

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ईकाई–3	दो चरों के फलनों की सीमा एवं सांतत्य, आंशिक अवकलन, चरों का परिवर्तन, समघात फलनों पर आयलर का प्रमेय, दो चरों के फलनों के लिए टेलर का प्रमेय, जेकोबियन।
Unit-4	Envelopes, Evolutes, Maxima and Minima of functions of two variables. Lagrange's multiplier method, Beta and Gamma Functions.
ईकाई–4	अन्वालोप, केन्द्रज, दो चरों के फलनों का उच्चिष्ठ एवं निम्निष्ठ, लेग्रांज के गुणांको की विधि, बीटा एवं गामा फलन।
Unit-5	Double and triple integrals, volumes and surfaces of solids of revolution Dirichlet's integrals, change of order of integration in double integrals.
ईकाई–5	द्विक एवं त्रि–समाकल, ठोस के परिभ्रमण से जनित आयतन एवं प्रष्ठ, ड्रीचलेटस् समाकल, द्विक समाकल के क्रम का परिवर्तन।

Text Books:

1. R. R. Goldbeg -Real Analysis, Oxford& I.B.H. Publishing co., New Delhi
2. Gorakh Prasad- Differential Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Gorakh Prasad- Integral Calculus, Pothishala Pvt. Ltd. Allahabad
4. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Books:

1. Gabriel Klaumber- Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975
2. T. M. Apostol- Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
3. D. Soma Sundaram and B. Choudhary- A first Course in mathematical Analysis, Narosa Publishing, House, New Delhi, 1997.
4. Murray R. Spiegel- Theory and problems of advance Calculus, Schauma Publishing Co., New York
5. O. E. Stanaitis- An Introduction to Sequences, Series and improper Integrals.

28.4.17 M. Dube 28/4/17

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Subject/विषय	:	Mathematics/गणित
Paper / प्रश्नपत्र	:	Third/तृतीय
Title/शीर्षक	:	Differential Equations अवकल समीकरण

Unit-1	Series solutions of differential equations. Power series method. Bessel and Legendre equations. Bessel's and Legendre's functions and their properties- recurrence and generating function. Orthogonality of functions.
ईकाई–1	अवकल समीकरण का श्रेणी हल, घात श्रेणी हल, बेसल एवं लेजेन्ड्रे समीकरण, बेसल एवं लेजेन्ड्रे फलन एवं उनके गुणधर्म, पुनरावृत्त एवं जनक फलन, फलन की लाम्बिकता।
Unit-2	Laplace Transformation. Linearity of the Laplace transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems, Differentiation and integration of transforms.
ईकाई–2	लॉप्लास रुपांतरण, लॉप्लास रुपांतरण की रैखिकता, लॉप्लास रुपांतरण के लिए अस्तित्व प्रमेय। अवकलजों एवं समाकलों का लॉप्लास रुपांतरण, स्थनांतर प्रमेय, रुपांतरणों का अवकलन एवं समाकलन।
Unit-3	Inverse Laplace transforms. Convolution theorem. Application of Laplace transformation in Solving linear differential equations with constant coefficients.
ईकाई–3	प्रतिलोम लॉप्लास रुपांतरण, संवलन प्रमेय, अचर गुणांको वाले रैखिक अवकल समीकरणों को हल करने में लॉप्लास रुपांतरणों के अनुप्रयोग।
Unit-4	Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method.

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ईकाई–4	प्रथम कोटि के आंशिक अवकल समीकरण, लैग्रांज विधि, विशिष्ट प्रकार के अवकल समीकरण का व्यापक विधि के अतिरिक्त अन्य विधि द्वारा सरलता से हल, चारपिट की व्यापक विधि।
Unit-5	Partial differential equations of second and higher orders. Classification of partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients.
ईकाई–5	द्वितीय व उच्च कोटि के आंशिक अवकल समीकरण, द्वितीय कोटि के आंशिक अवकल समीकरणों का वर्गीकरण, अचल गुणांकों के समघात एवं असमघात समीकरण, अचर गुणांकों में समानेय आंशिक अवकल समीकरण।

Text Book:

1. Sharma and Gupta- Integral Transform, Pragati, Prakashan Meerut.
2. Sharma and Gupta- Differential Equation, Pragati, Prakashan Meerut.
3. Raysinghania- Differential Equation, S. Chand & Company, New Delhi.
4. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Book:

1. D. A. Murray - Introductory course in differential equation, Orient Longman, India, 1967
2. G. F. Simnons – Differntial Equations, Tata Mcgraw Hill, 1972.
3. E.A. Codington - An introduction to Ordinary differential equations, Prentice Hall of India, 1961
4. H. T. H. Piaggio – Elementary Treatise on Differential equations and their applications, C. B. S. Publisher and Distributors, Delhi, 1985.
5. E. D. Rainville – Special Functions, The Macmillan Company, New York.

28.4.17 M. Dube 28/4/17

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28.4.17

(Dr.Rajesh Shrivastav) (Dr. Vandana Gupta) (Dr. Lal Chandra Rajput) (Dr. Arvind Bohare)

उच्च शिक्षा विभाग म.प्र. शासन
बी.एससी./बी.ए. कक्षाओ के लिये बार्षिक परीक्षा पद्धति के अनुसार पाठ्यकम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित
Department Of Higher Education, Govt. of M. P.
Scheme of Examination and Syllabus for Annual Exam System
B. Sc./B.A. III Year

Academic Session : 2019-2020

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assess-ment Maximum Marks.	Minimum Passing Marks in Internal Assess-ment	Prac-tical Maxi-mum Marks	Prac-tical Passing Marks	Total
I- Linear Algebra And Numerical Analysis	42.5	127.5	42	Ist term- (3 Months) 7.5 IInd term- (6 Months) 15 Total=22.5	8	---	---	150
II- Real and Complex Analysis	42.5							
III- Optional Paper*	42.5							

***III A Statistical methods, III B- Discrete Mathematics, III C- Mechanics, III D Mathematical Modelling, III E- Financial Mathematics**

(Optional Paper should be different from main subject.)

Note : There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks) :This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (12.5 Marks) : This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2.5 marks.

Section C (25 Marks) : This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory + 6 Period Practical)

28.4.17 M.Dube 28.4.17 28/4/17

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28.4.17 28-4-17

(Dr.Rajesh Shrivastava) (Dr. Vandana Gupta) (Dr. Lal Chandra Rajput) (Dr. Arvind Bohar

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
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B.Sc./B.A. Annual Examination System wise syllabus
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सत्र / Session : 2019-20

Max. Marks अधिकतम अंक	:	42.5
Class कक्षा	:	B.Sc./B.A.
Year/वर्ष	:	Third/ तृतीय
Subject/विषय	:	Mathematics/गणित
Paper / प्रश्नपत्र	:	First / प्रथम
Title/शीर्षक	:	Linear Algebra And Numerical Analysis रैखिक बीजगणित एवं संख्यात्मक विश्लेषण

Note;- Scientific Calculator will be allowed in the examination of this paper.
नोट:– इस प्रश्न पत्र की परीक्षा में साइंटिफिक केलक्यूलेटर के उपयोग की अनुमति है।

Unit-1	Definition and examples of Vector spaces, subspaces, sum and direct sum of subspaces. Linear span, Linear dependence, independence and their basic properties. Basis, Existence Theorem for basis. Extension Theorem. Invariance of the number of elements of a basis. Dimension. Finite dimensional vector spaces. Existence of complementary subspaces of a subspace of a finite dimensional vector space. Dimension of sum of subspaces. Quotient space and its dimension.
ईकाई–1	सदिश समष्टि की परिभाषा एवं उदाहरण, उपसमष्टि, उपसमष्टियों का योग एवं प्रत्यक्ष योग, रैखिक विस्तृति, रैखिक परतंत्रता, स्वतंत्रता एवं उनके मूल गुणधर्म, आधार, परिमित विमीय सदिश समष्टियॉं, आधार का अस्तित्व प्रमेय, विस्तार प्रमेय, आधार में अवयवों की संख्या की अपरिवर्तनशीलता, विमा, परिमित विमीय सदिश समष्टि की उपसमष्टि की पूरक उपसमष्टि का अस्तित्व, उपसमष्टियों के योग की विमा, विभाग समष्टि एवं उसकी विमा।
Unit-2	Linear transformations and their representation as matrices. Algebra of linear transformations, Rank-Nullity theorem, change of basis, dual space, bi-dual space and natural isomorphism, adjoint of a linear transformation, eigen values and eigen vectors of a linear transformation. Diagonalisation. Bilinear,Quadratic and Hermitian forms.
ईकाई–2	रैखिक रूपांतरण एवं उनका आव्यूह निरूपण, रैखिक रूपातरणों का बीज गणित, जाति शून्यता प्रमेय, आधार का परिवर्तन, द्वैत समष्टि, द्विद्वैत समष्टि एवं प्राकृतिक तुल्याकारिता, रैखिक रूपांतरण का संलग्न रूपांतरण, रैखिक रूपातरणों के आइगन मान एवं आइगन सदिश, विकर्णीकरण, द्विएकघाती, द्विघाती एवं हार्मितीय समघात
Unit-3	Inner Product Space- Cauchy-Schwartz inequality, orthogonal vectors, orthogonal complements, orthonormal sets and bases,Bessel's inequality for finite

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	dimensional spaces. Gram-Schmidt orthogonalization process.
ईकाई–3	आंतर गुणन समष्टि– कौशी स्वार्ज असमिका, लांबिक संदिश, लांबिक पूरक प्रसामान्य लांबिक समुच्चय एवं आधार, परिमित विमीय समष्टियों हेतु बेसल की असमिका, ग्राम श्मिट लांबिकता प्रक्रम।
Unit-4	Solution of Equations : Bisection. Secant. Regula Falsi.Newton's Methods. Roots of second degree Polynomials. Interpolation: Lagrange interpolation. Divided differences. Interpolation formula using Differences. Numerical Quadrature. Newton- Cote's formulae. Gauss Quadrature formulae
ईकाई–4	समीकरणों के हल– द्वि–विभाजन विधि, सिकेण्ट विधि, रेग्यूला फाल्सी विधि, न्यूटन विधि, द्वितीय घात के बहुपद समीकरण के मूल। अर्न्तवेशन –लैग्रांज अर्न्तवेशन, विभाजित अंतर, अंतर के उपयोग से अर्न्तवेशन सूत्र, संख्यात्मक क्षेत्रकलन, न्युटन कोट्स सूत्र, गाउस क्षेत्रकलन सूत्र।
Unit-5	Linear equations direct methods for solving systems of linear equations (Gauss elimination. LU decomposition. Cholesky decomposition). Iterative methods (Jacobi. Gauss- Seidel reduction methods). Ordinary differential equations : Euler method. Single step method, Runge-Kutta's method, Multistep methods. Milne Simpson method. Methods based on Numerical integration, methods based on numerical differentiation
ईकाइ–5	रैखिक समीकरण, रैखिक समीकरणों के निकाय को हल करने की प्रत्यक्ष विधियाः (गाउस विलोपन, एल–यू वियोजन, चोलेस्की वियोजन), पुनरावृत्ती विधियॉ (जेकोबी विधि, गाउस सिडेल विधि), साधारण अवकल समीकरणः आयलर विधि, एकल चरण विधि, रुंग कुटटा विधि, बहुचरण विधि, मिलने–सिम्पसन विधि, सख्यात्मक समाकलन पर आधारित विधियॉ एवं सख्यात्मक अवकलन पर आधरित विधियॅा।

Text Books:-

1. K. B. Datta- Matrix and Linear Algebra,Pretice hall of India Pvt. Ltd. New Delhi,2000.
2. S. S. Sastry- Introductory Methods of Numerical Analysis. PHI Learning Pvt. Ltd.

Reference Books:

1. K. Hoffiman and R. Kunze- Linear Algebra. 2^{nd} Edition. Prentice Hall Englewood Cliffs. New Jersey. 1971.
2. S. K. jain. A Gunawardena & P. B. Bhattacharya- Basic Linear Algebra with MATLAB Key College Publishing(Springer- Verlag) 2001
3. S. Kumarsaran- Linear Algebra. A Bermetric Approac Prentice- Hall of India.200
4. Balaguruswamy- Numerical Methods. Tata Mc Graw Hill Publication. New Yark.

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B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र / Session : 2019-20

Max. Marks/अधिकतम अंक : 42.5
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : Third / तृतीय
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : Second / द्वितीय
Title/शीर्षक : Real and Complex Analysis
वास्तविक एवं सम्मिश्र विश्लेषण

Unit-1	Riemann integral, Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus, Partial derivatives and differentiability of real-valued functions of two variables. Schwarz's and Young's theorem. Implicit function theorem.
ईकाई–1	रीमान समाकल, सतत एव एकदष्टि फलनों की समाकलनीयता, समाकलन का मूलभूत प्रमेय, समाकलनों के माध्यमान प्रमेय, दो चरों के वास्तविक मान फलनों के आंशिक अवकलज एवं अवकलनीयता, स्वार्ज एवं यंग क प्रमेय, अस्पष्ट फलन प्रमेय।
Unit-2	Improper integrals and their convergence. Comparisn tests. Abel's and Dirichlet's tests. Frullani's integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter. Fourier series of half and full intervals.
ईकाई–2	अनुचित समाकल एवं उनका अभिसरण, तुलना परीक्षण, आबेल एवं डिरिक्ले का परीक्षण, प्रचालिक फलनों के रुप में फ्रुलानी समाकल, सांतत्य, एक प्राचल के फलन के समाकल अवकलनीयता एवं समाकलनीयता, अर्द्ध एवं पूर्ण अंतरालों की फोरियर श्रेणी।
Unit-3	Definition and examples of metric spaces. Nieghbourhoods. Limit points. Interior points. Open and closed sets. Closure and interior . Boundary points. Subspace of metric space, Cauchy sequences, Completeness, Cantor's intersection theorem, Contraction principle, Real number as a complete ordered field. Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces.
ईकाई–3	दूरीक समष्टि की परिभाषा एवं उदाहरण, सामीप्य, सीमा बिन्दु, आंतरिक बिन्दु, विवृत एवं संवृत समुच्चय, संवरक एवं अभ्यंतर, परिसीमा बिन्दु, दूरीक समष्टि की उप समष्टि, कौशी अनुक्रम, पूर्णता, केन्टर का सर्वनिष्ठ प्रमेय, संकुचन सिद्धांत, पूर्ण क्रमित क्षेत्र के रुप में वास्तविक संख्यायें, सघन उपसमुच्चय, बायर–केटेगरी प्रमेय, पृथक्करण, द्वितीय गणनीय एवं प्रथम गणनीय समष्टि।
Unit-4	Continuous functions. Extension theorem. Uniform continuity. Compactness. Sequential compactness. Totally bounded spaces. Finite intersection property. Continuous functions and compact sets. Connectedness.

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ईकाई–4	सतत फलन, विस्तार प्रमेय, एकसमान सांतत्य, संहतता, अनुक्रमणीय सहतता पूर्ण परिबद्ध समिष्टि, परिमित सर्वनिष्ठ प्रगुण, संतत फलन एवं संहत समुच्चय, संबद्धता।
Unit-5	Complex numbers as ordered pairs. Geometric representation of complex numbers. Continuity and differentiability of complex functions. Analytic functions. Cauchy-Reimann equations. Harmonic functions. Mobius transformations. Fixed points. Cross ratio. Inverse points. Conformal Mappings.
ईकाई–5	सम्मिश्र संख्या क्रमित युग्म के रूप में, सम्मिश्र संख्या का ज्यामितिय निरुपण, सम्मिश्र फलनों की सांतत्यता और अवकलनीयता, विश्लेषिक फलन, कौशी– रीमान समीकरण, प्रसंवादी फलन, मोबियस रुपांतरण, स्थिर बिन्दु, तिर्यक अनुपात, प्रतिलोम बिन्दु, कॉनफार्मल फलन।

Text Books:

1. Mathematical analysis by S. C. Malik and Savita Arora. New Age Publication, Delhi.
2. G.F. Simmons – Introduction to Topology and Modern Analysis. Mc Graw Hill, New York 1963
3. L. V. Alhfors, complex Analysis Mc Graw Hill, New York
4. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Recommend Books

1. Walter Rudin- Real and Comples Analysis. Mc Graw Hill. New York
2. Ponnuswamy- Complex Analysis. Narosa Publication. New Delhi.
3. R. V. Churchill & J.W. Brown, Complex Variables andApplication. 5th Edition. Mc Graw Hill, New York. 1990

28.4.17 M. Dube KNRajeswari /28.4.17 28/4/17
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Year/वर्ष : Third/ तृतीय
Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Third Optional-A / तृतीय एच्छिक–ए
Title/शीर्षक : Statistical methods/सांख्यिकीय विधियां

Note;- Simple Calculator will be allowed in the examination of this paper.

नोटः– इस प्रश्न पत्र की परीक्षा में साधारण केलक्यूलेटर के उपयोग की अनुमति है।

Unit-1	Frequency distribution- Measures of central tendency. Mean. Median, Mode, G.M, H.M. Partition values. Measures of dispersion- Range. Interquartile range. Mean deviation. Standard deviation. Moments. Skewness and kurtosis.
ईकाई–1	आवृत्ति बंटन–केन्द्रीय प्रवृत्ति की माप, माध्य, माध्यिका, बहुलक, गुणोत्तर माध्य, हरात्मक माध्य। विभाजनकारी मान, विक्षेपण की माप–परास, अन्तर्चतुर्थक परास, माध्य विचलन, मानक विचलन, आघूर्ण, वैषम्य और कुकुदता।
Unit-2	Probablity- Event, Sample space. Probablity of an event. Addition and multiplication theorems, Baye's theorem, Continuous probablity- probablity density function and its applications for finding the mean. mode. median and standard deviation of various continuous probablity distributions. Mathematical expectation, Expectation of sum and product of random variables. Moment generating function.
ईकाई–2	प्रायिकता– घटना, प्रतिदर्श समष्टि किसी घटना की प्रायिकता, प्रायिकता की योग एवं गुणन प्रमेय, बेज का प्रमेय, सतत प्रायिकता, प्रायिकता घनत्व फलन एवं विभिन्न सतत प्रायिकता बंटनो के लिये माध्य, बहुलक, माध्यिका ज्ञात करने में इसके अनुप्रयोग, गणितीय प्रत्याशा, यादृच्छिक चरो के योग एवं गुणन की गणितीय प्रत्याशा, आघूर्ण जनित फलन।
Unit-3	Theoretical distribution- Binomial. Poisson. rectangulars and exponential distributions, their properties and uses.

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ईकाई–3	सैद्धांतिक बंटन– द्विपद, प्वॉसो, आयताकार और चरघातांकी बंटन, इनके प्रगुण एवं प्रयोग।
Unit-4	Methods of least squares. Curve fitting, co-relation and regression, partial and multiple correlations (upto three variables only).
ईकाई–4	न्यूनतम वर्गविधि, वक्रों का आसंजन, सहसंबंध एवं समाश्रयण, आंशिक एवं बहु सहसंबंध (केवल तीन चरो तक)।
Unit-5	Sampling- Sampling of large samples. Null and alternative hypothesis. Errors of first and second kinds. Level of significance. Critical region. Tests of significance based on chi-square.t.F and Z-statistics.
ईकाई–5	प्रतिचयन– वृहद प्रतिदर्शो का प्रतिचयन, शून्य एवं वैकल्पिक परिकल्पना प्रथम एवं द्वितीय प्रकार की त्रुटियाँ, सार्थकता स्तर, कांतिक क्षेत्र, काई–वर्ग, एजएथ और सांख्यिक पर आधारित सार्थकता परीक्षण।

Text Books:

1. H. C. Saxena and J. N. Kapoor. Mathematical Statistics, S. Chand and Company.
2. M. Ray_ Statistical Methods.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

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Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Third Optional-B / तृतीय एच्छिक–बी
Title/शीर्षक : Discrete Mathematics/ विविक्त गणित

Unit-1	Boolean functions-disjunctive & cunjunctive normal forms (canonical & dual canonical), Bool's expansion theorem. Relations- Binary relation. Inverse relation, Composite relation, Equivalence relation, Equivalence classes & its properties Partition of a set.
ईकाई–1	बूलीय फलन – वियोजनीय एवं संयोजनीय प्रसामान्य रूप (केनोनिकल एवं डूअल केनानिकल), बूल का विस्तार प्रमेय। संबंध– द्विचर संबंध, प्रतिलोम संबंध, संयोजित संबंध, तुल्यता संबंध, तुल्यता वर्ग एवं उसके गुण धर्म, समुच्चय का विभाजन।
Unit-2	Partial order relation, Partially ordered sets, totally ordered sets. Hasse diagram, maximal and minimal element. first and last element Lattice- definition and examples. dual lattice. bounded lattice. distributive lattice. complemented lattice.
ईकाई–2	अंशतः कम संबंध, अंशतः क्रमित समुच्चय, पूर्णतः क्रमित समुच्चय, हैसूह आरेख, उच्चिष्ठ एवं निमनिष्ठ अवयव, प्रथम एवं अन्तिम अवयव, जालक –परिभाषां एवं उदाहरण, द्वैत जालक, परिबद्ध जालक, वितरणीय जालक, पूरक जालक।
Unit-3	Graph- Definition. types of graphs. Subgraphs. walk. path . circuit. connected and disconnected graphs. Euler graph. Hamiltonian path and circuit. shortest path in weighted graph. Dijkstra's Algorithm for shortest paths.
ईकाई–3	आलेख– परिभाषा एवं प्रकार उप आलेख, गमन, पथ एवं परिपथ, संबद्ध एवं असंबद्ध ग्राफ, ऑयलर ग्राफ, हेमिल्टोनियन पथ और परिपथ, भारित आलेख में लघुत्तम पथ हेतु

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	डॉइजकस्त्रा, एल्गोरीथम।
Unit-4	Trees and its properties, Rooted tree, Binary tree, Spanning tree, Rank and nullity of a graph, Kruskal's Algorithm and Prim's Algorithm.
ईकाई–4	वृक्ष एवं उसके गुण धर्म, नियत वृक्ष, द्विचर वृक्ष, जनक वृक्ष, आलेख की जाति एवं शून्यता, कुस्कल एवं प्राइम की एल्गोरीथम।
Unit-5	Matrix representation of graphs—Incidence and Adjacency matrix,Cutset and its properties, Planar graphs (definition) Kuratowski's two graphs.
ईकाई–5	आलेख का आव्यूह निरूपण– इन्सीडेंस एवं एडजेन्सी आव्यूह, कटसेट्स एवं उसके प्रगुण, प्लानर आलेख(परिभाषा), कुराटोव्हस्की के द्विआलेख।

Text Books:

1. C.L.Liu.- Elements of Discrete Mathematics , Mcgraw Hill New-York
2. Narsingh Deo- Graph Theory, Prentice Hall.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

28.4.17 M. Dube 28/4/17 28/4/17

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28.4.17 28.4.17 28/4/17 28/4/17 28.4.17

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Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : Third Optional-C / तृतीय एच्छिक–सी
Title/शीर्षक : Mechanics / यांत्रिकी

Unit-1	Analytical conditions of Equilibrium of Coplanar forces. Virtual work. Catenary.
ईकाई–1	समतलीय बलों की साम्यावस्था के वैश्लेषिक प्रतिबंध, कल्पित कार्य, रज्जुका।
Unit-2	Forces in three dimensions, Poinsot's central axis. Null lines and Planes. Stable and unstable Equilibrium.
ईकाई–2	त्रिविमीय बल, प्वासो का केन्द्रीय अक्ष, शून्य रेखाएँ एवं समतल, स्थिर एवं अस्थिर साम्यावस्था।
Unit-3	Velocites and accelerations along radial and transverse directions and along tangential and normal directions. Simple Harmonic motion. Elastic Strings, Projectile.
ईकाई–3	त्रिज्यीय एवं अनुप्रस्थ दिशा में वेग एवं त्वरण, स्पर्श रेखीय एवं अभिलंब दिशाओं में वेग एवं त्वरण। सरल आवर्त गति, प्रत्यास्थ डोरियॉ, प्रक्षेप्य।
Unit-4	Motion on smooth and rough plane curves . Motion in a resisting medium. Motion of particles of varying mass. Central orbits. Kepler's Law of motion.
ईकाई–4	चिकने एवं रूक्ष समतल वक्र पर गति प्रतिरोधी माध्यम में गति, परिर्वतनीय द्रव्यमान वाले कणो की गति, सकेन्द्र कक्ष, केप्लर के गति के नियम।
Unit-5	Motion of a particle in three dimensions. Moments and Product of inertia
ईकाई–5	त्रिविमीय तल में किसी कण की गति, जडत्व एवं गुणन आघुर्ण

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Text Books:

1. R.S. Verma – Statics
2. S. L. Loney- An elementary Treatise on the dynamics of particle of rigid bodies.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. M.Ray- Dynamics
2. M. Ray and H. S. Sharma- Dynamics of rigid bodies

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Vyas 28.4.17 28.4.17 28.4.17 28.4.17 28.4.17

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Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Third Optional-D / तृतीय एच्छिक–डी
Title/शीर्षक : Mathematical Modelling/ गणितीय मॉडलिंग

Unit-1	Mathematical modelling through ordinary differential equations of first order: Linear Growth and Decay models. Non-linear Growth and Decay Models. Dynamic problems. Geometrical problems.
ईकाई–1	प्रथम कोटि के साधारण अवकल समीकरणों द्वारा गणितीय मॉडलिंग: रेखीय वृद्धि एवं ह्रास मॉडल्स, अरेखीय वृद्धि एवं ह्रास मॉडल्स, गतिकी समस्याए ज्यामितीय समस्याऐं।
Unit-2	Mathematical modelling through system of ordinary differential equations of first order: Population Dynamics, Epidemics, Compartment models, Economic medicine, Arms Race, Battles and International Trade, Dynamics models .
ईकाई–2	प्रथम कोटि के साधारण अवकल समीकरणों के निकायो द्वारा गणितीय मॉडलिंग: जनसंख्या गतिकी, महामारी, उपखण्डीय, अर्थशास्त्रीय, चिकित्सकीय, आर्म रेस, बैटल्स, अर्न्तराष्ट्रीय व्यापार एवं गतिकी मॉडल्स।
Unit-3	Mathematical modelling through ordinary differential equations of second order: Planetary Motions, Circular Motions and Motion of Satellites. Mathematical modelling through Linear differential equations of second order and miscellaneous mathematical models.
ईकाई–3	द्वितीय कोटि के साधारण अवकल समीकरणों द्वारा गणितीय मॉडलिंग: ग्रहीय गति, वृत्तीय गति एवं उपग्रहीय गति। द्वितीय कोटि के रैखिक अवकल समीकरणो द्वारा गणितीय मॉडलिंग एवं विविध गणितीय मॉडल्स।
Unit-4	Mathematical modelling through difference equations: Simples Models. Basic theory of linear difference equations with constants coefficients. economic and finance-population dynamics and genetics. probability theory.
ईकाई–4	अन्तर समीकरण द्वारा गणितीय मॉडलिंग: सरल मॉडल्स, अचर गुणांको वाले रैखिक अन्तर समीकरणों के सिद्धांत एवं उनके द्वारा अर्थशास्त्रीय एवं वित्तीय, जनसंख्या गतिकी एवं जनांकिकी एवं प्रायिकता सिद्धांत में गणितीय मॉडलिंग।
Unit-5	Mathematical modelling through Graphs: Solutions that can be modelled through graph, mathematical modelling in terms of directed graphs, signed graphs, weighted digraphs and un-oriented graphs.

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28/4/17 K.M.Rajeswari 28.4.17 28.4.17 28.4.17 28.4.17

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ईकाई--5	ग्राफ के द्वारा गणितीय मॉडलिंग: ग्राफ के द्वारा मॉडल्स का हल ज्ञात करना। निदेशित ग्राफ, चिन्हित ग्राफ, भारित ग्राफ और अनिश्चित ग्राफ के सन्दर्भ में गणितीय मॉडलिंग

Text Books:

1. J.N.Kapur- Mathematical Modelling. New Age International Publishers
2. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. Stefan Heinz- Mathematical Modelling. Springer.
2. Heilio,M.Lahivaara, T.Latinen- Mathematical Modelling. Springers Nature.
3. Dr.V.P. Saxena- Bio-Mathematics.
4. Belinda Barnes and Glenn Robert Fulford- Mathematical Modelling with Case Studies. CRC Press

28.4.17 M. Dube KNRajeswari 28/4/17
(Dr. Geeta Modi) (Dr. Mridula Dube) (Dr. K.N. Rajeshwari) (Dr. V.H. Badshah) (Dr. Sanjay Jain)

Vyas 28.4.17 28.4.17 28.4.17 28.4.17
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28-4-17
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Paper / प्रश्नपत्र	:	Third Optional-E / तृतीय एच्छिक–ई
Title/शीर्षक	:	Financial Mathematics/ वित्तीय गणित

Unit-1	Financial Management- Nature and Scope of Financial Management, Goals of Financial Management and main decisions of financial management. Difference between Risk, Speculation and Gambling.
ईकाई–1	वित्तीय प्रबंधन– वित्तीय प्रबंधन की प्रकृति एवं क्षेत्र, वित्तीय प्रबंधन के लक्ष्य एवं प्रमुख निर्णय, जोखिम, सट्टे एवं जुए में अन्तर।
Unit-2	Time value of Money-Interest rate and Discount Rate. Present value and Future value, discrete case as well as continuous compounding case. Annuities and its kinds.
ईकाई–2	मुद्रा का समयमान–ब्याज दर एवं बट्टा दर, वर्तमान मूल्य एव भावी मूल्य, विविक्त और सतत् चक्रवर्ती वृद्धियॉं, वार्षिकी एवं उसके प्रकार।
Unit-3	Meaning of return, Return as Internal Rate of Return (IRR), Numerical methods like Newton Raphson Method to calculate IRR, Measurement of returns under uncertainty situations.
ईकाई–3	वापसी का अर्थ, वापसी की आन्तरिक दर, संख्यात्मक विधिया जैसे वापसी की आन्तरिक दर की गणना की न्यूटन रॉफसन विधि, अनिश्चय की अवस्था में वापसी की गणना।
Unit-4	Meaning of Risk, Difference between risk and uncertainty, Types of Risks, Measurements of Risk, Calculation of security and portfolio risk and Return-Markowitz Model, Sharpe's Single Index Model- Systematic Risk and Unsystematic Risk.
ईकाई–4	जोखिम का अर्थ, जोखिम एवं अनिश्चय में अन्तर, जोखिम के प्रकार, जोखिम को मापना, प्रतिभूति एवं विनियोजन जोखिम एवं वापसी की गणना, मारकोविज मॉडल, शॉर्प का एकल सूचकांक मॉडल नियमित एवं अनियमित जोखिम।
Unit-5	Taylor series and Bond Valuation, Calculation of Duration and Convexity of Bonds, Financial Derivatives- Futures, Forward, Swaps and options, Call and Put Option, Call and Put Parity theorem.

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28.4.17 28.4.17 28/4/17 28/4.17 28.4.17

ईकाई–5	टेलर श्रेणी एवं बॉण्ड मूल्यांकन, बॉण्ड की अवधि एवं उत्तलता की गणना, वित्तीय यौगिक– फायदा, फॉरवर्ड, बदला एवं विकल्प कॉल एवं पुट विकल्प, कॉल एवं पुट समानता प्रमेय।

Text Books:

1. Sheldon M. Ross- An Introduction to Mathematical Finance, Cambridge University Press.
2. Mark S. Dorfman- Introduction to Risk Management and Insurance, Prentice Hall Englrewood Cliffs, New Jersey.
3. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. Aswath Damodaran, Corporate Finance- Theory and Practice, John Wiley & Inc.
2. John C. Hull- Options, Futures and Other Derivatives, Prentice Hall of India Private Ltd.
3. C. D. Daykin, T. Pentikainen and M. Pesonen- Practical Risk Theory for Actuaries, Chapman & Hall.

(Dr. Geeta Modi) (Dr. Mridula Dube) (Dr. K.N. Rajeshwari) (Dr. V.H. Badshah) (Dr. Sanjay Jain)
(Dr. Uma Vyas) (Dr. Praveen Patil) (Dr. Pariksha Wagle) (Dr. Piyush Bhatnagar) (Dr. P.L. Sanodia)
(Dr. Rajesh Shrivastav) (Dr. Vandana Gupta) (Dr. Lal Chandra Rajput) (Dr. Arvind Bohare)

उच्च शिक्षा विभाग म.प्र. शासन

बी.एससी./बी.ए. कक्षाओ के लिये बार्षिक परीक्षा पद्धति के अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department Of Higher Education, Govt. of M. P.

Scheme of Examination and Syllabus for Annual Exam System

B. Sc./B.A. I Year

Academic Session : 2019-20

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assess-ment Maximum Marks.	Minimum Passing Marks in Internal Assess-ment	Prac-tical Maxi-mum Marks	Prac-tical Passing Marks	Total
I- Algebra and Trigonometry	40	120	40	Ist term- (3 Months) 10 IInd term- (6 Months) 20 Total=30	10	---	---	150
II- Calculus and Differential Equations	40							
III- Vector Analysis and Geometry	40							

Note : There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks) :This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (10 Marks) : This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2 marks.

Section C (25 Marks) : This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory + 6 Period Practical)

3-6-19
(Dr. Geeta Modi)

3-6-19
(Dr. V.K. Gupta)

3-6-19
(Dr. Vandana Gupta)

3-6-19
(Dr. P.L. Sanodia)

3-6-19
(Dr. Uma Vyas)

3/6/19
(Dr. Sanjay Jain)

3-6-2019
(Dr. Lal Chandra Raput)

3-6-19
(Dr.Arvind Bohare)

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बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies

सत्र / Session : 2019-20

Max. Marks/अधिकतम अंक : 40
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : First/ प्रथम
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : First / प्रथम
Title/शीर्षक : Algebra and Trigonometry
बीजगणित एवं त्रिकोणमिति

Unit-1	Rank of a matrix, Normal & Echelon form of a matrix, Characteristic equations of a matrix, Eigen values, Eigen vectors, Linear Independence of row and column matrix.
ईकाई–1	आव्यूह की जाति, आव्यूह का प्रासामान्य एवं ऐसेलॉन रूप, आव्यूह का अभिलाक्षणिक समीकरण, आयगेन मान, आयगेन सदिश, पंक्ति एवं स्तम्भ आव्यूह की स्वतंत्रता।
Unit-2	Cayley Hamilton theorem and its use in finding inverse of a matrix, application of matrix to solve a system of linear (homogenous and non-homogenous) equations, theorems on consistency and inconsistency of a system of linear equations, solving linear equations upto three unknowns.
ईकाई–2	केली –हैमिल्टन प्रमेय एवं आव्यूह का व्युत्क्रम आव्यूह (समघात एवं असमघात) ज्ञात करने में इसका उपयोग, रैखिक समीकरणों के निकाय के हल के लिये आव्यूह का प्रयोग, रैखिक समीकरणों के निकाय की संगतता एवं असंगतता पर प्रमेय, तीन अज्ञात राशियों तक के रैखिक समीकरणों के हल।
Unit-3	Relation between the roots and coefficients of a general polynomial equation in one variable, transformation of equations. Reciprocal equations, Descarte's rule of signs.
ईकाई–3	एक चर के सामान्य बहुपदों के समीकरण के गुणांकों एवं मूलों के बीच संबंध, समीकरणों का रूपांतरण, व्युत्क्रम समीकरण, चिन्हों का दिकार्ते नियम।
Unit-4	Logic- Logical connectives, Truth Tables, Tautology, Contradiction, Logical Equivalence, Algebra of propositions. Boolean Algebra -definition and properties,Boolean Functions, switching circuits and its applications, logic gates and circuits.

3-6-19 **(Dr. Geeta Modi)**
3-6-19 **(Dr. V.K. Gupta)**
3.6.19 **(Dr. Vandana Gupta)**
3.6.19 **(Dr. P.L. Sanodia)**

3.6.19 **(Dr. Uma Vyas)**
3/6/19 **(Dr. Sanjay Jain)**
3-6-2019 **(Dr. Lal Chandra Raput)**
3.6.19 **(Dr.Arvind Bohare)**

ईकाई–4	तर्कशास्त्र– तर्क संयोजक, सत्यता सारणी, पुनरुक्ति और व्याघात, तार्किक तुल्यता, साध्यों का बीजगणित। बूलीय बीजगणित– परिभाषा एवं उसके गुणधर्म, बूलीय फलन, स्विचन परिपथ एवं उसके अनुप्रयोग, तर्कद्वार एवं परिपथ।
Unit-5	De – Moivre's theorem and its applications, direct and inverse circular and hyperbolic functions, expansion of trignometric functions, logarithm of complex quantities, Gregory's series, summation of trignometrical series.
ईकाई–5	डी–मोइवर्स प्रमेय एवं इसके अनुप्रयोग, प्रत्यक्ष एवं व्युत्क्रम वृत्तीय एवं अतिपरवलयिक फलन। त्रिकोणमितीय फलनों का विस्तार, सम्मिश्र संख्याओं का लघुगणक, ग्रीगोरी श्रेणी त्रिकोणमितीय श्रेणियों का योग।

Text Books:

1. S.L. Loney – Plane Trigonometry Part-II.
2. K.B. Datta – Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi 2000.
3. Chandrika Prasad – A Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd. Allahabad.
4. C. L. Liu- Elements of Discrete Mathematics(Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.
5. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. H.S. Hall and S.R. Knight- Higher Algebra H.M Publication, 1994.
2. N. Jocobson- Basic Algebra Vol. I and II, W. H. Freeman.
3. I. S. Luther and I. B. S. Passi- Algebra Vol I and II, Narosa Publishing House.
4. N. Saran and R. S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad.

3-6-19
(Dr. Geeta Modi)

3.6.19
(Dr. V.K. Gupta)

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(Dr. Vandana Gupta)

3.6.19
(Dr. P.L. Sanodia)

3.6.19
(Dr. Uma Vyas)

3/6/19
(Dr. Sanjay Jain)

3/6/2019
(Dr. Lal Chandra Raput)

3.6.19
(Dr.Arvind Bohare)

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बी.एससी./बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies

सत्र / Session : 2019-20

Max. Marks/अधिकतम अंक : 40
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : First /प्रथम
Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Third / तृतीय
Title/शीर्षक : Vector Analysis and Geometry सदिश विश्लेषण एवं ज्यामिति

Unit-1	Product of four vectors, Reciprocal vectors, vector differentiation. Gradient, divergence and curl in cartesian and cylindrical co-ordinates. Higher order derivatives, vector identities and vector equations.
ईकाई–1	चार सदिशों का गुणन, व्युत्क्रम सदिश, सदिश अवकलन, कार्तीय एवं बेलनाकार निर्देशंकों में ग्रेडियंट, डायवरजेन्स एवं कर्ल। उच्च कोटि अवकलज, सदिश समिकाये एवं सदिश समीकरण।
Unit-2	Vector Integration, Theorems of Gauss, Green, Stoke (without proof) and problems based on them. Application to geometry, curves in space,curvature and torsion,Serret-Frenet's formula.
ईकाई–2	सदिश समाकलन, गॉस, ग्रीन एवं स्टोकको प्रमेय (बिना उपपत्ति) एवं इन पर आधारित प्रश्न। ज्यामिति में अनुप्रयोग, समष्टि में वक्र, वक्रता, एवं मरोड़, सैरेट,फ्रेनेट सूत्र।
Unit-3	General equation of second degree, tracing of conics, system of conics, polar equation of a conic.
ईकाई–3	द्वितीय घात के व्यापक समीकरण, शांकवो का अनुरेखण, शांकव निकाय, शांकव का ध्रुवीय समीकरण
Unit-4	Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators, Right circular cone, equation of cylinder and its properties.
ईकाई–4	दिए गए आधार पर शंकु का समीकरण, शंकु के जनक, तीन परस्पर लम्बवत जनको हेतु प्रतिबंध, लम्बवृत्तीय शंकु, बेलन का समीकरण और इसके प्रगुण।
Unit-5	Central conicoids, Paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.
ईकाई–5	केन्द्रीय शांकवज, एक और द्वि पृष्ठीय के परवलयज, दीर्घवृत्तज, अतिपरवलयज एवं उनके गुणधर्म।

Text Books:

3/6/2019 (Dr. Lal Chandra Rajput)

3.6.19 (Dr. Arvind Boh

3.6.19 (Dr. Geeta Modi)

(Dr. Uma Vyas)

3.6.19 (Dr V.K. Gupta)

3/6/19

3.6.19

(Dr Jhyaj

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र / Session : 2019-20

Max. Marks/अधिकतम अंक	:	40
Class/कक्षा	:	B.Sc./B.A.
Year/वर्ष	:	First / प्रथम
Subject/विषय	:	Mathematics/गणित
Paper / प्रश्नपत्र	:	Second / द्वितीय
Title/शीर्षक	:	Calculus and Differential Equations कलन एवं अवकल समीकरण

Unit-1	Successive differentiation, Leibnitz theorem, Maclaurin's and Taylor's series expansions, Asymptotes.
ईकाई–1	उत्तरोत्तर अवकलन, लैबनीज प्रमेय, मॅक्लारिन एवं टेलर श्रेणी मे विस्तार। अनंतस्पर्शी।
Unit-2	Curvature, tests for concavity and convexity, points of inflexion, multiple points, tracing of curves in cartesian and polar coordinates.
ईकाई–2	वक्रता, उत्तलता एवं अवतलता का परीक्षण, नति परिवर्तन बिन्दु, बहुबिन्दु, कार्तीय एवं ध्रुवीय निर्देशांको में वक्रो का अनुरेखण।
Unit-3	Integration of transcendental functions, Definite Integrals, Reduction formulae, Quadrature, Rectification.
ईकाई–3	अबीजीय फलनों का समाकलन, निश्चित समाकलन, समानयन सूत्र, क्षेत्रकलन एवं चापकलन।
Unit-4	Linear differential equations and equations reducible to the linear form, Exact differential equations, first order and higher degree equations solvable for x, y and p, Clairaut's equation and singular solutions, geometrical meaning of a differential equation, Orthogonal trajectories.

3.6.19
(Dr. Geeta Modi)

3.6.19

3/6/2019
(Dr. Lal Chandra Rajput)

3.6.19
(Dr. Arvind Bohre)

(Dr V.K. Gupta)

3/6/19
(Dr. Sanjay Jain)

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(Dr. Vandana Gupta)

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(Dr. Uma Vyas)

3.6.19
(Dr R.L. Sanodia)

ईकाई–4	रैखिक अवकल समीकरण एवं रैखिक समीकरण में समानेंय अवकल समीकरण, यथातथ अवकल समीकरण, x, y एवं p में हल होने योग्य प्रथम कोटि एवं उच्च धातीय अवकल समीकरण, क्लेरो का समीकरण और विचित्र हल। अवकल समीकरण का ज्यामितीय अर्थ:, लांबिक संछेदियां।
Unit-5	Linear differential equation with constant coefficients, Homogeneous linear ordinary differential equations, Linear differential equations of second order, transformation of equations by changing the dependent variable/ independent variable, method of variation of parameters.
ईकाई–5	अचर गुणांको वाले रैखिक अवकल समीकरण, साधारण रैखिक समघात अवकल समीकरण, द्वितीय कोटि के रैखिक अवकल समीकरण, स्वतंत्र चर/ परतंत्र चर के परिवर्तन द्वारा समीकरणों का रुपांतरण, प्राचल विचरण विधि।

Text Books:

1. Gorakh Prasad- Differential Calculus, Pothishala Private Ltd., Allahabad.
2. Gorakh Prasad- Integral Calculus, Pothishala Private Ltd., Allahabad.
3. D. A. Murray- Introductory Course in Differential Equations, Orient Longman (India) 1967.
4. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Books:

1. G. F. Simmons- Differential Equations, Tata McGraw Hill, 1972.
2. E. A. Codington- An Introduction to ordinary differential Equation, Prentice Hall of India, 1961.
3. H. T. H. Piaggio- Elementary Treatise on Differential Equations and their Application, C. B.S. Publisher & Distributors, Delhi, 1985.
4. S. G. Deo- Differential Equations, Narosa Publishing House.
5. N. Piskunov – Differential and Integral Calculus, Peace Publishers, Moscow.

Chan 3.6.19 (Dr. Geeta modi)

3.6.19 (Dr V.K. Gupta)

3/6/2019 (Dr Lal Chandra Rajput)

3.6.19 (Dr. Arvind Bohre)

3/6/19 (Dr Sanjay Jain)

3.6.19 (Dr. Vandana Gupta)

Wyas 3.6.19 (Dr. Uma Vyas)

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3.6.19 Dr P L Sanodia

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र / Session : 2019-20

Max. Marks/अधिकतम अंक : 40
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : First /प्रथम
Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Third / तृतीय
Title/शीर्षक : Vector Analysis and Geometry
सदिश विश्लेषण एवं ज्यामिति

Unit-1	Product of four vectors, Reciprocal vectors, vector differentiation. Gradient, divergence and curl in cartesian and cylindrical co-ordinates. Higher order derivatives, vector identities and vector equations.
ईकाई–1	चार सदिशों का गुणन, व्युत्क्रम सदिश, सदिश अवकलन, कार्तीय एवं बेलनाकार निर्देशंकों में ग्रेडियंट, डायवरजेन्स एवं कर्ल। उच्च कोटि अवकलज, सदिश समिकाये एवं सदिश समीकरण।
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ईकाई–2	सदिश समाकलन, गॉस, ग्रीन एवं स्टोककी प्रमेय (बिना उपपत्ति) एवं इन पर आधारित प्रश्न। ज्यामिति में अनुप्रयोग, समष्टि में वक्र, वक्रता, एवं मरोड़, सैरेट,फ्रेनेट सूत्र।
Unit-3	General equation of second degree, tracing of conics, system of conics, polar equation of a conic.
ईकाई–3	द्वितीय घात के व्यापक समीकरण, शांकवो का अनुरेखण, शांकव निकाय, शांकव का ध्रुवीय समीकरण
Unit-4	Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators, Right circular cone, equation of cylinder and its properties.
ईकाई–4	दिए गए आधार पर शंकु का समीकरण, शंकु के जनक, तीन परस्पर लम्बवत जनको हेतु प्रतिबंध, लम्बवृत्तीय शंकु, बेलन का समीकरण और इसके प्रगुण।
Unit-5	Central conicoids, Paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.
ईकाई–5	केन्द्रीय शांकवज, एक और द्वि पृष्ठीय के परवलयज, दीर्घवृत्तज, अतिपरवलयज एवं उनके गुणधर्म।

Text Books:

3-6-19
(Dr. Geeta Modi)

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(Dr. Uma Vyas)

3.6.19
(Dr V.K. Gupta)

3/6/2019
(Dr. Lal Chandra Rajput)

3.6.19
(Dr. Arvind Bohre)

3/6/19
(Dr Jaya [illegible])

3.6.19
(Dr. Vandana Gupta)

3-6-19
(Dr R2 Sarodia)

1. N. Saran and S. N. Nigam- Introduction to Vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H. C. Gupta-Text Book on Coordinate Geometry, Pothishala Pvt. Ltd. Allahabad.
3. N. Saran and R.S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad (Unit IV).

Reference Books:

1. R. J. T. Bell- Elementary Treatise on Coordinate Geometry of Three Dimensions, Macmillan India Ltd., 1994(Unit-V).
2. Murray R. Spiegel-Theory and Problems of Advance Calculus, Schaum Publishing Company, New York.
3. Murray R.Spiegel-Vector Analysis, Schaum Publishing Company, New York.
4. Shanti Narayan-A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
5. Shanti Narayan- A Text Book of Vector Algebra, S. Chand & Co., New Delhi.
6. S. L. Loney-The Elements of Coordinate Geometry, Macmillan and Company, London.
7. P. K. Jain and Khalil Ahmad- A text book of Analytical Geometry of Two Dimensions, Macmillan Indian Ltd., 1994
8. P. K. Jain and Khalil Ahmad- A text book of Analytical Geometry of Three Dimensions, Willey Eastern Ltd., 1999.

3.6.19 (Dr. Geeta Modi)
3.6.19 (Dr. V.K. Gupta)
3.6.19 (Dr. Vandana Gupta)
3.6.19 (Dr. P.L. Sanodia)

3.6.19 (Dr. Uma Vyas)
3/6/19 (Dr. Sanjay Jain)
3/6/2019 (Dr. Lal Chandra Raput)
3.6.19 Dr.Arvind Bohre

उच्च शिक्षा विभाग म.प्र. शासन

बी.एससी./बी.ए. कक्षाओ के लिये बार्षिक परीक्षा पद्धति के अनुसार पाठ्यक्रम

केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department Of Higher Education, Govt. of M. P.

Scheme of Examination and Syllabus for Annual Exam System

B. Sc./B.A. II Year

Academic Session: 2020-2021

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assessment Maximum Marks.	Minimum Passing Marks in Internal Assessment	Practical Maximum Marks	Practical Passing Marks	Total
I- Abstract Algebra	40	120	40	Ist term- (3 Months) 10 IInd term- (6 Months) 20 Total=30	10	---	---	150
II- Advanced calculus	40							
III- Differential Equations	40							

Note : There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks) :This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (10 Marks) : This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2 marks.

Section C (25 Marks) : This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory + 6 Period Practical)

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(Dr. Geeta Modi) **(Dr. V.K. Gupta)** **(Dr. Vandana Gupta)** **Dr. P.L. Sanodia)**

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(Dr. Uma Vyas) **(Dr. Sanjay Jain)** **(Dr. Lal Chandra Raput)** **Dr.Arvind Bohre**

बी.एससी./बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies

सत्र/Session : 2020-21

Max. Marks/अधिकतम अंक : 40
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : Second /द्वितीय
Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : First/प्रथम
Title/शीर्षक : Abstract Algebra
अमूर्त बीजगणित

Unit-1	Definition and basic properties of groups, subgroups, subgroups generated by a subset, Cyclic groups and simple properties.
ईकाई–1	समूह की परिभाषा एवं सामान्य प्रगुण, उपसमूह, उपसमुच्चय से जनित उपसमूह, चक्रीय समूह एवं सामान्य प्रगुण
Unit-2	.Coset decomposition, Lagrange's theorem and its corollaries including Fermat's theorem, Normal subgroups. Quotient groups.
ईकाई–2	सहसमुच्चय वियोजन, लैग्रांज प्रमेय एवं इसकी उपप्रमेय फर्मा प्रमेय, प्रसामान्य उपसमूह, विभाग समूह।
Unit-3	Homomorphism and Isomorphism of groups, Fundamental theorem of homomorphism. Transformation and Permutation group, S_n (various subgroups of S_n, $n<5$ to be studied), Cayley's theorem.
ईकाई–3	समूहों की समाकारिता एवं तुल्याकारिता, समाकारिता का मूलभूत प्रमेय, रुपान्तरण एवं क्रमचय समूह S_n(S_n के विभिन्न उपसमूह, संकल्पित है कि $n<5$), कैली प्रमेय।
Unit-4	Group Automorphism, Inner Automorphism, group of Automorphisms, Conjugacy relation and Centraliser, Normaliser, Counting principle and class equation of a finite group, Cauchy's theorem for finite abelian groups and non-abelian groups.
ईकाई–4	समूह स्वकारिता, अंतः स्वकारिता, स्वकारिताओं का समूह, संयुग्मिता संबंध और केन्द्रीयकारक, प्रसामान्यक, गणना सिद्धांत एवं परिमित समूह का वर्ग समीकरण। परिमित

3.6.19
(Dr. Geeta modi)

Vyas 3/6/19
(Dr. Uma Vyas)

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(Dr V. K. Gupta)

3.6.19
Dr. Lal Chandra
Raipur

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(Dr. Vandana Gupta)

Dr. Arvind Bohre

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(Dr P L Sanodia)

3/6/19
(Dr Sanjay Jain)

	आबेली एवं अन–आबेली समूह के लिए कौशी का प्रमेय।
Unit-5	Definition and basic properties of rings, Ring homomorphism, subrings, Ideals and Quotient rings, Polynomial rings & its properties, Integral domain, Principal ideal domains,Euclidean domains and unique factorization domains, Field and quotient field.
ईकाई–5	वलय की परिभाषा एवं सामान्य प्रगुण, वलय समाकारिता, उपवलय, गुणजावली एवं विभाग वलय, बहुपद वलय एवं उसके प्रगुण, पूर्णाकीय प्रांत। मुख्य गुणजावली प्रांत, यूक्लीडियन प्रांत एवं अद्वितीय गुणनखण्डीकरण प्रांत, क्षेत्र एवं विभाग क्षेत्र।

Text Books:

1. I. N. Herstein-Topics in Algebra,Wiley Eastern Ltd. New Delhi. 1977.
2. PB Bhattacharya, S. K. Jain and S R Nagpaul-Basic Abstract Algebra, Wiley Eastern, New Delhi, 1997
3. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Books:

1. Shantinarayan-A text Book of Modern Abstract Algebra, S.Chand and Company, New Delhi.
2. Surjeet Singh- A Text Book of Modern Algebra.
3. N. Jacobson- Basic Algebra, Vol. I and II, W. H. Freeman.
4. I. S. Luther and I. B. S. Passi- Algebra., Vol I and II, Narosa Publishing House.

3-6-19 (Dr. Geeta Modi)
3.6.19 (Dr. V.K. Gupta)
3-6-19 (Dr. Vandana Gupta)
3.6.19 (Dr. P.L. Sanodia)

3.6.19 (Dr. Uma Vyas)
3/6/19 (Dr. Sanjay Jain)
3-6-19 (Dr. Lal Chandra Raput)
Dr.Arvind Bohre

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केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies

सत्र/Session : 2020-21

Max. Marks/अधिकतम अंक	:	40
Class/कक्षा	:	B.Sc./B.A.
Year/वर्ष	:	Second/ द्वितीय
Subject/विषय	:	Mathematics/गणित
Paper /प्रश्नपत्र	:	Second/द्वितीय
Title/शीर्षक	:	Advanced calculus उच्च कलन

Unit-1	Definition of a sequence, Theorems on limits of sequences, indeterminate forms. Bounded and monotonic sequences. Cauchy's convergence criterion, series of non-negative terms, comparison test, Cauchy's intergral test, Cauchy's root test, ratio tests, Raabe's tests, logarithmic tests, Alternating series. Leibnitz's test, Absolute and conditional convergence, absolute and conditional convergence of series of real and complex terms, rearrangement of series.
ईकाई–1	अनुक्रम की परिभाषा, अनुक्रम की सीमा पर प्रमेय, अनिरधार्य रूप, परिबद्ध एवं एकदिष्ट अनुक्रम कॉशी का अभिसरण मापदण्ड, अऋणात्मक पदों की श्रेणी, तुलना परीक्षण, कॉशी का समाकल परीक्षण, कॉशी का मूल परीक्षण, अनुपात परीक्षण, राबी का परीक्षण, लघुगणकीय परीक्षण, एकान्तर श्रेणी, लिबनीज परीक्षण, निरपेक्ष एवं प्रतिबंधी अभिसरण, वास्तविक एवं सम्मिश्र पदो की श्रेणियो का निरपेक्ष एवं प्रतिबंधमयी अभिसरण।
Unit-2	Continuity of functions of single variable, sequential continuity. Properties of continuous functions. Uniform continuity, chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives.
ईकाई–2	सांतत्य (एक चर फलन), अनुक्रमणीय सांतत्य, संतत फलनों के गुणधर्म, एक समान सांतत्य, अवकलनीयता का श्रृंखला नियम, मध्यमान प्रमेय एवं उनका ज्यामितीय अर्थ, अवकलों के लिए डार्बू का मध्यवर्ती मान प्रमेय।
Unit-3	Limit and continuity of functions of two variables, Partial differentiation, Change of variables, Euler's theorem on homogeneous functions, Taylor's theorem for

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(Dr. Arvind Bohre)

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(Dr D.L. Sanodia)

(Dr V.K. Gupta)

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(Dr Sanjay Jain)

	functions of two variables, Jacobians.
ईकाई–3	दो चरों के फलनों की सीमा एवं सांतत्य, आंशिक अवकलन, चरों का परिवर्तन, समघात फलनों पर आयलर का प्रमेय, दो चरों के फलनों के लिए टेलर का प्रमेय, जेकोबियन।
Unit-4	Envelopes, Evolutes, Maxima and Minima of functions of two variables, Lagrange's multiplier method, Beta and Gamma Functions.
ईकाई–4	अन्वालोप, केन्द्रज, दो चरों के फलनों का उच्चिष्ठ एवं निम्निष्ठ, लेग्रांज के गुणांको की विधि, बीटा एवं गामा फलन।
Unit-5	Double and triple integrals, volumes and surfaces of solids of revolution Dirichlet's integrals, change of order of integration in double integrals.
ईकाई–5	द्विक एवं त्रिक समाकल, ठोस के परिभ्रमण से जनित आयतन एवं पृष्ठ, ड्रीचलेटस् समाकल, द्विक समाकल के क्रम का परिवर्तन।

Text Books:

1. R. R. Goldbeg -Real Analysis, Oxford& I.B.H. Publishing co., New Delhi
2. Gorakh Prasad- Differential Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Gorakh Prasad- Integral Calculus, Pothishala Pvt. Ltd. Allahabad
4. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Books:

1. Gabriel Klaumber- Mathematical Analysis, Marcel Dekkar, Inc. NewYork, 1975
2. T. M. Apostol- Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
3. D. Soma Sundaram and B. Choudhary- A first Course in mathematical Analysis, Narosa Publishing, House, New Delhi, 1997.
4. Murray R. Spiegel- Theory and problems of advance Calculus, Schauma Publishing Co., New York
5. O. E. Stanaitis- An Introduction to Sequences, Series and improper Integrals.

3.6.19
(Dr. Geeta Modi)

3.6.19
(Dr. V.K. Gupta)

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3.6.19
(Dr. Sanjay Jain)

3/6/2019
(Dr. Lal Chandra Raput)

Dr.Arvind Bohre

बी.एससी./बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र/Session : 2020-21

Max. Marks/अधिकतम अंक	:	40
Class/कक्षा	:	B.Sc./B.A.
Year/वर्ष	:	Second / द्वितीय
Subject/विषय	:	Mathematics/गणित
Paper /प्रश्नपत्र	:	Third/तृतीय
Title/शीर्षक	:	Differential Equations अवकल समीकरण

Unit-1	Series solutions of differential equations, Power series method, Bessel's and Legendre's equations, Bessel's and Legendre's functions and their properties-recurrence and generating function. Orthogonality of functions.
ईकाई–1	अवकल समीकरण का श्रेणी हल, घात श्रेणी विधि बेसल एवं लेजेन्ड्रे समीकरण, बेसल एवं लेजेन्ड्रे फलन एवं उनके गुणधर्म, पुनरावृत्त एवं जनक फलन, फलन की लाम्बिकता।
Unit-2	Laplace Transformation, Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems, Differentiation and integration of transforms.
ईकाई–2	लॉप्लास रुपांतरण, लॉप्लास रुपांतरण की रैखिकता, लॉप्लास रुपांतरण के लिए अस्तित्व प्रमेय। अवकलजों एवं समाकलों का लॉप्लास रुपांतरण, स्थनांतर प्रमेय, रुपांतरणों का अवकलन एवं समाकलन।
Unit-3	Inverse Laplace transforms, Convolution theorem, Application of Laplace transformation for solving initial value problems of second order linear differential equations with constant coefficients.
ईकाई–3	प्रतिलोम लॉप्लास रुपांतरण, संवलन प्रमेय, प्रारंभिक मान समस्याओ के लिए द्वितीय कोटि के अचर गुणांको सहित रैखिक अवकल समीकरणों को हल करने में लॉप्लास रुपांतरणों के अनुप्रयोग।
Unit-4	Partial differential equations of the first order, Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method.

3-6-19
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(Dr. Vandana Gupta)

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(Dr. Lal Chandra Rajput)

(Dr. Arvind Bohre)

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(Dr. Sanjay Jain)

(Dr. V.K. Gupta)

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ईकाई–4	प्रथम कोटि के आंशिक अवकल समीकरण, लैग्रांज विधि, विशिष्ट प्रकार के अवकल समीकरण का व्यापक विधि के अतिरिक्त अन्य विधि द्वारा सरलता से हल, चारपिट की व्यापक विधि।
Unit-5	Partial differential equations of second and higher orders, Classification of partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, equation of vibrating string, heat equation Laplace's equation and their solutions.
ईकाई–5	द्वितीय व उच्च कोटि के आंशिक अवकल समीकरण, द्वितीय कोटि के आंशिक अवकल समीकरणों का वर्गीकरण, अचल गुणांकों के समघात एवं असमघात समीकरण, अचर गुणांकों में समानेय आंशिक अवकल समीकरण, कंपनेय डोरी का समीकरण, उष्मा समीकरण, लॉप्लास समीकरण एवं इनके हल।

Text Book:

1. Sharma and Gupta- Integral Transform, Pragati, Prakashan Meerut.
2. Sharma and Gupta- Differential Equation, Pragati, Prakashan Meerut.
3. Raysinghania- Differential Equation, S. Chand & Company, New Delhi.
4. मध्यप्रदेश हिन्दी ग्रन्थ अकादमी की पुस्तकें।

Reference Book:

1. D. A. Murray - Introductory course in differential equation, Orient Longman, India, 1967
2. G. F. Simnons – Differntial Equations, Tata Mcgraw Hill, 1972.
3. E.A. Codington - An introduction to Ordinary differential equations, Prentice Hall of India, 1961
4. H. T. H. Piaggio – Elementary Treatise on Differential equations and their applications, C. B. S. Publisher and Distributors, Delhi, 1985.
5. E. D. Rainville – Special Functions, The Macmillan Company, New York.

3.6.19 (Dr. Geeta Modi)
3.6.19 (Dr. V.K. Gupta)
3.6.19 (Dr. Vandana Gupta)
3.6.19 (Dr. P.L. Sanodia)

3.6.19 (Dr. Uma Vyas)
3\6\19 (Dr. Sanjay Jain)
3.6.19 (Dr. Lal Chandra Raput)
Dr.Arvind Bohre

उच्च शिक्षा विभाग म.प्र. शासन
बी.एससी./बी.ए. कक्षाओ के लिये बार्षिक परीक्षा पद्धति के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department Of Higher Education, Govt. of M. P.
Scheme of Examination and Syllabus for Annual Exam System
B. Sc./B.A. III Year

Academic Session: 2021-2022

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assess-ment Maximum Marks.	Minimum Passing Marks in Internal Assess-ment	Prac-tical Maxi-mum Marks	Prac-tical Passing Marks	Total
I- Linear Algebra And Numerical Analysis	40	120	40	Ist term- (3 Months) 10 IInd term- (6 Months) 20 Total=30	10	---	---	150
II- Real and Complex Analysis	40							
III- Optional Paper*	40							

***III A Statistical methods, III B- Discrete Mathematics, III C- Mechanics, III D Mathematical Modelling, III E- Financial Mathematics III F –Computer and Linear Programming.**

(Optional Paper should be different from main subject.)

Note : There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks) :This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (10 Marks) : This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2 marks.

Section C (25 Marks) : This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science subjects

(6 Period Theory + 6 Period Practical)

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies

सत्र / Session : 2021-22

Max. Marks/अधिकतम अंक : 40
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : Third/ तृतीय
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : First / प्रथम
Title/शीर्षक : Linear Algebra And Numerical Analysis
रैखिक बीजगणित एवं संख्यात्मक विश्लेषण

Note;- Scientific Calculator will be allowed in the examination of this paper.
नोटः– इस प्रश्न पत्र की परीक्षा में साइंटिफिक केलक्यूलेटर के उपयोग की अनुमति है।

Unit-1	Definition and examples of Vector spaces, subspaces, sum and direct sum of subspaces, Linear span, Linear dependence, independence and their basic properties, Basis, Existence Theorem for basis, Extension Theorem, Invariance of the number of elements of a basis, Dimension, Finite dimensional vector spaces, Existence of complementary subspaces of a subspace of a finite dimensional vector space, Dimension of sum of subspaces, Quotient space and its dimension.
ईकाई–1	संदिश समष्टि की परिभाषा एवं उदाहरण, उपसमष्टि, उपसमष्टियों का योग एवं प्रत्यक्ष योग, रैखिक विस्तृति, रैखिक परतंत्रता, स्वतंत्रता एवं उनके मूल गुणधर्म, आधार, आधार का अस्तित्व प्रमेय, विस्तार प्रमेय, आधार में अवयवों की संख्या की अपरिवर्तनशीलता, विमा, परिमित विमीय सदिश समष्टियॉं, परिमित विमीय सदिश समष्टि की उपसमष्टि की पूरक उपसमष्टि का अस्तित्व, उपसमष्टियों के योग की विमा, विभाग समष्टि एवं उसकी विमा।
Unit-2	Linear transformations and their representation as matrices, Algebra of linear transformations, Rank-Nullity theorem, change of basis, dual space, bi-dual space and natural isomorphism, adjoint of a linear transformation, eigen values and eigen vectors of a linear transformation, Diagonalisation, Bilinear,Quadratic and Hermitian forms.
ईकाई–2	रैखिक रूपांतरण एवं उनका आव्यूह निरूपण, रैखिक रूपातरणों का बीज गणित, जाति शून्यता प्रमेय, आधार का परिवर्तन, द्वैत समष्टि, द्विद्वैत समष्टि एवं प्राकृतिक तुल्याकारिता, एडज्वाइंट का रैखिक रूपांतरण ,रैखिक रूपांतरणों के आइगन मान एवं आइगन सदिश, विकर्णीकरण, द्विएकघाती, द्विघाती एवं हर्मितीय समघात
Unit-3	Inner Product Space- Cauchy-Schwartz inequality, orthogonal vectors, orthogonal

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	complements, orthonormal sets and bases,Bessel's inequality for finite dimensional spaces. Gram-Schmidt orthogonalization process.
ईकाई–3	आंतर गुणन समष्टि– कौशी स्वार्ज असमिका, लांबिक संदिश, लांबिक पूरक, प्रसामान्य लांबिक समुच्चय एवं आधार, परिमित विमीय समष्टियों हेतु बेसल की असमिका, ग्राम श्मिट लांबिकता प्रक्रम।
Unit-4	Solution of Equations : Bisection, Secant, Regula Falsi,Newton's Methods. Roots of second degree polynomial equations. Interpolation: Lagrange interpolation, Divided differences, Interpolation formula using Differences. Numerical Quadrature. Newton- Cote's formulae. Gauss Quadrature formulae
ईकाई–4	समीकरणों के हल– द्वि–विभाजन विधि, सिकेण्ट विधि, रेग्यूला फाल्सी विधि, न्यूटन विधि, द्वितीय घात के बहुपद समीकरण के मूल। अन्र्तवेशन लैग्रांज अन्र्तवेशन, विभाजित अंतर, अंतर के उपयोग से अन्र्तवेशन सूत्र, संख्यात्मक क्षेत्रकलन, न्युटन कोट्स सूत्र, गाउस क्षेत्रकलन सूत्र।
Unit-5	Linear equations direct methods for solving systems of linear equations (Gauss elimination, LU decomposition, Cholesky decomposition), Iterative methods (Jacobi, Gauss- Seidel reduction methods). Ordinary differential equations : Euler method, Single step method, Runge-Kutta's method, Multistep methods, Milne Simpson method. Methods based on Numerical integration, methods based on numerical differentiation.
ईकाई–5	रैखिक समीकरण, रैखिक समीकरणों के निकाय को हल करने की प्रत्यक्ष विधियाः (गाउस विलोपन, एल–यू वियोजन, चोलेस्की वियोजन), पुनरावृत्ती विधियॉ (जेकोबी विधि, गाउस सिडेल विधि), साधारण अवकल समीकरणः आयलर विधि, एकल चरण विधि, रुंग कुटटा विधि, बहुचरण विधि, मिलने–सिम्पसन विधि, सख्यात्मक समाकलन पर आधारित विधियॉ एवं सख्यात्मक अवकलन पर आधरित विधियॉ।

Text Books:-

1. K. B. Datta- Matrix and Linear Algebra,Pretice hall of India Pvt. Ltd. New Delhi,2000.
2. S. S. Sastry- Introductory Methods of Numerical Analysis, PHI Learning Pvt. Ltd.

Reference Books:

1. K. Hoffiman and R. Kunze- Linear Algebra, 2nd Edition, Prentice Hall Englewood Cliffs, New Jersey, 1971.
2. S. K. jain, A Gunawardena & P. B. Bhattacharya- Basic Linear Algebra with MATLAB Key College Publishing(Springer- Verlag) 2001
3. S. Kumarsaran- Linear Algebra, A Bermetric Approac Prentice- Hall of India,200
4. Balaguruswamy- Numerical Methods, Tata Mc Graw Hill Publication, New Yark.

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केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
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Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : Third Optional-A / तृतीय एच्छिक–ए
Title/शीर्षक : Statistical methods/सांख्यिकीय विधियां

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Unit-1	Frequency distribution- Measures of central tendency, Mean, Median, Mode, G.M, H.M, Partition values, Measures of dispersion- Range, Interquartile range, Mean deviation, Standard deviation, Moments, Skewness and kurtosis.
ईकाई–1	आवृत्ति बंटन–केन्द्रीय प्रवृत्ति की माप, माध्य, माध्यिका, बहुलक, गुणोत्तर माध्य, हरात्मक माध्य। विभाजनकारी मान, विक्षेपण की माप–परास, अन्तर्चतुर्थक परास, माध्य विचलन, मानक विचलन, आघूर्ण, वैषम्य और कुकुदता।
Unit-2	Probablity- Event, Sample space, Probablity of an event, Addition and multiplication theorems, Baye's theorem, Continuous probablity- probablity density function and its applications for finding the mean, mode, median and standard deviation of various continuous probablity distributions. Mathematical expectation, Expectation of sum and product of random variables, Moment generating function.
ईकाई–2	प्रायिकता– घटना, प्रतिदर्श समष्टि किसी घटना की प्रायिकता, प्रायिकता की योग एवं गुणन प्रमेय, बेज का प्रमेय, सत्त प्रायिकता, प्रायिकता घनत्व फलन एवं विभिन्न सतत् प्रायिकता बंटनो के लिये माध्य, बहुलक, माध्यिका ज्ञात करने में इसके अनुप्रयोग, गणितीय प्रत्याशा, यादृच्छिक चरो के योग एवं गुणन की गणितीय प्रत्याशा, आघूर्ण जनित फलन।
Unit-3	Theoretical distribution- Binomial, Poisson, rectangulars and exponential distributions, their properties and uses.

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ईकाई–3	सैद्धांतिक बंटन– द्विपद, प्वॉसो, आयताकार और चरघातांकी बंटन, इनके प्रगुण एवं प्रयोग।
Unit-4	Methods of least squares, Curve fitting, co-relation and regression, partial and multiple correlations (upto three variables only).
ईकाई–4	न्यूनतम वर्गविधि, वक्रों का आसंजन, सहसंबंध एवं समाश्रयण, आंशिक एवं बहु सहसंबंध (केवल तीन चरो तक)।
Unit-5	Sampling- Sampling of large samples, Null and alternative hypothesis, Errors of first and second kinds, Level of significance, Critical region, Tests of significance based on chi-square,t,F and Z-statistics.
ईकाई–5	प्रतिचयन– वृहद प्रतिदर्शो का प्रतिचयन, शून्य एवं वैकल्पिक परिकल्पना प्रथम एवं द्वितीय प्रकार की त्रुटियाँ, सार्थकता स्तर, क्रांतिक क्षेत्र, काई–बर्ग, एजएथ और सांख्यिक पर आधारित सार्थकता परीक्षण।

Text Books:

1. H. C. Saxena and J. N. Kapoor, Mathematical Statistics, S. Chand and Company.
2. M. Ray_ Statistical Methods.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

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Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
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Paper /प्रश्नपत्र	:	Second /द्वितीय
Title/शीर्षक	:	Real and Complex Analysis वास्तविक एवं सम्मिश्र विशलेषण

Unit-1	Riemann integral, Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus, Partial derivatives and differentiability of real-valued functions of two variables. Schwarz's and Young's theorem. Implicit function theorem.
ईकाई–1	रीमान समाकल, सतत एव एकदष्टि फलनों की समाकलनीयता, समाकलन का मूलभूत प्रमेय, समाकलनों के माध्यमान प्रमेय, दो चरों के वास्तविक मान फलनों के आंशिक अवकलज एवं अवकलनीयता, स्वार्ज एवं यंग क प्रमेय, अस्पष्ट फलन प्रमेय।
Unit-2	Improper integrals and their convergence, Comparisn tests, Abel's and Dirichlet's tests. Frullani's integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter. Fourier series of half and full intervals.
ईकाई–2	अनुचित समाकल एवं उनका अभिसरण, तुलना परीक्षण, आबेल एवं डिरिक्ले का परीक्षण, प्रचालिक फलनों के रुप में फ्रुलानी समाकल, सांतत्य, एक प्राचल के फलन के समाकल अवकलनीयता एवं समाकलनीयता, अर्द्ध एवं पूर्ण अंतरालों की फोरियर श्रेणी।
Unit-3	Definition and examples of metric spaces. Nieghbourhoods. Limit points. Interior points. Open and closed sets. Closure and interior . Boundary points. Subspace of metric space, Cauchy sequences, Completeness, Cantor's intersection theorem, Contraction principle, Real number as a complete ordered field. Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces, Continuous functions, Uniform continuity, Properties of continuous fuctions on compact sets.
ईकाई–3	दूरीक समष्टि की परिभाषा एवं उदाहरण, सामीप्य, सीमा बिन्दु, आंतरिक बिन्दु, विवृत एवं संवृत समुच्चय, संवरक एवं अभ्यंतर, परिसीमा बिन्दु, दूरीक समष्टि की उप समष्टि, कौशी अनुक्रम, पूर्णता, केन्टर का सर्वनिष्ठ प्रमेय, संकुचन सिद्धांत, पूर्ण क्रमित क्षेत्र के रुप में वास्तविक संख्यायें, सघन उपसमुच्चय, बायर–केटेगरी प्रमेय, पृथक्करण, द्वितीय गणनीय एवं प्रथम गणनीय समष्टि, सतत फलन, एकसमान सांतत्य, संहत समुच्चयों पर सतत फलनो के प्रगुण।

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Dr V.K. Gupta
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Unit-4	Continuity and differentiability of complex functions. Analytic functions. Cauchy-Reimann equations. Harmonic functions, Cauchy's Theorem, Cauchy's Integral formula.
ईकाई–4	सम्मिश्र फलनों की संतत्यता और अवकलनीयता, विश्लेषिक फलन, कौशी– रीमान समीकरण, हार्मोनिक फलन, कौशी प्रमेय एवं कौशी समाकलन सूत्र।
Unit-5	Power series representation of an analytical function, Taylor's series, Laurant's series, Singularities, Cauchy's Residue Theorem, Contour Integratrion.
ईकाई–5	घात श्रेणी, वैश्लेषिक फलन का निरूपण, टेलर की श्रेणी, लॉरेन्ट की श्रेणी, विलक्षणता (सिंगुलेरटीज़), कॉशी का अवशेष प्रमेय, परिरेखा (कंटूर) समाकलन।

Text Books:

1. Mathematical analysis by S. C. Malik and Savita Arora, New Age Publication, Delhi.
2. G.F. Simmons – Introduction to Topology and Modern Analysis, Mc Graw Hill, New York 1963
3. L. V. Alhfors, complex Analysis Mc Graw Hill, New York
4. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Recommend Books

1. Walter Rudin- Real and Comples Analysis, Mc Graw Hill, New York
2. Ponnuswamy- Complex Analysis, Narosa Publication, New Delhi.
3. R. V. Churchill & J.W. Brown, Complex Variables andApplication, 5th Edition, Mc Graw Hill, New York, 1990

3-6-19
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ईकाई–1	आवृत्ति बंटन–केन्द्रीय प्रवृत्ति की माप, माध्य, माध्यिका, बहुलक, गुणोत्तर माध्य, हरात्मक माध्य। विभाजनकारी मान, विक्षेपण की माप–परास, अन्तर्चतुर्थक परास, माध्य विचलन, मानक विचलन, आघूर्ण, वैषम्य और कुकुदता।
Unit-2	Probablity- Event, Sample space, Probablity of an event, Addition and multiplication theorems, Baye's theorem, Continuous probablity- probablity density function and its applications for finding the mean, mode, median and standard deviation of various continuous probablity distributions. Mathematical expectation, Expectation of sum and product of random variables, Moment generating function.
ईकाई–2	प्रायिकता– घटना, प्रतिदर्श समष्टि किसी घटना की प्रायिकता, प्रायिकता की योग एवं गुणन प्रमेय, बेज का प्रमेय, सतत् प्रायिकता, प्रायिकता घनत्व फलन एवं विभिन्न सतत् प्रायिकता बंटनो के लिये माध्य, बहुलक, माध्यिका ज्ञात करने में इसके अनुप्रयोग, गणितीय प्रत्याशा, यादृच्छिक चरो के योग एवं गुणन की गणितीय प्रत्याशा, आघूर्ण जनित फलन।
Unit-3	Theoretical distribution- Binomial, Poisson, rectangulars and exponential distributions, their properties and uses.

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3/6/19 (Dr Sanjay Jain)
3.6.19 (Dr. Vandana Gupta)

ईकाई–3	सैद्धांतिक बंटन– द्विपद, प्वॉसो, आयताकार और चरघातांकी बंटन, इनके प्रगुण एवं प्रयोग।
Unit-4	Methods of least squares, Curve fitting, co-relation and regression, partial and multiple correlations (upto three variables only).
ईकाई–4	न्यूनतम वर्गविधि, वक्रों का आसंजन, सहसंबंध एवं समाश्रयण, आंशिक एवं बहु सहसंबंध (केवल तीन चरो तक)।
Unit-5	Sampling- Sampling of large samples, Null and alternative hypothesis, Errors of first and second kinds, Level of significance, Critical region, Tests of significance based on chi-square,t,F and Z-statistics.
ईकाई–5	प्रतिचयन– वृहद प्रतिदर्शो का प्रतिचयन, शून्य एवं वैकल्पिक परिकल्पना प्रथम एवं द्वितीय प्रकार की त्रुटियाँ, सार्थकता स्तर, क्रांतिक क्षेत्र, काई–बर्ग, एजएथ और ' सांख्यिक पर आधारित सार्थकता परीक्षण।

Text Books:

1. H. C. Saxena and J. N. Kapoor, Mathematical Statistics, S. Chand and Company.
2. M. Ray_ Statistical Methods.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

3.6.19
(Dr. Geeta Modi)

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(Dr. V.K. Gupta)

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(Dr. Vandana Gupta)

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(Dr. P.L. Sanodia)

3.6.19
(Dr. Uma Vyas)

3.6.19
(Dr. Sanjay Jain)

3-6-2019
(Dr. Lal Chandra Raput)

Dr.Arvind Bohre

बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
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Class/कक्षा : B.Sc./B.A.
Year/वर्ष : Third/तृतीय
Subject/विषय : Mathematics/गणित
Paper / प्रश्नपत्र : Third Optional-B / तृतीय एच्छिक–बी
Title/शीर्षक : Discrete Mathematics/ विविक्त गणित

Unit-1	Boolean functions-disjunctive & cunjunctive normal forms (canonical & dual canonical), Bool's expansion theorem, Relations- Binary relation, Inverse relation, Composite relation, Equivalence relation, Equivalence classes & its properties Partition of a set.
ईकाई–1	बूलीय फलन – वियोजनीय एवं संयोजनीय प्रसामान्य रूप (केनोनिकल एवं डूअल केनानिकल), बूल का विस्तार प्रमेय। संबंध– द्विचर संबंध, प्रतिलोम संबंध, संयोजित संबंध, तुल्यता संबंध, तुल्यता वर्ग एवं उसके गुण धर्म, समुच्चय का विभाजन।
Unit-2	Partial order relation, Partially ordered sets, totally ordered sets, Hasse diagram, maximal and minimal element, first and last element Lattice- definition and examples, dual lattice, bounded lattice, distributive lattice, complemented lattice.
ईकाई–2	अंशतः क्रम संबंध, अंशतः क्रमित समुच्चय, पूर्णतः क्रमित समुच्चय, हैसूह आरेख, उच्चिष्ठ एवं निमनिष्ठ अवयव, प्रथम एवं अन्तिम अवयव, जालक –परिभाषां एवं उदाहरण, द्वैत जालक, परिबद्ध जालक, वितरणीय जालक, पूरक जालक।
Unit-3	Graph- Definition, types of graphs, Subgraphs, walk, path , circuit, connected and disconnected graphs, Euler graph, Hamiltonian path and circuit, shortest path in weighted graph, Dijkstra's Algorithm for shortest paths.
ईकाई–3	आलेख– परिभाषा एवं प्रकार उप आलेख, गमन, पथ एवं परिपथ, संबद्ध एवं असंबद्ध ग्राफ, ऑयलर ग्राफ, हेमिल्टोनियन पथ और परिपथ, भारित आलेख में लघुत्तम पथ हेतु डॉइजकस्त्रा, एल्गोरीथम।

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3-6-19
3-6-2019 (Dr. Lal Chandra Rajput)
Dr Arvind Bhare
Chan 3-6-19 (Dr. Geeta Modi)
(Dr V. K. Gupta)
3/6/19 (Dr Sanjay Rin)
3-6-19 (Dr. Vandana Gupta)
3-6-19 (Dr R S Sanodia)

इकाई–5	ग्राफ के द्वारा गणितीय मॉडलिंग: ग्राफ के द्वारा मॉडल्स का हल ज्ञात करना। निर्देशित ग्राफ, चिन्हित ग्राफ, भारित ग्राफ और अनिश्चित ग्राफ के सन्दर्भ में गणितीय मॉडलिंग

Text Books:

1. J.N.Kapur- Mathematical Modelling, New Age International Publishers
2. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. Stefan Heinz- Mathematical Modelling, Springer.
2. Heilio,M.Lahivaara, T.Latinen- Mathematical Modelling, Springers Nature.
3. Dr.V.P. Saxena- Bio-Mathematics.
4. Belinda Barnes and Glenn Robert Fulford- Mathematical Modelling with Case Studies. CRC Press

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3.6.19
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3.6.19
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3/6/2019
(Dr. Lal Chandra Raput)

Dr.Arvind Bohre

Unit-4	Trees and its properties, Rooted tree, Binary tree, Spanning tree, Rank and nullity of a graph, Kruskal's Algorithm and Prim's Algorithm.
ईकाई–4	वृक्ष एवं उसके गुण धर्म, नियत वृक्ष, द्विचर वृक्ष, जनक वृक्ष, आलेख की जाति एवं शून्यता, कुस्कल एवं प्राइम की एल्गोरीथम।
Unit-5	Matrix representation of graphs—Incidence and Adjacency matrix,Cutset and its properties, Planar graphs (definition) Kuratowski's two graphs.
ईकाई–5	आलेख का आव्यूह निरूपण– इन्सीडेंस एवं एडजेन्सी आव्यूह, कटसेट्स एवं उसके प्रगुण, प्लानर आलेख(परिभाषा), कुराटोव्हस्की के द्विआलेख।

Text Books:

1. C.L.Liu.- Elements of Discrete Mathematics , Mcgraw Hill New-York
2. Narsingh Deo- Graph Theory, Prentice Hall.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

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3-6-2019
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बी.एससी./बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
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Year/वर्ष	:	Third/तृतीय
Subject/विषय	:	Mathematics/गणित
Paper /प्रश्नपत्र	:	Third Optional-C / तृतीय एच्छिक–सी
Title/शीर्षक	:	Mechanics / यांत्रिकी

Unit-1	Moments, Work and Energy, conservation of energy, Potential energy, Analytical conditions of Equilibrium of Coplanar forces, Virtual work, Catenary.
ईकाई–1	आघूर्ण, कार्य एवं उर्जा, उर्जा का संरक्षण विभीय उर्जा, समतलीय बलों की साम्यावस्था के वैश्लेषिक प्रतिबंध, कल्पित कार्य, रज्जुका।
Unit-2	Friction, Forces in three dimensions, Poinsot's central axis, Null lines and Planes. Stable and unstable Equilibrium.
ईकाई–2	घर्षण, त्रिविमीय बल, प्वासो का केन्द्रीय अक्ष, शून्य रेखाएँ एवं समतल, स्थिर एवं अस्थिर साम्यावस्था।
Unit-3	Velocites and accelerations along radial and transverse directions and along tangential and normal directions. Simple Harmonic motion. Elastic Strings, Projectile.
ईकाई–3	त्रिज्यीय एवं अनुप्रस्थ दिशा में वेग एवं त्वरण, स्पर्श रेखीय एवं अभिलंब दिशाओं में वेग एवं त्वरण। सरल आवर्त गति, प्रत्यास्थ डोरियाँ, प्रक्षेप्य।
Unit-4	Motion on smooth and rough plane curves . Motion in a resisting medium. Motion of particles of varying mass. Central orbits, Kepler's Law of motion, Motion of a particle in three dimensions.
ईकाई–4	चिकने एवं रूक्ष समतल वक्र पर गति प्रतिरोधी माध्यम में गति, परिर्वतनीय द्रव्यमान वाले कणो की गति, सकेन्द्र कक्ष, केप्लर के गति के नियम, त्रिविमीय तल में किसी कण की

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3.6.19
Dr V.K.Gupta

3/6-2019
(Dr. Lalchandra Rajput)

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(Dr. Geeta Modi)

3/6/19
(Dr Sanjay Jha)

3.6.19
(Dr. Vandana Gupta)

3.6.19
(Dr P.L. Sanodia)

(24)

	गति, त्रिविमीय में एक कण की गति।
Unit-5	Generalized co-ordinates, D'Alembert's Principle and Lagranges equations, Hamilton equations, Moment of inertia, motion of rigid bodies in two dimensions. Equation of continuity, Euler's equations of motion for inviscid flow, stream lines, path of a particle, potential flow, Two dimensional and axisymmetric motion, sources and sinks, vortex motion, Navier-stokes equation for a viscous fluid.
ईकाई–5	व्यापक निर्देशांक, डी एलमवर्ट का सिद्धांत एवं लॉगरेन्ज समीकरण हेमिल्टन समीकरण, जड़त्व आघूर्ण द्विविमीय में दृढ पिण्डो की गति, सांतत्य का समीकरण अविवेकी प्रवाह की गति के लिए आयलर का समीकरण, धारा रेखायें, एक कण का पथ, विभीय प्रवाह द्विविमीय एवं प्रतिसमतित गति, स्त्रोत एवं डूब, भंवर गति, अविवेकी प्रवाह के लिए नेवियर स्टोक्स समीकरण।

Text Books:

1. R.S. Verma – Statics
2. S. L. Loney- An elementary Treatise on the dynamics of particle of rigid bodies.
3. म.प्र. हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:
1. M.Ray- Dynamics
2. M. Ray and H. S. Sharma- Dynamics of rigid bodies

3-6-19
(Dr. Geeta Modi)

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3/6/19
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बी.एससी. / बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

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Subject/विषय	:	Mathematics/गणित
Paper / प्रश्नपत्र	:	Third Optional-D / तृतीय एच्छिक–डी
Title/शीर्षक	:	Mathematical Modelling/ गणितीय मॉडलिंग

Unit-1	Mathematical modelling through ordinary differential equations of first order: Linear Growth and Decay models, Non-linear Growth and Decay Models, Dynamic problems, Geometrical problems.
ईकाई–1	प्रथम कोटि के साधारण अवकल समीकरणों द्वारा गणितीय मॉडलिंग: रेखीय वृद्धि एवं ह्रास मॉडल्स, अरेखीय वृद्धि एवं ह्रास मॉडल्स, गतिकी समस्याए ज्यामितीय समस्याऐं।
Unit-2	Mathematical modelling through system of ordinary differential equations of first order: Population Dynamics, Epidemics, Compartment models, Economic medicine, Arms Race, Battles and International Trade, Dynamics models .
ईकाई–2	प्रथम कोटि के साधारण अवकल समीकरणों के निकायो द्वारा गणितीय मॉडलिंग: जनसंख्या गतिकी, महामारी, उपखण्डीय मॉडल, अर्थशास्त्रीय, चिकित्सकीय, आर्म रेस, बैटल्स अर्न्तराष्ट्रीय व्यापार एवं गतिकी मॉडल्स।
Unit-3	Mathematical modelling through ordinary differential equations of second order: Planetary Motions, Circular Motions and Motion of Satellites. Mathematical modelling through Linear differential equations of second order and miscellaneous mathematical models.
ईकाई–3	द्वितीय कोटि के साधारण अवकल समीकरणों द्वारा गणितीय मॉडलिंग: ग्रहीय गति, वृत्तीय गति एवं उपग्रहीय गति। द्वितीय कोटि के रैखिक अवकल समीकरणो द्वारा गणितीय मॉडलिंग एवं विविध गणितीय मॉडल्स।
Unit-4	Mathematical modelling through difference equations: Simples Models, Basic theory of linear difference equations with constants coefficients, economic and finance-population dynamics and genetics, Mathemetical model in probability theory.
ईकाई–4	अन्तर समीकरण द्वारा गणितीय मॉडलिंग: सरल मॉडल्स, अचर गुणांको वाले रैखिक अन्तर समीकरणों के सिद्धांत एवं उनके द्वारा अर्थशास्त्रीय एवं वित्तीय, जनसंख्या गतिकी एवं जनांकिकी एवं प्रायिकता सिद्धांत में गणितीय मॉडलिंग।
Unit-5	Mathematical modelling through Graphs: Solutions that can be modelled through graph, mathematical modelling in terms of directed graphs, signed graphs, weighted digraphs and un-oriented graphs.

Vyas 3.6.19
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3/6/2019
(Dr. Lal Chandra Rajput)
(Dr Anand Bohare)
Chan 3.6.19
(Dr. Geeta Modi)
(Dr V.K. Gupta)
3.6.19 (Dr P.L. Sanodia)
3.6.19
(Dr. Vandana Gupta)
3/6/19
(Dr Sanjay [illegible])

ईकाई–5	ग्राफ के द्वारा गणितीय मॉडलिंग: ग्राफ के द्वारा मॉडल्स का हल ज्ञात करना। निंदेशित ग्राफ, चिन्हित ग्राफ, भारित ग्राफ और अनिश्चित ग्राफ के सन्दर्भ में गणितीय मॉडलिंग

Text Books:

1. J.N.Kapur- Mathematical Modelling, New Age International Publishers
2. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

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1. Stefan Heinz- Mathematical Modelling, Springer.
2. Heilio,M.Lahivaara, T.Latinen- Mathematical Modelling, Springers Nature.
3. Dr.V.P. Saxena- Bio-Mathematics.
4. Belinda Barnes and Glenn Robert Fulford- Mathematical Modelling with Case Studies. CRC Press

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3.6.19 (Dr. P.L. Sanodia)

3.6.19 (Dr. Uma Vyas)
3/6/19 (Dr. Sanjay Jain)
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बी.एससी./बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
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Paper / प्रश्नपत्र	:	Third Optional-E / तृतीय एच्छिक–ई
Title/शीर्षक	:	Financial Mathematics/ वित्तीय गणित

Unit-1	Financial Management- Nature and Scope of Financial Management, Goals of Financial Management and main decisions of financial management, Difference between Risk, Speculation and Gambling.
ईकाई–1	वित्तीय प्रबंधन– वित्तीय प्रबंधन की प्रकृति एवं क्षेत्र, वित्तीय प्रबंधन के लक्ष्य एवं प्रमुख निर्णय, जोखिम, सट्टे एवं जुए में अन्तर।
Unit-2	Time value of Money-Interest rate and Discount Rate. Present value and Future value, discrete case as well as continuous compounding case, Annuities and its kinds.
ईकाई–2	मुद्रा का समयमान–ब्याज दर एवं बट्टा दर, वर्तमान मूल्य एवं भावी मूल्य, विविक्त और सतत् चक्रवर्ती वृद्धियाँ, वार्षिकी एवं उसके प्रकार।
Unit-3	Meaning of return, Return as Internal Rate of Return (IRR), Numerical methods like Newton Raphson Method to calculate IRR, Measurement of returns under uncertainty situations.
ईकाई–3	वापसी का अर्थ, वापसी की आन्तरिक दर, संख्यात्मक विधिया जैसे वापसी की आन्तरिक दर की गणना की न्यूटन रॉफसन विधि, अनिश्चय की अवस्था में वापसी की गणना।
Unit-4	Meaning of Risk, Difference between risk and uncertainty, Types of Risks, Measurements of Risk, Calculation of security and portfolio risk and Return-Markowitz Model, Sharpe's Single Index Model- Systematic Risk and Unsystematic Risk.
ईकाई–4	जोखिम का अर्थ, जोखिम एवं अनिश्चय में अन्तर, जोखिम के प्रकार, जोखिम को मापना, प्रतिभूति एवं विनियोजन जोखिम एवं वापसी की गणना, मारकोविज मॉडल, शॉर्प का एकल सूचकांक मॉडल, नियमित एवं अनियमित जोखिम।
Unit-5	Taylor series and Bond Valuation, Calculation of Duration and Convexity of Bonds, Financial Derivatives- Futures, Forward, Swaps and options, Call and Put

Vyas 3.6.19
(Dr. Uma Vyas)

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(Dr. V.K.Gupta)

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(Dr. Lal chandra Rajput)

(Dr Arvind Bohare)

3.6.19

3.6.19 (Dr P.L Sanodia)

3-6-19
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(Dr. Vandana Gupta)

	Option, Call and Put Parity theorem.
ईकाई–5	टेलर श्रेणी एवं बॉण्ड मूल्यांकन, बॉण्ड की अवधि एवं उत्तलता की गणना, वित्तीय यौगिक– फायदा, फॉरवर्ड, बदला एवं विकल्प कॉल एवं पुट विकल्प, कॉल एवं पुट समानता प्रमेय।

Text Books:

1. Sheldon M. Ross- An Introduction to Mathematical Finance, Cambridge University Press.
2. Mark S. Dorfman- Introduction to Risk Management and Insurance, Prentice Hall Englrewood Cliffs, New Jersey.
3. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. Aswath Damodaran, Corporate Finance- Theory and Practice, John Wiley & Inc.
2. John C. Hull- Options, Futures and Other Derivatives, Prentice Hall of India Private Ltd.
3. C. D. Daykin, T. Pentikainen and M. Pesonen- Practical Risk Theory for Actuaries, Chapman & Hall.

3-6-19
(Dr. Geeta Modi)

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(Dr. V.K. Gupta)

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(Dr. Vandana Gupta)

3-6-19
(Dr. P.L. Sanodia)

Vyas 3.6.19
(Dr. Uma Vyas)

3/6/19
(Dr. Sanjay Jain)

3/6/2019
(Dr. Lal Chandra Raput)

Dr.Arvind Bohre

बी.एससी./बी.ए. कक्षाओं के लिये वार्षिक परीक्षा प्रणाली के अनुसार पाठ्यक्रम
केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित

Department of Higher Education, Govt. of M.P.
B.Sc./B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies
सत्र/Session : 2021-22

Max. Marks/अधिकतम अंक : 40
Class/कक्षा : B.Sc./B.A.
Year/वर्ष : Third/तृतीय
Subject/विषय : Mathematics/गणित
Paper /प्रश्नपत्र : Third Optional-F/तृतीय एच्छिक–एफ
Title/शीर्षक : Linear and Computer Programming/ रैखिक एवं संगणक प्रकमन

Unit-1	Linear Programming problems, basic solution, basic feasible solution and optimal solution.
ईकाई–1	रैखिय प्रकमन समस्यायें, मूलभूत हल, मूलभूत संभव एवं इष्टतम हल।
Unit-2	Graphical method and simplex method of solutions, Duality Transportation and assignment problems.
ईकाई–2	हलों के लिए ग्रफीय एवं सिम्प्लेक्स विधि, द्वैतता, परिवहन एवंनिर्धारण समस्यायें।
Unit-3	Computer Programming, Binary system, Arithmetic and logical operations on numbers, Octal and Hexadecimal systems.
ईकाई–3	संगणक (कम्प्यूटर) प्रकमनः द्विचर निकाय संख्याओं पर अंकगाणितीय एवं तार्किक संक्रियायें अष्ट एवं षोडश आधारी दशमलव पद्धति।
Unit-4	Conversion to and from decimal systems, Algebra of binary numbers Elements of computer systems and concept of memory.
ईकाई–4	दाशमिक पद्धति से एवं दाशमिक पद्धति में रूपान्तरण, द्विचर संख्याओं का बीजगणित, संगणक निकाय के तत्व तथा स्मृति की अवधारणा,
Unit-5	Representation of unsigned integers, signed integers and reals, double precision reals and long integers. Algorithms and flow charts for solving numerical analysis problems.

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(Dr. Uma Vyas)

3.6.19
(Dr. V.K. Gupta)

3/6/2019
(Dr. Lal Chandra Raipur)

(Dr Arvind Borhare)

Chan 3-6-19
(Dr. Geeta Modi)

3/6/19
(Dr J. Ram)

3.6.19.
(Dr. Vandana Gupta)

3.6.19
Dr R2 Sanodia

ईकाई–5	अचिन्हित पूर्णाकों, चिन्हित पूर्णाकों एवम वास्तविक संख्याओं का निरूपण, द्विक यथार्थ वास्तविक एवं दीर्घ पूर्णांक, संख्यात्मक विश्लेषण समस्या के हल हेतू तर्क प्रवाह एवं प्रवाह चित्र।

Text Books:

1.	Proggrame in ANSI-C	By E Balagurusamy	Mc Grawhill
2.	Computer fundamentals	By Pradeep K Sinhah & Priti Sinha,	BPB Publication
3.	Linear Programming.	By R..K. Gupta,	Krishna Publication.

3-6-19 (Dr. Geeta Modi)
3-6-19 (Dr. V.K. Gupta)
3-6-19 (Dr. Vandana Gupta)
3-6-19 (Dr. P.L. Sanodia)
3-6-19 (Dr. Uma Vyas)
3/6/19 (Dr. Sanjay Jain)
3/6/2019 (Dr. Lal Chandra Raput)
Dr.Arvind Bohre

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2017-2018)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए वार्षिक पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject	:	**Physics**
Paper	**:**	**1**
Title of Paper	:	**Mathematical Physics, Mechanics and Properties of Matter**

Unit-I: Mathematical Physics [15 Lectures]

Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics; Triple and quadruple product (without geometrical applications); Scalar and vector fields; Differentiation of a vector; Repeated integral of a function of more than one variable; Unit tangent vector and unit normal vector; Gradient, Divergence and Curl; Laplacian operator; Idea of line, surface and volume integrals; Gauss', Stokes' and Green's Theorems.

इकाई–1: गणितीय भौतिकी [15 Lectures]

दो सदिशो का योग, अंतर व गुणनफल; ध्रुवीय एवं अक्षीय सदिश एवं उनके भौतिकी उदाहरण; तीन व चार सदिशोंका गुणन(ज्यामितीय अनुप्रयोग के बिना), अदिश व सदिश क्षेत्र; सदिश का अवकलन, एक से अधिक चरों के फलन का बारम्बार समाकलन; इकाई स्पर्श सदिश व इकाई नार्मल सदिश;सदिश का ग्रेडियन्ट, डायवर्जेस एवं कर्ल; लाप्लासीयन आपरेटर; रेखीय, पृष्ठीय, आयतन समाकलन; गॉस, स्टोक व ग्रीन प्रमेय।

Unit-II: Mechanics [15 Lectures]

Position, velocity and acceleration vectors. Components of velocity and acceleration in different coordinate systems. Newton's Laws of motion and its explanation with problems various types of forces in nature (explanation),Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications. Motion under a central force, Derivation of Kepler's laws. Gravitational law and field, Potential due to a spherical body.Gauss & Poisson'sequation of Gravitational self-energy. System of particles, Centre of mass and reduced Mass. Elastic and inelastic collisions.

इकाई–2: यांत्रिकी [15 Lectures]

स्थिति, वेग एवं त्वरण सदिश, गति व त्वरण के विभिन्न निंदेशांक पद्वतियों में घटक। न्यूटन के गति के नियम व इसकी व्याख्या; प्रकृति में विभिन्न बल व व्याख्या, छद्म बल(उदाहरण: अभिकेंद्रीय बल)कोरियालिस बल व इसके उदाहरण; केंद्रीय बल के अर्न्तगत गति, केप्लर के नियमों की निष्पति; गुरूत्वाकर्षण का नियम व क्षेत्र; गोलाकर पिण्ड का गुरूत्वीय विभव, गॉस व पायसन की गुरूत्वीय स्व उर्जा की समीकरण; कणों का निकाय; द्रव्यमान केंद्र व समानीत द्रव्यमान; प्रत्यास्थ व अप्रत्यास्थ टक्कर।

Dr.P.K.Khare
(Dr S C Dubey)
(M. Singh)
(Sudhir Jain)
(R. Kalre)
(V V S Murty)
DK Sow
Dr S K Khan

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Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Unit-III: General Properties of Matter [15 Lectures]

Elastic moduli and their relations, Determination of Y of rectangular thin bar loaded at the centre; Torsional oscillations, Torsional rigidity of a wire, to determine η by torsional oscillations. Surface Tension, Angle of Contact, Capillary Rise Method; Energy required to raise a liquid in capillary tube; Factors affecting surface tension; Jeager's method for Determination of surface tension; Applications of Surface Tension. Concept of Viscous Forces and Viscosity; Steady and Turbulent Flow, Reynolds's number; Equation of Continuity; Bernoulli's Principle; Application of Bernoulli's equation - (i) Speed of Efflux (ii) Venturimeter(iii) Aspirator Pump(iv) Change of plane of motion of a spinning ball.

इकाई–3: द्रव्य के सामान्य गुण [15 Lectures]

प्रत्यास्थता गुणांक एवं उनके संबंध, मध्य में भारितपतली आयताकार छड(केन्टीलीवर) के Y का निर्धारण; ऐठन दोलन; किसी तार की ऐंठन दृढ़ता,व इसका ऐंठन दोलन विधि से निर्धारण। पृष्ठ तनाव, स्पर्श कोण, केशिका उन्नयन विधि, केशिका में द्रव चढाने में आवश्यक उर्जा, पृष्ठ तनाव को प्रभावित करने वाले कारक,जेगर की विधि से पृष्ठ तनाव का निर्धारण, पृष्ठ तनाव के अनुप्रयोग। श्यानबल की संकल्पना व श्यानता गुणांक, धारारेखीय व विक्षुब्ध प्रवाह, रेनॉल्ड संख्या, सातत्य समीकरण, बरनॉली का सिद्धांत, बरनॉली प्रमेय के अनुप्रयोग: 1. एफ्लक्स की चाल 2. वेन्चुरीमीटर 3. एस्पिरेटर पम्प 4. स्पिनिंग बॉल के तल का परिवर्तन।

Unit-IV: Oscillations [15 Lectures]

Concept of Simple, Periodic & Harmonic Oscillation with illustrations; Differential equation of harmonic oscillator; Kinetic and potential energy of Harmonic Oscillator; Oscillations of two masses connected by a spring; Translational and Rotational motion, Moment of Inertia and their Product,Principal moments and axes, Motion of Rigid Body, Euler's equation.

इकाई–4: दोलन [15 Lectures]

सरल, आवर्ती व हार्मोनिक गति की सचित्र संकल्पना, आवर्ती दोलित्र का समीकरण, आवर्ती दोलित्र की गतिज व स्थितिज उर्जा, स्प्रिंग से जुडे दो पिंडों का दोलन, स्थानान्तरणीय व घूर्णीय गति, जड़त्व आघूर्ण व उनका गुणन, मुख्य आघूर्ण एवं अक्ष, दृढ़ पिण्ड की गति,यूलर समीकरण।

Unit-V: [15 Lectures]

Relativistic Mechanics: Michelson-Morley experiment and its outcome; Postulates of Special Theory of Relativity; Lorentz Transformations. Simultaneity and order of events; Lorentz contraction; Time dilation; Relativistic transformation of velocity, frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity.

Earlier Developments in Physics up to 18th Century: Contributions of Aryabhatt, Archimedes, Nicolus Copernicus, Galileo Galilei, Huygens, Robert Hooke,

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(Sanjay Sathe)
(R. Kalwar)
VVS Murty
Dr S K Khare
DRSW

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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Torricelli, Vernier, Pascal, Kepler, Newton, Boyle, Young, Thompson, Coulomb, Amperes, Gauss, Biot-Savarts, Cavendish, Galvani, Franklin and Bernoulli.

इकाई–5: **[15 Lectures]**

सापेक्षकीय यांत्रिकी: माइकल्सन व मोरले का प्रयोग एवं इसके निष्कर्ष, विशिष्ट सापेक्षिकता के सिद्धांत की अवधारणाएं, लॉरेंज रूपांतरण, समकालिक घटना एवं घटनाओं के क्रम, लॉरेंज संकुचन, समय विस्तारण; वेग, आवृत्ति तथा वेव नम्बर का सापेक्षकीय रूपान्तरण; वेगों का सापेक्षिकीय योग; वेग के साथ द्रव्यमान परिवर्तन।

भौतिकी का प्रारंभिक विकास 18वीं सदी तक: आर्यभट्ट, आर्कमिडिज, निकोलस कोपरनिकस, गेलिलीओ गेलिली, हॉयगन, राबर्टहुक, टॉरसेली, वर्नियर, पॉस्कल, केप्लर, न्यूटन, बॉयल, यंग, थॉमसन, कुलॉम्ब, ऍम्पीयर, गॉस, बॉयो–सेवर्ट, केवनडिश, गेलवानी, फ्रेंकलीन और बरनॉली।

Reference Books:

1. University Physics: Sears and Zeemansky, XIth edition, Pearson Education
2. Concepts of Physics: H.C. Varma, Bharati Bhavan Publishers
3. Problems in Physics: P. K. Srivastava, Wiley Eastern Ltd.
4. Berkley Physics Course, Vol 1, Mechanics: E.M. Purcell, Mcgraw hill
5. Properties of Matter: D. S. Mathur, Shamlal Chritable Trust, New Delhi
6. Mechanics: D.S. Mathur, S Chand and Company, New Delhi-5.
7. The Feymman Lectures in Physics Vol. 1: R.P. Feymman, R.B. Lighton and M. Sands

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Department of Higher Education, Government of Madhya Pradesh
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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 2
Title of Paper : **Thermodynamics and Statistical Physics**

Unit-I: Thermodynamics-I [15 Lectures]

Reversible and irreversible process. Heat engines. Definition of efficiency, Carnot's ideal heat engine, Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator, Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation, Carnot's cycle and its applications. Steam engine, Otto engine. Petrol engine. Diesel engine.

इकाई–1: उष्मागतिकी-I [15 Lectures]

उत्क्रमणीय एवं अनुत्क्रमणीय प्रक्रम, कार्नो का आदर्श चक्र, इसकी दक्षता बढ़ाने के प्रभावी तरीकें, कार्नो का उष्मीय इंजन व प्रशीतक, दक्षता गुणांक, उष्मागतिकी का द्वितीय नियम व इसके विभिन्न कथन, कार्नो का प्रमेय, क्लेपरियॉन की गुप्त उष्मा समीकरण, कार्नोचक्र एवं उसके अनुप्रयोग। उष्मीय इंजिन, ऑटो इंजिन, पेट्रोल इंजिन, डीजल इंजिन।

Unit II: Thermodynamics-II [15 Lectures]

Concept of entropy, Change in entropy in adiabatic process, Change in entropy in reversible cycle. Principle of increase of entropy. Change in entropy in irreversible process. T-S diagram. Physical significance of Entropy, Entropy of a perfect gas. Kelvin's thermodynamic scale of temperature, The size of a degree, Zero of absolute scale, Identity of a perfect gas scale and absolute scale. Third law of thermodynamics. Zero point energy, Negative temperatures (not possible), Heat death of the universe. Relation between thermodynamic variables (Maxwell's relations).

इकाई–2: उष्मागतिकी-II [15 Lectures]

एन्ट्रापी की संकल्पना, रूद्धोष्म प्रक्रम में एन्ट्रापी का परिवर्तन, चक्रीय प्रक्रम में एन्ट्रापी का परिवर्तन, एन्ट्रापी के वृद्धि का सिद्धांत, उत्क्रमणीय व अनुत्क्रमणीय प्रक्रम में एन्ट्रोपी का परिवर्तन। T-S आरेख, एन्ट्रापी का भौतिक महत्व, आदर्श गैस की एन्ट्रापी, केलविन का उष्मागतिक ताप पैमाना,परम पैमाने का शून्य ताप, आदर्श गैस व परम ताप पैमाने में साम्यता। उष्मागतिकी का तृतीय नियम, शून्य बिन्दू उर्जा, ऋणात्मक तापक्रम (सम्भव नही), ब्रहमाण्ड की उष्मीय समाप्ति। उष्मागतिकी चरों में संबंध (मेक्सवेल के समीकरण)।

R.Kalore

Unit-III: Statistical Physics-I [15 Lectures]

Dr.P.K.Khare

Description of a system: Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a system, Equilibrium states,Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system, Phase space. Micro Canonical Ensemble, Canonical Ensemble.

(Sanjay Sathe)

Dr SKKhare

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Helmholtz free energy, Enthalpy, First law of thermodynamics, Gibbs free energy, Grand Canonical Ensemble.

इकाई–3: सांख्यिकीय भौतिकी-I [15 Lectures]

निकाय का वर्णन: सांख्यिकीय अवधारणा का महत्व, कण एवं निकाय की अवस्थाऐं, निकाय की सूक्ष्म एवं स्थूल अवस्थाऐं, साम्य अवस्थाऐं, विचलन, चिरसम्मत व सांख्यिकी प्रायिकता, पूर्व प्रायिकता सिद्धान्त, सांख्यिकी एन्सेम्बल, किसी निकाय के लिये अभिगम्य अवस्थाऐं, कला आकाश। माइक्रो केनोनीकल एन्सेम्बल, केनोनीकल एन्सेम्बल, हेल्मोल्टज मुक्त उर्जा, एन्थलपी, ऊष्मागतिकी का प्रथम नियम, गिब्स मुक्त उर्जा, ग्रेंड केनोनीकल एम्सेम्बल.

Unit-IV: Statistical Physics-II [15 Lectures]

Statistical Mechanics: Phase space, The probability of a distribution, The most probable distribution and its narrowing with increase in number of particles, Maxwell-Boltzmann statistics, Molecular speeds, Distribution and mean, r.m.s. and most probable velocity, Constraints of accessible and inaccessible states. **Quantum Statistics:** Partition Function, Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula, ThePlanck radiation formula, Fermi-Dirac statistics, Comparison of results, Concept of Phase transitions.

इकाई–4: सांख्यिकीय भौतिकी-II [15 Lectures]

सांख्यिकी यांत्रिकी: कला आकाश, वितरण की प्रायिकता, अधिकतम संभाव्य वितरण व इसका कणों की संख्या बढने पर संकुचन, मेक्सवेल बोल्टजमैन सांख्यिकी, आणविक चाल का वितरण, औसत चाल, वर्ग–माध्य–मूल चाल और अधिकतम प्रसम्भाव्य वेग, प्रतिबंध, अभिगम्य एवं अनअभिगम्य अवस्थाओं के प्रतिबंध। **क्वांटम सांख्यिकी:** पार्टीशन फलन,एंट्रापी व पार्टीशन फलन में संबंध, बोस आइन्सटीन सांख्यिकी, कृष्ण पिण्ड विकिरण, रेले जीन्स सूत्र, प्लांक विकिरण सूत्र, फर्मी–डिराक सांख्यिकी, परिणामों की तुलना, फेस संक्रमण की संकल्पना।

Unit-V: Contributions of Physicists [15 Lectures]

S.N. Bose, M.N. Saha, Maxwell, Clausius, Boltzmann, Joule, Wien, Einstein, Planck, Bohr, Heisenberg,Fermi, Dirac, Max Born, Bardeen.

इकाई–5: भौतिकविदों का योगदान [15 Lectures]

एस.एन.बोस, एम.एन. साहा, मैक्सवेल, क्लासियस, बोल्टजमैन, जूल, वीन, आइन्सटीन, प्लांक, बोहर, हाईजनबर्ग, फर्मी, डिराक, मेक्सबार्न, बार्डीन।

(R.Kalare)

Text and Reference Books:

1. **Heat and Thermodynamics:** Mark W. Zemansky, Richard H. Dittman, Seventh Edition, McGraw-Hill International Editions.
2. **Thermal Physics (Heat and Thermodynamics):** A.B. Gupta, H. P. Roy, Books and Allied (P) Ltd. Calcutta.

Dr R.K. Khare

(Sanjay Sathe)

UVg (UVS Murty)

Dr SKKhare

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

3. **Heat and Thermodynamics:** Brijlal and N. Subrahmanyam, S. Chand & Company Ltd. New Delhi.
4. Berkley Physics Course, Vol 3, Thermodynamics: F. Reif, Mcgraw Hill
5. **Thermodynamics and Statistical Physics,** D. P. Khandelwal and A. K. Pandey, Himalaya Publication.
6. **Laboratory manual of Physics for undergraduate classes**, D. P. Khandelwal, Vani publishing house, New Delhi.

(Mahendra)

(V V S Murty)

Dr S K Khare

D K Soni

(Sanjay Saxena)

(R. Kalare)

27/4/2017
(C D Varshney)

DR P.K. Khare

Dr (Mrs) Seema Singh

(7)

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उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. To verify laws of parallel and perpendicular axes for moment of inertia.
2. To determine acceleration due to gravity using compound pendulum.
3. To determine damping coefficient using a bar pendulum.
4. To determine Young's Modulus by bending of beam method.
5. To determine Young's Modulus using Cantilever method.
6. To determine coefficient of rigidity by static method.
7. To determine coefficient of rigidity by dynamic method.
8. To determine Surface Tension by Jaegar's method.
9. To determine Surface Tension of a liquid by capillary rise method.
10. To determine Viscosity of fluid using Poisellie's method.
11. To study conversion of mechanical energy into heat using Calender & Barne's method.
12. To determine heating efficiency of electrical Kettle with various voltages.
13. To determine heating temperature coefficient of resistance using platinum resistance thermometer.
14. To determine thermo electromotive force by a thermocouple method.
15. To determine heating efficiency of electrical Kettle with various voltages.
16. To determine heat conductivity of bad conductors of different geometry by Lee's method.
17. To verify Newton's Laws of cooling.
18. To determine specific heat of Coefficient of thermal conductivity by Searl's method.
19. To determine specific heat of a liquid.
20. To compare Maxwell-Boltzmann, Bose Einstein and Fermi-Dirac Distribution function vs temperature using M.S. Excel / C++.
21. To plot equation of state and Vander-wall equation with temperature using M.S. Excel / C++.

Mahendra Singh
(VVS Thakur)
DV Soni
(R Kalani)

Sudhir Jain.
Dr (Mrs) Seema

B.Sc. First Year

27/4/2017
(D Varshney)

DR P.K. Khare

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Acedmic Year (2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students :

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. For Private students :

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

VVS Murty

Dr S Khan

S C Dixit

Dr Soni

(R. Katare)

(Sanjay Sahel)

(D. Varshney)

24/7/17

(D. Varshney)

Dr P.K. Khare

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(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 1
Title of Paper : **Mathematical Physics, Mechanics and Properties of Matter**

Unit-I: Mathematical Physics [15 Lectures]

Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics; Triple and quadruple product (without geometrical applications); Scalar and vector fields; Differentiation of a vector: Repeated integral of a function of more than one variable: Unit tangent vector and unit normal vector; Gradient, Divergence and Curl; Laplacian operator: Idea of line, surface and volume integrals: Gauss', Stokes' and Green's Theorems.

इकाई–1: गणितीय भौतिकी [15 Lectures]

दो सदिशो का योग, अंतर व गुणनफल; ध्रुवीय एवं अक्षीय सदिश एवं उनके भौतिकी उदाहरण; तीन व चार सदिशोंका गुणन(ज्यामितीय अनुप्रयोग के बिना); अदिश व सदिश क्षेत्र; सदिश का अवकलन; एक से अधिक चरों के फलन का बारम्बार समाकलन; इकाई स्पर्श सदिश व इकाई नार्मल सदिश,सदिश का ग्रेडियन्ट, डायवर्जेस एवं कर्ल; लाप्लासीयन आपरेटर; रेखीय, पृष्ठीय, आयतन समाकलन; गॉस, स्टोक व ग्रीन प्रमेय।

Unit-II: Mechanics [15 Lectures]

Position, velocity and acceleration vectors. Components of velocity and acceleration in different coordinate systems. Newton's Laws of motion and its explanation with problems. various types of forces in nature (explanation),Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications. Motion under a central force, Derivation of Kepler's laws. Gravitational law and field. Potential due to a spherical body.Gauss & Poisson'sequation of Gravitational self-energy. System of particles, Centre of mass and reduced Mass. Elastic and inelastic collisions.

इकाई–2: यांत्रिकी [15 Lectures]

स्थिति, वेग एवं त्वरण सदिश, गति व त्वरण के विभिन्न निर्देशांक पद्दतियों में घटक। न्यूटन के गति के नियम व इसकी व्याख्या; प्रकृति में विभिन्न बल व व्याख्या, छद्म बल(उदाहरण: अभिकेंद्रीय बल)कोरियालिस बल व इसके उदाहरण; केंद्रीय बल के अर्न्तगत गति, केप्लर के नियमों की निष्पति; गुरूत्वाकर्षण का नियम व क्षेत्र; गोलाकर पिण्ड का गुरूत्वीय विभव; गॉस व पायसन की गुरूत्वीय स्व उर्जा की समीकरण; कणों का निकाय; द्रव्यमान केंद्र व समानीत द्रव्यमान; प्रत्यास्थ व अप्रत्यास्थ टक्कर।

D. Varshney
(S. C. Dey)
(R. Kalani)
Jain
(Sanjay Sathe)
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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Unit-III: General Properties of Matter [15 Lectures]

Elastic moduli and their relations, Determination of Y of rectangular thin bar loaded at the centre; Torsional oscillations, Torsional rigidity of a wire, to determine η by torsional oscillations. Surface Tension, Angle of Contact, Capillary Rise Method; Energy required to raise a liquid in capillary tube; Factors affecting surface tension; Jeager's method for Determination of surface tension; Applications of Surface Tension. Concept of Viscous Forces and Viscosity; Steady and Turbulent Flow, Reynolds's number; Equation of Continuity; Bernoulli's Principle; Application of Bernoulli's equation - (i) Speed of Efflux (ii) Venturimeter(iii) Aspirator Pump(iv) Change of plane of motion of a spinning ball.

इकाई–3: द्रव्य के सामान्य गुण [15 Lectures]

प्रत्यास्थता गुणांक एवं उनके संबंध, मध्य में भारितपतली आयताकार छड(केन्टीलीवर) के Y का निर्धारण, ऐठन दोलन; किसी तार की ऐंठन दृढ़ता,व इसका ऐंठन दोलन विधि से निर्धारण। पृष्ठ तनाव, स्पर्श कोण, केशिका उन्नयन विधि, केशिका में द्रव चढ़ाने में आवश्यक उर्जा, पृष्ठ तनाव को प्रभावित करने वाले कारक,जेगर की विधि से पृष्ठ तनाव का निर्धारण, पृष्ठ तनाव के अनुप्रयोग। श्यानबल की संकल्पना व श्यानता गुणांक, धारारेखीय व विक्षुब्ध प्रवाह, रेनॉल्ड संख्या, सातत्य समीकरण, बरनॉली का सिद्धांत, बरनॉली प्रमेय के अनुप्रयोगः 1. एफलक्स की चाल 2. वेन्चुरीमीटर 3. एस्पिरेटर पम्प 4. स्पिनिंग बॉल के तल का परिवर्तन।

Unit-IV: Oscillations [15 Lectures]

Concept of Simple, Periodic & Harmonic Oscillation with illustrations; Differential equation of harmonic oscillator; Kinetic and potential energy of Harmonic Oscillator; Oscillations of two masses connected by a spring; Translational and Rotational motion, Moment of Inertia and their Product,Principal moments and axes, Motion of Rigid Body, Euler's equation.

इकाई–4: दोलन [15 Lectures]

सरल, आवर्ती व हार्मोनिक गति की सचित्र संकल्पना, आवर्ती दोलित्र का समीकरण, आवर्ती दोलित्र की गतिज व स्थितिज उर्जा, स्प्रिंग से जुड़े दो पिंडों का दोलन, स्थानान्तरणीय व घूर्णीय गति, जड़त्व आघूर्ण व उनका गुणन, मुख्य आघूर्ण एवं अक्ष, दृढ़ पिण्ड की गति,यूलर समीकरण।

Unit-V: [15 Lectures]

Relativistic Mechanics: Michelson-Morley experiment and its outcome; Postulates of Special Theory of Relativity; Lorentz Transformations. Simultaneity and order of events; Lorentz contraction; Time dilation; Relativistic transformation of velocity, frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity.

Earlier Developments in Physics up to 18th Century: Contributions of Aryabhatt, Archimedes, Nicolus Copernicus, Galileo Galilei, Huygens, Robert Hooke.

D. Varshney

Dr SKKhare

DKSONI

DR P.K Khare

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Torricelli,Vernier, Pascal, Kepler, Newton, Boyle, Young, Thompson, Coulomb, Amperes, Gauss, Biot-Savarts, Cavendish, Galvani, Franklin and Bernoulli.

इकाई–5: **[15 Lectures]**

सापेक्षकीय यांत्रिकी: माइकल्सन व मोरले का प्रयोग एवं इसके निष्कर्ष, विशिष्ट सापेक्षिकता के सिद्धांत की अवधारणाएं, लॉरेंज रूपांतरण, समकालिक घटना एवं घटनाओं के क्रम, लॉरेंज संकुचन, समय विस्तारण; वेग, आवृत्ति तथा वेव नम्बर का सापेक्षकीय रूपान्तरण; वेगों का सापेक्षिकीय योग; वेग के साथ द्रव्यमान परिवर्तन।

भौतिकी का प्रारंभिक विकास 18वीं सदी तक: आर्यभट्ट, आर्कमिडिज, निकोलस कोपरनिकस, गेलिलीओ गेलिली, हॉयगन, राबर्टहुक, टॉरसेली, वर्नियर, पॉस्कल, केप्लर, न्यूटन, बॉयल, यंग, थॉमसन, कुलॉम्ब, ऍम्पीयर, गॉस, बॉयो–सेवर्ट, केवनडिश, गेलवानी, फ्रेंकलीन और बरनॉली।

Reference Books:

1. University Physics: Sears and Zeemansky, XIth edition, Pearson Education
2. Concepts of Physics: H.C. Varma, Bharati Bhavan Publishers
3. Problems in Physics: P. K. Srivastava, Wiley Eastern Ltd.
4. Berkley Physics Course, Vol 1, Mechanics: E.M. Purcell, Mcgraw hill
5. Properties of Matter: D. S. Mathur, Shamlal Chritable Trust, New Delhi
6. Mechanics: D.S. Mathur, S Chand and Company, New Delhi-5.
7. The Feymman Lectures in Physics Vol. I: R.P. Feymman, R.B. Lighton and M. Sands

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(Mahadeo Sitohi)

Dr S K Khare

(Sanjay Sathe)

(R. Kalani)

Dr (Miss) Seema Sy

D.K. Soni

DR P.K. Khare

(V V S Murty)

27/9/2017

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(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 2
Title of Paper : **Thermodynamics and Statistical Physics**

Unit-I: Thermodynamics-I [15 Lectures]

Reversible and irreversible process. Heat engines. Definition of efficiency, Carnot's ideal heat engine, Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator, Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation, Carnot's cycle and its applications. Steam engine, Otto engine, Petrol engine, Diesel engine.

इकाई–1: उष्मागतिकी-I [15 Lectures]

उत्क्रमणीय एवं अनुत्क्रमणीय प्रक्रम, कार्नो का आदर्श चक्र, इसकी दक्षता बढ़ाने के प्रभावी तरीकें, कार्नो का उष्मीय इंजन व प्रशीतक, दक्षता गुणांक, उष्मागतिकी का द्वितीय नियम व इसके विभिन्न कथन, कार्नो का प्रमेय, क्लेपरियॉन की गुप्त उष्मा समीकरण, कार्नोचक्र एवं उसके अनुप्रयोग। उष्मीय इंजिन, ऑटो इंजिन, पेट्रोल इंजिन, डीजल इंजिन।

Unit II: Thermodynamics-II [15 Lectures]

Concept of entropy. Change in entropy in adiabatic process. Change in entropy in reversible cycle. Principle of increase of entropy. Change in entropy in irreversible process. T-S diagram. Physical significance of Entropy. Entropy of a perfect gas. Kelvin's thermodynamic scale of temperature. The size of a degree. Zero of absolute scale. Identity of a perfect gas scale and absolute scale. Third law of thermodynamics. Zero point energy. Negative temperatures (not possible), Heat death of the universe. Relation between thermodynamic variables (Maxwell's relations).

इकाई–2: उष्मागतिकी-II [15 Lectures]

एन्ट्रापी की संकल्पना, रूद्धोष्म प्रक्रम में एन्ट्रापी का परिवर्तन, चक्रीय प्रक्रम में एन्ट्रापी का परिवर्तन, एन्ट्रापी के वृद्धि का सिद्धांत, उत्क्रमणीय व अनुत्क्रमणीय प्रक्रम में एन्ट्रोपी का परिवर्तन। T-S आरेख, एन्ट्रापी का भौतिक महत्व, आदर्श गैस की एन्ट्रापी, केलविन का उष्मागतिक ताप पैमाना,परम पैमाने का शून्य ताप, आदर्श गैस व परम ताप पैमाने में साम्यता। उष्मागतिकी का तृतीय नियम, शून्य बिन्दू उर्जा, ऋणात्मक तापक्रम (सम्भव नही), ब्रहमाण्ड की उष्मीय समाप्ति। उष्मागतिकी चरों में संबंध (मेक्सवेल के समीकरण)।

(R. Kalwe)

Unit-III: Statistical Physics-I [15 Lectures]

Description of a system: Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a system, Equilibrium states,Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system, Phase space. Micro Canonical Ensemble, Canonical Ensemble.

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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Helmholtz free energy, Enthalpy, First law of thermodynamics, Gibbs free energy, Grand Canonical Ensemble.

इकाई–3: सांख्यिकीय भौतिकी-I [15 Lectures]

निकाय का वर्णन: सांख्यिकीय अवधारणा का महत्व, कण एवं निकाय की अवस्थाऐं, निकाय की सूक्ष्म एवं स्थूल अवस्थाऐं, साम्य अवस्थाऐं, विचलन, चिरसम्मत व सांख्यिकी प्रायिकता, पूर्व प्रायिकता सिद्धान्त, सांख्यिकी एन्सेम्बल, किसी निकाय के लिये अभिगम्य अवस्थाऐं, कला आकाश। माइक्रो केनोनीकल एन्सेम्बल, केनोनीकल एन्सेम्बल, हेल्मोल्टज मुक्त उर्जा, एन्थलपी, ऊष्मागतिकी का प्रथम नियम, गिब्स मुक्त उर्जा, ग्रेंड केनोनीकल एम्सेम्बल.

Unit-IV: Statistical Physics-II [15 Lectures]

Statistical Mechanics: Phase space, The probability of a distribution, The most probable distribution and its narrowing with increase in number of particles, Maxwell-Boltzmann statistics, Molecular speeds, Distribution and mean, r.m.s. and most probable velocity, Constraints of accessible and inaccessible states. **Quantum Statistics:** Partition Function, Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula, ThePlanck radiation formula, Fermi-Dirac statistics, Comparison of results, Concept of Phase transitions.

इकाई–4: सांख्यिकीय भौतिकी-II [15 Lectures]

सांख्यिकी यांत्रिकी: कला आकाश, वितरण की प्रायिकता, अधिकतम संभाव्य वितरण व इसका कणों की संख्या बढने पर संकुचन, मेक्सवेल बोल्टजमैन सांख्यिकी, आणविक चाल का वितरण, औसत चाल, वर्ग–माध्य–मूल चाल और अधिकतम प्रसम्भाव्य वेग, प्रतिबंध, अभिगम्य एवं अनअभिगम्य अवस्थाओं के प्रतिबंध। **क्वांटम सांख्यिकी:** पार्टीशन फलन,एंट्रापी व पार्टीशन फलन में संबंध, बोस आइन्सटीन सांख्यिकी, कृष्ण पिण्ड विकिरण, रेले जीन्स सूत्र, प्लांक विकिरण सूत्र, फर्मी–डिराक सांख्यिकी, परिणामों की तुलना, फेस संक्रमण की संकल्पना।

Unit-V: Contributions of Physicists [15 Lectures]

S.N. Bose, M.N. Saha, Maxwell, Clausius, Boltzmann, Joule, Wien, Einstein, Planck, Bohr, Heisenberg,Fermi, Dirac, Max Born, Bardeen.

इकाई–5: भौतिकविदों का योगदान [15 Lectures]

एस.एन.बोस, एम.एन. साहा, मैक्सवेल, क्लासियस, बोल्टजमैन, जूल, वीन, आइन्सटीन, प्लांक, बोहर, हाईजनबर्ग, फर्मी, डिराक, मेक्सबार्न, बार्डीन।

(R. Kalare)

DR P.K.Khare

Text and Reference Books:

1. **Heat and Thermodynamics:** Mark W. Zemansky, Richard H. Dittman, Seventh Edition, McGraw-Hill International Editions.
2. **Thermal Physics (Heat and Thermodynamics)**: A.B. Gupta, H. P. Roy, Books and Allied (P) Ltd, Calcutta.

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Class: B.Sc. First Year
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3. **Heat and Thermodynamics:** Brijlal and N. Subrahmanyam, S. Chand & Company Ltd, New Delhi.
4. Berkley Physics Course, Vol 3, Thermodynamics: F. Reif, Mcgraw Hill
5. **Thermodynamics and Statistical Physics,** D. P. Khandelwal and A. K. Pandey, Himalaya Publication.
6. **Laboratory manual of Physics for undergraduate classes,** D. P. Khandelwal, Vani publishing house, New Delhi.

(Maheshwari)

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27/4/2017
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उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. To verify laws of parallel and perpendicular axes for moment of inertia.
2. To determine acceleration due to gravity using compound pendulum.
3. To determine damping coefficient using a bar pendulum.
4. To determine Young's Modulus by bending of beam method.
5. To determine Young's Modulus using Cantilever method.
6. To determine coefficient of rigidity by static method.
7. To determine coefficient of rigidity by dynamic method.
8. To determine Surface Tension by Jaegar's method.
9. To determine Surface Tension of a liquid by capillary rise method.
10. To determine Viscosity of fluid using Poisellie's method.
11. To study conversion of mechanical energy into heat using Calender & Barne's method.
12. To determine heating efficiency of electrical Kettle with various voltages.
13. To determine heating temperature coefficient of resistance using platinum resistance thermometer.
14. To determine thermo electromotive force by a thermocouple method.
15. To determine heating efficiency of electrical Kettle with various voltages.
16. To determine heat conductivity of bad conductors of different geometry by Lee's method.
17. To verify Newton's Laws of cooling.
18. To determine specific heat of Coefficient of thermal conductivity by Searl's method.
19. To determine specific heat of a liquid.
20. To compare Maxwell-Boltzmann, Bose Einstein and Fermi-Dirac Distribution function vs temperature using M.S. Excel / C++.
21. To plot equation of state and Vander-wall equation with temperature using M.S. Excel / C++.

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(VVS Murty) DK Soni

(Sudhir Jain)

(D. Varshney) 23/9/2017

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Acedmic Year (2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students :

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. For Private students :

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

(Madhu Singh)

24/7/17
(D Varshney)

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S C Dubey

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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 1
Title of Paper : **Mathematical Physics, Mechanics and Properties of Matter**

Unit-I: Mathematical Physics [15 Lectures]

Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics; Triple and quadruple product (without geometrical applications); Scalar and vector fields; Differentiation of a vector; Repeated integral of a function of more than one variable; Unit tangent vector and unit normal vector; Gradient, Divergence and Curl; Laplacian operator; Idea of line, surface and volume integrals; Gauss', Stokes' and Green's Theorems.

इकाई–1: गणितीय भौतिकी [15 Lectures]

दो सदिशो का योग, अंतर व गुणनफल; ध्रुवीय एवं अक्षीय सदिश एवं उनके भौतिकी उदाहरण; तीन व चार सदिशोंका गुणन(ज्यामितीय अनुप्रयोग के बिना); अदिश व सदिश क्षेत्र; सदिश का अवकलन, एक से अधिक चरों के फलन का बारम्बार समाकलन; इकाई स्पर्श सदिश व इकाई नार्मल सदिश;सदिश का ग्रेडियन्ट, डायवर्जेंस एवं कर्ल; लाप्लासीयन आपरेटर; रेखीय, पृष्ठीय, आयतन समाकलन; गॉस, स्टोक व ग्रीन प्रमेय।

Unit-II: Mechanics [15 Lectures]

Position, velocity and acceleration vectors, Components of velocity and acceleration in different coordinate systems. Newton's Laws of motion and its explanation with problems, various types of forces in nature (explanation).Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications. Motion under a central force, Derivation of Kepler's laws. Gravitational law and field. Potential due to a spherical body.Gauss & Poisson'sequation of Gravitational self-energy. System of particles, Centre of mass and reduced Mass. Elastic and inelastic collisions.

इकाई–2: यांत्रिकी [15 Lectures]

स्थिति, वेग एवं त्वरण सदिश, गति व त्वरण के विभिन्न निर्देशांक पद्वतियों में घटक। न्यूटन के गति के नियम व इसकी व्याख्या; प्रकृति में विभिन्न बल व व्याख्या, छद्म बल(उदाहरण: अभिकेंद्रीय बल)कोरियालिस बल व इसके उदाहरण; केंद्रीय बल के अर्न्तगत गति, केप्लर के नियमों की निष्पति गुरूत्वाकर्षण का नियम व क्षेत्र; गोलाकर पिण्ड का गुरूत्वीय विभव; गॉस व पायसन की गुरूत्वीय स्व उर्जा की समीकरण; कणों का निकाय; द्रव्यमान केंद्र व समानीत द्रव्यमान; प्रत्यास्थ व अप्रत्यास्थ टक्कर।

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(18)

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2017-2018)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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Unit-III: General Properties of Matter [15 Lectures]

Elastic moduli and their relations, Determination of Y of rectangular thin bar loaded at the centre; Torsional oscillations, Torsional rigidity of a wire, to determine η by torsional oscillations. Surface Tension, Angle of Contact, Capillary Rise Method; Energy required to raise a liquid in capillary tube; Factors affecting surface tension; Jeager's method for Determination of surface tension; Applications of Surface Tension. Concept of Viscous Forces and Viscosity; Steady and Turbulent Flow, Reynolds's number; Equation of Continuity; Bernoulli's Principle; Application of Bernoulli's equation - (i) Speed of Efflux (ii) Venturimeter(iii) Aspirator Pump(iv) Change of plane of motion of a spinning ball.

इकाई–3: द्रव्य के सामान्य गुण [15 Lectures]

प्रत्यास्थता गुणांक एवं उनके संबंध, मध्य में भारितपतली आयताकार छड(केन्टीलीवर) के Y का निर्धारण; ऐठन दोलन; किसी तार की ऐंठन दृढ़ता,व इसका ऐंठन दोलन विधि से निर्धारण। पृष्ठ तनाव, स्पर्श कोण, केशिका उन्नयन विधि, केशिका में द्रव चढ़ाने में आवश्यक उर्जा, पृष्ठ तनाव को प्रभावित करने वाले कारक,जेगर की विधि से पृष्ठ तनाव का निर्धारण, पृष्ठ तनाव के अनुप्रयोग। श्यानबल की संकल्पना व श्यानता गुणांक, धारारेखीय व विक्षुब्ध प्रवाह, रेनॉल्ड संख्या, सातत्य समीकरण, बरनॉली का सिद्धांत, बरनॉली प्रमेय के अनुप्रयोग: 1. एफ्लक्स की चाल 2. वेन्चुरीमीटर 3. एस्पिरेटर पम्प 4. स्पिनिंग बॉल के तल का परिवर्तन।

Unit-IV: Oscillations [15 Lectures]

Concept of Simple, Periodic & Harmonic Oscillation with illustrations; Differential equation of harmonic oscillator; Kinetic and potential energy of Harmonic Oscillator; Oscillations of two masses connected by a spring; Translational and Rotational motion, Moment of Inertia and their Product,Principal moments and axes, Motion of Rigid Body, Euler's equation.

इकाई–4: दोलन [15 Lectures]

सरल, आवर्ती व हार्मोनिक गति की सचित्र संकल्पना, आवर्ती दोलित्र का समीकरण, आवर्ती दोलित्र की गतिज व स्थितिज उर्जा, स्प्रिंग से जुडे दो पिंडों का दोलन, स्थानान्तरणीय व घूर्णीय गति, जड़त्व आघूर्ण व उनका गुणन, मुख्य आघूर्ण एवं अक्ष, दृढ़ पिण्ड की गति,यूलर समीकरण।

Unit-V: [15 Lectures]

Relativistic Mechanics: Michelson-Morley experiment and its outcome; Postulates of Special Theory of Relativity; Lorentz Transformations. Simultaneity and order of events; Lorentz contraction; Time dilation; Relativistic transformation of velocity, frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity.

Earlier Developments in Physics up to 18th Century: Contributions of Aryabhatt, Archimedes, Nicolus Copernicus, Galileo Galilei, Huygens, Robert Hooke,

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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Torricelli,Vernier, Pascal, Kepler, Newton, Boyle, Young, Thompson, Coulomb, Amperes Gauss, Biot-Savarts, Cavendish, Galvani, Franklin and Bernoulli.

इकाई–5: **[15 Lectures]**

सापेक्षकीय यांत्रिकी: माइकल्सन व मोरले का प्रयोग एवं इसके निष्कर्ष, विशिष्ट सापेक्षिकता के सिद्धांत की अवधारणाएं, लॉरेंज रूपांतरण, समकालिक घटना एवं घटनाओं के क्रम, लॉरेंज संकुचन, समय विस्तारण; वेग, आवृत्ति तथा वेव नम्बर का सापेक्षकीय रूपान्तरण; वेगों का सापेक्षिकीय योग, वेग के साथ द्रव्यमान परिवर्तन।

भौतिकी का प्रारंभिक विकास 18वीं सदी तक: आर्यभट्ट, आर्कमिडिज, निकोलस कोपरनिकस, गेलिलीओ गेलिली, हॉयगन, राबर्टहुक, टॉरसेली, वर्नियर, पॉस्कल, केप्लर, न्यूटन, बॉयल, यंग, थॉमसन, कुलॉम्ब, ऍम्पीयर, गॉस, बॉयो–सेवर्ट, केवनडिश, गेलवानी, फ्रेंकलीन और बरनॉली।

Reference Books:

1. University Physics: Sears and Zeemansky, XIth edition, Pearson Education
2. Concepts of Physics: H.C. Varma, Bharati Bhavan Publishers
3. Problems in Physics: P. K. Srivastava, Wiley Eastern Ltd.
4. Berkley Physics Course, Vol I, Mechanics: E.M. Purcell, Mcgraw hill
5. Properties of Matter: D. S. Mathur, Shamlal Chritable Trust, New Delhi
6. Mechanics: D.S. Mathur, S Chand and Company, New Delhi-5.
7. The Feymman Lectures in Physics Vol. 1: R.P. Feymman, R.B. Lighton and M. Sands

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2017-2018)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए वार्षिक पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित

(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 2
Title of Paper : **Thermodynamics and Statistical Physics**

Unit-I: Thermodynamics-I [15 Lectures]

Reversible and irreversible process, Heat engines, Definition of efficiency, Carnot's ideal heat engine, Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator, Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation. Carnot's cycle and its applications. Steam engine. Otto engine. Petrol engine. Diesel engine.

इकाई–1: उष्मागतिकी-I [15 Lectures]

उत्क्रमणीय एवं अनुत्क्रमणीय प्रक्रम, कार्नो का आदर्श चक्र, इसकी दक्षता बढ़ाने के प्रभावी तरीकें, कार्नो का उष्मीय इंजन व प्रशीतक, दक्षता गुणांक, उष्मागतिकी का द्वितीय नियम व इसके विभिन्न कथन, कार्नो का प्रमेय, क्लेपरियॉन की गुप्त उष्मा समीकरण, कार्नोचक्र एवं उसके अनुप्रयोग। उष्मीय इंजिन, ऑटो इंजिन, पेट्रोल इंजिन, डीजल इंजिन।

Unit II: Thermodynamics-II [15 Lectures]

Concept of entropy. Change in entropy in adiabatic process, Change in entropy in reversible cycle. Principle of increase of entropy. Change in entropy in irreversible process. T-S diagram, Physical significance of Entropy, Entropy of a perfect gas, Kelvin's thermodynamic scale of temperature, The size of a degree, Zero of absolute scale, Identity of a perfect gas scale and absolute scale. Third law of thermodynamics, Zero point energy, Negative temperatures (not possible). Heat death of the universe. Relation between thermodynamic variables (Maxwell's relations).

इकाई–2: उष्मागतिकी-II [15 Lectures]

एन्ट्रापी की संकल्पना, रूद्धोष्म प्रक्रम में एन्ट्रापी का परिवर्तन, चक्रीय प्रक्रम में एन्ट्रापी का परिवर्तन, एन्ट्रापी के वृद्धि का सिद्धांत, उत्क्रमणीय व अनुत्क्रमणीय प्रक्रम में एन्ट्रोपी का परिवर्तन। T-S आरेख, एन्ट्रापी का भौतिक महत्व, आदर्श गैस की एन्ट्रापी, केलविन का उष्मागतिक ताप पैमाना,परम पैमाने का शून्य ताप, आदर्श गैस व परम ताप पैमाने में साम्यता। उष्मागतिकी का तृतीय नियम, शून्य बिन्दू उर्जा, ऋणात्मक तापक्रम (सम्भव नही), ब्रहमाण्ड की उष्मीय समाप्ति। उष्मागतिकी चरों में संबंध (मेक्सवेल के समीकरण)।

Unit-III: Statistical Physics-I [15 Lectures]

Description of a system: Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a system, Equilibrium states,Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system, Phase space. Micro Canonical Ensemble. Canonical Ensemble.

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Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

Helmholtz free energy, Enthalpy, First law of thermodynamics, Gibbs free energy, Grand Canonical Ensemble.

इकाई–3: सांख्यिकीय भौतिकी-I [15 Lectures]

निकाय का वर्णन: सांख्यिकीय अवधारणा का महत्व, कण एवं निकाय की अवस्थाऐं, निकाय की सूक्ष्म एवं स्थूल अवस्थाऐं, साम्य अवस्थाऐं, विचलन, चिरसम्मत व सांख्यिकी प्रायिकता, पूर्व प्रायिकता सिद्धान्त, सांख्यिकी एन्सेम्बल, किसी निकाय के लिये अभिगम्य अवस्थाऐं, कला आकाश। माइक्रो केनोनीकल एन्सेम्बल, केनोनीकल एन्सेम्बल, हेल्मोल्टज मुक्त उर्जा, एन्थलपी, ऊष्मागतिकी का प्रथम नियम, गिब्स मुक्त उर्जा, ग्रेंड केनोनीकल एम्सेम्बल.

Unit-IV: Statistical Physics-II [15 Lectures]

Statistical Mechanics: Phase space. The probability of a distribution. The most probable distribution and its narrowing with increase in number of particles. Maxwell-Boltzmann statistics, Molecular speeds, Distribution and mean, r.m.s. and most probable velocity. Constraints of accessible and inaccessible states. **Quantum Statistics:** Partition Function. Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula, ThePlanck radiation formula, Fermi-Dirac statistics, Comparison of results, Concept of Phase transitions.

इकाई–4: सांख्यिकीय भौतिकी-II [15 Lectures]

सांख्यिकी यांत्रिकी: कला आकाश, वितरण की प्रायिकता, अधिकतम संभाव्य वितरण व इसका कणों की संख्या बढने पर संकुचन, मेक्सवेल बोल्टजमैन सांख्यिकी, आणविक चाल का वितरण, औसत चाल, वर्ग–माध्य–मूल चाल और अधिकतम प्रसम्भाव्य वेग, प्रतिबंध, अभिगम्य एवं अनअभिगम्य अवस्थाओं के प्रतिबंध। **क्वांटम सांख्यिकी:** पार्टीशन फलन,एंट्रापी व पार्टीशन फलन में संबंध, बोस आइन्सटीन सांख्यिकी, कृष्ण पिण्ड विकिरण, रेले जीन्स सूत्र, प्लांक विकिरण सूत्र, फर्मी–डिराक सांख्यिकी, परिणामों की तुलना, फेस संक्रमण की संकल्पना।

Unit-V: Contributions of Physicists [15 Lectures]

S.N. Bose, M.N. Saha, Maxwell, Clausius, Boltzmann, Joule, Wien, Einstein, Planck, Bohr, Heisenberg,Fermi, Dirac, Max Born, Bardeen.

इकाई–5: भौतिकविदों का योगदान [15 Lectures]

एस.एन.बोस, एम.एन. साहा, मैक्सवेल, क्लासियस, बोल्टजमैन, जूल, वीन, आइन्सटीन, प्लांक, बोहर, हाईजनबर्ग, फर्मी, डिराक, मेक्सबार्न, बार्डीन।

Text and Reference Books:

1. **Heat and Thermodynamics:** Mark W. Zemansky, Richard H. Dittman, Seventh Edition, McGraw-Hill International Editions.
2. **Thermal Physics (Heat and Thermodynamics)**: A.B. Gupta, H. P. Roy, Books and Allied (P) Ltd. Calcutta.

DR P.K.Khare

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(22)

Class: B.Sc. First Year
Max. Marks: 42½ + (CCE) 7½ = 50

3. **Heat and Thermodynamics:** Brijlal and N. Subrahmanyam, S. Chand & Company Ltd, New Delhi.
4. Berkley Physics Course, Vol 3, Thermodynamics: F. Reif, Mcgraw Hill
5. **Thermodynamics and Statistical Physics,** D. P. Khandelwal and A. K. Pandey, Himalaya Publication.
6. **Laboratory manual of Physics for undergraduate classes,** D. P. Khandelwal, Vani publishing house, New Delhi.

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Department of Higher Education, Government of Madhya Pradesh
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उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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(शैक्षणिक सत्र 2017-2018 से लागू)

Class: B.Sc. First Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. To verify laws of parallel and perpendicular axes for moment of inertia.
2. To determine acceleration due to gravity using compound pendulum.
3. To determine damping coefficient using a bar pendulum.
4. To determine Young's Modulus by bending of beam method.
5. To determine Young's Modulus using Cantilever method.
6. To determine coefficient of rigidity by static method.
7. To determine coefficient of rigidity by dynamic method.
8. To determine Surface Tension by Jaegar's method.
9. To determine Surface Tension of a liquid by capillary rise method.
10. To determine Viscosity of fluid using Poisellie's method.
11. To study conversion of mechanical energy into heat using Calender & Barne's method.
12. To determine heating efficiency of electrical Kettle with various voltages.
13. To determine heating temperature coefficient of resistance using platinum resistance thermometer.
14. To determine thermo electromotive force by a thermocouple method.
15. To determine heating efficiency of electrical Kettle with various voltages.
16. To determine heat conductivity of bad conductors of different geometry by Lee's method.
17. To verify Newton's Laws of cooling.
18. To determine specific heat of Coefficient of thermal conductivity by Searl's method.
19. To determine specific heat of a liquid.
20. To compare Maxwell-Boltzmann, Bose Einstein and Fermi-Dirac Distribution function vs temperature using M.S. Excel / C++.
21. To plot equation of state and Vander-wall equation with temperature using M.S. Excel / C++.

(Sudhir Jain)

(V.S. Murty)

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Acedmic Year (✓2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. **For Regular students :**

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. **For Private students :**

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

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S C Dubey
D.K. Soni
24/7/17
D. Vanrrag
(Sanjay Kothe)
Dr Mrs Beena Singh
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(R. Kalare)

25

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
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उच्च शिक्षा विभाग, मध्यप्रदेश शासन
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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject	:	**Physics**
Paper	:	**1**
Title of Paper	:	**Optics**

Unit-I Geometrical Optics [15 Lectures]

Reflection and refraction. Fermat's Principle. Refraction at a spherical surface, Aplanatic points and its applications. Lens formula. Combination of thin lenses and equivalent focal length. Dispersion and dispersive power, chromatic aberration and achromatic combination, different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.

इकाई–1 ज्यामितीय प्रकाशिकी [15 Lectures]

परावर्तन और अपवर्तन, फर्मेट का सिद्धांत, गोलाकार सतह पर अपवर्तन, अपलेनेटिक बिन्दु एवं अनुप्रयोग, लैंस सूत्र, पतले लैंसों का संयोजन व समतुल्य फोकस दूरी। विक्षेपण व विक्षेपण क्षमता, वर्ण विपथन व अवर्णक संयोजन। विभिन्न प्रकार के विपथन (गुणात्मक) एवं उनका समाधान, नेत्रिका में बहुल लैंस निकाय की आवश्यकता। रेम्सडन व हाइगन नेत्रिकाएं।

Unit-II Interference of light [15 Lectures]

The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations, Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, thin films, interference by a film with two non-parallel reflecting surfaces. Newton's rings. Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.

इकाई–2 प्रकाश का व्यतिकरण [15 Lectures]

अध्यारोपण का सिद्धांत, द्विस्लिट व्यतिकरण, स्त्रोतों की कला संबद्वता की आवश्यकता, प्रकाशीय पथ का मंदन, फ्रिजों का पार्श्विक विस्थापन, रेले का रिफ्रेक्ट्रोमीटर व अन्य अनुप्रयोग, स्थानीकृत फ्रिंजे, पतली फिल्म, दो असमानान्तर परावर्तक सतह से बनी फिल्म से व्यतिकरण, न्यूटन वलय। हैडिन्जर फ्रिंजे (समान झुकाव की फ्रिंजे), माइकल्सन व्यतिकरणमापी, इसके द्वारा प्रकाश की तरंगदैर्ध्य (λ), दो अत्यंत समीपस्थ तरंगदैर्ध्य का अंतर तथा वर्णक्रम रेखा की चौड़ाई का परिशुद्ध निर्धारण। बहुल पुंज व्यतिकरण में तीव्रता का वितरण, फेब्री पैरो व्यतिकरणमापी एवं इटालॉन।

Unit-III Diffraction [15 Lectures]

Fresnel's theory of half period zone, diffraction at straight edge, rectilinear propagation. Diffraction at a slit, phasor diagram and integral calculus methods.

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उच्च शिक्षा विभाग, मध्यप्रदेश शासन

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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy. Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.

इकाई–3 विवर्तन [15 Lectures]

फ्रेनल के अर्द्धकालिक कटिबंध का सिद्धांत, सीधी कोर पर विवर्तन, सरलरेखीय गमन। एकल झिरी पर विवर्तन का आरेख एवं समाकलन विधियां, वृत्तीय द्वारक, वृत्तीय चकती पर विवर्तन, प्रतिबिम्बों के विभेदन की रैले की कसौटी। दूरदर्शी व सूक्ष्मदर्शी की विवेदन क्षमता, फेज़ कन्ट्रास्ट सूक्ष्मदर्शी की सामान्य रूपरेखा। N समानान्तर झिर्रियों पर विवर्तन, तीव्रता विवरण, समतल विवर्तन ग्रेटिंग, परावर्तन ग्रेटिंग, ग्रेटिंग की विभेदन क्षमता तथा इसकी प्रिज्म व फेब्री पैरो इटलॉन की विभेदन क्षमता से तुलना।

Unit-IV Polarisation [15 Lectures]

Transverse nature of light waves, Polarization of electromagnetic waves, Plane polarised light – production and analysis, Description of Linear, circular and elliptical polarisation. Propagation of electro magnetic waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor. Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal, Nicol prism, Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter.

इकाई–4 ध्रुवण [15 Lectures]

प्रकाश तरंग की अनुप्रस्थ प्रकृति, विद्युत चुम्बकीय तरंग का ध्रुवण, समतल ध्रुवित प्रकाश – उत्पादन व विश्लेषण। रेखिक, वृत्तीय व दीर्घवृत्तीय ध्रुवण का वर्णन। विद्युत चुम्बकीय तरंग का असंमागी माध्यम में संचरण, एक–अक्षीय व द्वि–अक्षीय क्रिस्टल, परावैद्युत टेन्सर की सममित प्रकृति, द्वि–अपर्वतन, हाइगन का सिद्धांत, साधारण व असाधारण वर्तनांक, फ्रेनल का सूत्र, एक अक्षीय क्रिस्टल में प्रकाश संचरण। निकॉल प्रिज्म, वृत्तीय व दीर्घवृत्तीय प्रकाश का उत्पादन व विश्लेषण, बेबिनेट संकारक व अनुप्रयोग, प्रकाशीय धूर्णन व पोलारीमीटर से इसका मापन।

Unit-V Laser and Photo Sensors [15 Lectures]

A brief history of lasers, characteristics of laser light, Einstein prediction, Relationship between Einstein's coefficients (qualitative discussion), Pumping schemes, Resonators, Ruby laser, He-Ne laser, Applications of lasers, Principle of Holography, Photodiodes, Phototransistors, and Photomultipliers.

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के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

इकाई–5 लेज़र व फोटो सेन्सर्स [15 Lectures]

लेज़र का संक्षिप्त इतिहास, लेज़र प्रकाश के अभिलाक्षणिक गुण, आइन्सटीन की संकल्पना, आइन्सटीन गुणांको में सम्बन्ध (गुणात्मक विवेचना), पम्पिंग प्रणालियाँ, रेज़ोनेटर्स, रूबी लेज़र, हीलियम–निआन लेज़र, लेज़र के उपयोग, होलोग्राफी का सिद्धांत। फोटोडायोड, फोटो ट्रांजिस्टर व फोटो मल्टीप्लायर।

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6. **Optics and Atomic Physics,** D. P. Khandelwal. Himalaya Publication.
7. **Lasers: Theory and Applications**: K. Thyagrajan and A. K. Ghatak.

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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 2
Title of Paper : **Electrostatics, Magneto statics and Electrodynamics**

Unit-1 Electrostatics [15 Lectures]

Coulombs law in vacuum expressed in vector forms. calculations of electric field **E** for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field and electric potential ($\mathbf{E} = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field. Gauss's law and its application for finding **E** for symmetric charge distributions. Capacitors, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector **P**, relation between displacement vector **D**, **E** and **P**. Molecular interpretation of Claussius-Mossotti equation.

इकाई–1 स्थिरविद्युतिकी [15 Lectures]

निर्वात में कूलम्ब का नियम – सदिश रूप में, विद्युत क्षेत्र **E** की स्थिर आवेश के सरल द्विध्रुव व चतुर्ध्रुव आधूर्ण वितरण हेतु गणना। स्थिर विद्युत क्षेत्र में किसी आवेश पर किया गया कार्य एवं उसे रेखिक समाकलन रूप में लिखना, स्थिर विद्युत क्षेत्र की संरक्षी प्रकृति। विद्युत क्षेत्र और विभव में संबंध ($\mathbf{E} = -\nabla V$), एक समान विद्युतीय क्षेत्र में द्विध्रुव का आधूर्ण व इसकी उर्जा। विद्युत क्षेत्र का फ्लक्स, गॉस का नियम व इसका सममित आवेश वितरण हेतु **E** के परिकलन में उपयोग। संधारित्र, समरूप विद्युत क्षेत्र में गोलकार चालक, किसी पृथ्वीकृत अनन्त चालक के सम्मुख बिन्दु पर आवेश। पराविद्युत, पराविद्युत की उपस्थिति में समानांतर प्लेट संधारित्र, परावैद्युतांक, ध्रुवण व ध्रुवण सदिश **P**, विस्थापन सदिश **D**, **P** एवं **E** में संबंध, क्लासियस–मोसाटी समीकरण की आणविक व्याख्या।

Unit-2 Magnetostatics [15 Lectures]

Force on a moving charge. Lorentz force equation and definition of **B**, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio. Biot and Savart's law, calculation of **H** for simple geometrical situations such as Solenoid, Anchor ring. Ampere's Law, $\nabla \times \mathbf{B} = \mu_0 \mathbf{J}$, $\nabla . \mathbf{B} = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (**M**), relationship between **B**, **H** and **M**. Derivation of the relation $\nabla \times \mathbf{M} = \mathbf{J}$ for non-uniform magnetization.

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इकाई–2 स्थिर चुम्बकत्व [15 Lectures]

किसी गतिमान आवेश पर बलः लारेंज बल समीकरण एवं **B** की परिभाषा, सीधे धारावाही चालक को चुम्बकीय क्षेत्र में रखने पर बल, धारा लूप पर बल आघूर्ण, चुम्बकीय बल आघूर्ण, कोणीय संवेग व जाइरोमैग्नेटिक अनुपात, बायोट–सेवार्ट का नियम, सरल ज्यामितीय परिस्थितियों में **H** की गणना (परनलिका एवं एंकर वलय), एम्पीयर का परिपर्थीय नियम, $\nabla\times\mathbf{B} = \mu_0\mathbf{J}$ व $\nabla.\mathbf{B} = 0$, चुम्बकीय द्विध्रुव द्वारा बद्ध व मुक्त धाराएँ, चुम्बकन सदिश (**M**); **B**, **H** एवं **M** में संबंध, असमरूप से चुम्बकित पदार्थ हेतु $\nabla\times\mathbf{M} = \mathbf{J}$ का निगमन।

Unit-3 Current Electricity and Bio electricity [15 Lectures]

Steady current, current density **J**, non-steady currents and continuity equation, Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits, AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance, Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power. Electricity observed in living systems, Origin of bioelectricity.

इकाई–3 विधुत धारा व बायो–धारा [15 Lectures]

स्थाई धारा, धारा घनत्व **J**, अस्थाई धारा समीकरण एवं सांतत्य समीकरण, किरचॉफ के नियम व मल्टीलूप परिपथ विश्लेषण, LR व CR परिपथ में धारा की वृद्धि व क्षय, क्षय–नियतांक, LCR परिपथ। AC परिपथ, सम्मिश्र संख्याएं और उनके अनुप्रयोग द्वारा AC परिपथ में सम्मिश्र प्रतिबाधा, रीएक्टेंस, श्रेणी एवं समानांतर अनुनाद को हल करना। Q गुणांक, AC परिपथ द्वारा शक्ति का उपयोग, शक्ति गुणांक, Y एवं Δ नेटवर्क व विद्युत शक्ति का प्रेषण। जैविक निकायों में विद्युत का अवलोकन, जैव विद्युत की उत्पति।

Unit-4 Motion of Charged Particles in Electric and Magnetic Fields [15 Lectures]

(Note: The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.)

E as an accelerating field, electron gun, discharge tube, linear accelerator. **E** as deflecting field - CRO, Sensitivity of CRO. Transverse **B** field; 180° deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination for nuclear particles: Principle and working of Cyclotron. Mutually perpendicular and parallel **E** & **B** fields: Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing (lenses).

इकाई–4 विद्युत व चुम्बकीय क्षेत्र में अविशित कणों की गति [15 Lectures]

(यहाँ उपकरणों के वर्णन की अपेक्षा उनके यांत्रिकीय पक्ष पर अधिक ध्यान दिया जाना चाहिए।)

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Class: B.Sc. Second Year
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त्वरण क्षेत्र के रूप में **E**, इलेक्ट्रान गन, विर्सजन नलिका, रेखीय त्वरक, **E** विक्षेपक क्षेत्र के रूप में CRO, CRO की सुग्राहिता। अनुप्रस्थ **B** क्षेत्र; 180° विचलन, द्रव्यमान स्पेक्ट्रोग्राफ या वेग सिलेक्टर, नाभिकीय कणों के संसूचन हेतु कणों के पथों की वक्रता, साइक्लोट्रॉन (उर्जा मापन) का सिद्धांत व कार्य पद्धति, समानान्तर व लम्बवत **E** व **B** क्षेत्र, धन–किरण के परवलय, आइसोटोप की खोज, द्रव्यमान स्पेक्ट्रोग्राफ के मूलतत्व, चुम्बकीय फोकस का सिद्धांत (लैंस)।

Unit-5 Electrodynamics [15 Lectures]

Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws. Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density. Poynting vector. Electromagnetic wave equation. Plane electromagnetic waves in vacuum and dielectric media, Reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarization by reflection and total internal reflection. Waves in a conducting medium, Reflection and refraction by the ionosphere.

इकाई–5 विद्युत गतिकी [15 Lectures]

विद्युत चुम्बकीय प्रेरण, फेराडे के नियम, विद्युत बाहक बल, फेराडे नियम के अवकलन व समाकलन रूप, स्वः व अन्योन्य प्रेरण, ट्रान्सफार्मर, स्थिर विद्युत क्षेत्र में उर्जा, मेक्सवैल की विस्थापन धारा घनत्व की संकल्पना, मैक्सवेल की समीकरणों की स्थापना, विद्युत चुम्बकीय क्षेत्र का उर्जा धनत्व। पॉयंटिग सदिश, विद्युत चुम्बकीय तरंग समीकरण, निर्वात एवं परावैधुत माध्यम में समतल विद्युत चुम्बकीय तरंग, परावैद्युत की समतल सतह से परावर्तन, फ्रेनेल के नियम, परावर्तन से ध्रुवण व पूर्ण आंतरिक परावर्तन, चालक माध्यम में तरंग, आयनमण्डल के द्वारा परावर्तन व अपवर्तन।

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2. **Physics Volume 2**, D. Halliday and R. Resnick
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6. **From Neuron to Brain:** Kuffler and Nicholas. Sinauer Associates, Inc Pub. Sunderland. Masschuetts.
7. **Schaums Outline of Begining Physics II: Electricity and Magnetism**

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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Study of interference using biprism.
2. Study of diffraction at straight edge.
3. Use of plane diffraction grating to determine D_1, D_2 lines of Sodium lamp.
4. Resolving power of telescope.
5. Polarization by reflection and verification of Brewster's Law.
6. Study of optical rotation in Sugar solution.
7. Refractive index and dispersive power of prism using spectrometer.
8. Absorption spectrum of material using constant deviation spectrograph.
9. Beam divergence of He-Ne Laser.
10. Determination of wavelength of Laser by diffraction.
11. Determination of radius of curvature of plano-convex lense by Newton's rings.
12. Characteristics of a Ballistic galvanometer.
13. Setting up and using an electroscope or electrometer.
14. Measurement of low resistance by Carey-Foster bridge or otherwise.
15. Measurement of inductance using impedance at different frequencies.
16. Measurement of capacitance using, impedance at different frequencies.
17. Response curve for LCR circuits and response frequencies.
18. Sensitivity of a cathode- ray oscilloscope.
19. Use of a vibration magnetometer to study a field.
20. Study of Magnetic field due to current using Tangent Galvanometer.
21. Study of decay of currents in LR and RC circuits.
22. Study of Lissajous figures using CRO.
23. Verification of Network theorems.

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Acedmic Year (2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. **For Regular students :**

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. **For Private students :**

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

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Class: B.Sc. Second Year
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Subject : **Physics**
Paper : 1
Title of Paper : **Optics**

Unit-I Geometrical Optics [15 Lectures]

Reflection and refraction. Fermat's Principle, Refraction at a spherical surface. Aplanatic points and its applications, Lens formula, Combination of thin lenses and equivalent focal length. Dispersion and dispersive power, chromatic aberration and achromatic combination, different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.

इकाई–1 ज्यामितीय प्रकाशिकी [15 Lectures]

परावर्तन और अपवर्तन, फर्मेट का सिद्धांत, गोलाकार सतह पर अपवर्तन, अपलेनेटिक बिन्दु एवं अनुप्रयोग, लैंस सूत्र, पतले लैंसों का संयोजन व समतुल्य फोकस दूरी। विक्षेपण व विक्षेपण क्षमता, वर्ण विपथन व अवर्णक संयोजन। विभिन्न प्रकार के विपथन (गुणात्मक) एवं उनका समाधान, नेत्रिका में बहुल लैंस निकाय की आवश्यकता। रेम्सडन व हाइगन नेत्रिकाएं।

Unit-II Interference of light [15 Lectures]

The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations. Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, thin films, interference by a film with two non-parallel reflecting surfaces, Newton's rings. Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.

इकाई–2 प्रकाश का व्यतिकरण [15 Lectures]

अध्यारोपण का सिद्धांत, द्विस्लिट व्यतिकरण, स्त्रोतों की कला संबद्वता की आवश्यकता, प्रकाशीय पथ का मंदन, फ्रिजों का पार्श्विक विस्थापन, रेले का रिफ्रेक्ट्रोमीटर व अन्य अनुप्रयोग, स्थानीकृत फ्रिंजे, पतली फिल्म, दो असमानान्तर परावर्तक सतह से बनी फिल्म से व्यतिकरण, न्यूटन वलय। हैडिन्जर फ्रिंजे (समान झुकाव की फ्रिंजे), माइकल्सन व्यतिकरणमापी, इसके द्वारा प्रकाश की तरंगदैर्ध्य (λ), दो अत्यंत समीपस्थ तरंगदैर्ध्य का अंतर तथा वर्णक्रम रेखा की चौड़ाई का परिशुद्ध निर्धारण। बहुल पुंज व्यतिकरण में तीव्रता का वितरण, फेब्री पैरो व्यतिकरणमापी एवं इटालॉन।

Unit-III Diffraction [15 Lectures]

Fresnel's theory of half period zone, diffraction at straight edge, rectilinear propagation. Diffraction at a slit, phasor diagram and integral calculus methods.

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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(w.e.f. session 2018-2019)

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Class: B.Sc. Second Year
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Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy. Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.

इकाई–3 विवर्तन [15 Lectures]

फ्रेनल के अर्द्धकालिक कटिबंध का सिद्धांत, सीधी कोर पर विवर्तन, सरलरेखीय गमन। एकल झिरी पर विवर्तन का आरेख एवं समाकलन विधियां, वृत्तीय द्वारक, वृत्तीय चकती पर विवर्तन, प्रतिबिम्बों के विभेदन की रैले की कसौटी। दूरदर्शी व सूक्ष्मदर्शी की विवेदन क्षमता, फेज़ कन्ट्रास्ट सूक्ष्मदर्शी की सामान्य रूपरेखा। N समानान्तर झिरियों पर विवर्तन, तीव्रता विवरण, समतल विवर्तन ग्रेटिंग, परावर्तन ग्रेटिंग, ग्रेटिंग की विभेदन क्षमता तथा इसकी प्रिज्म व फेब्री पैरो इटलॉन की विभेदन क्षमता से तुलना।

Unit-IV Polarisation [15 Lectures]

Transverse nature of light waves. Polarization of electromagnetic waves, Plane polarised light – production and analysis, Description of Linear, circular and elliptical polarisation. Propagation of electro magnetic waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor, Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal, Nicol prism, Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter.

इकाई–4 ध्रुवण [15 Lectures]

प्रकाश तरंग की अनुप्रस्थ प्रकृति, विद्युत चुम्बकीय तरंग का ध्रुवण, समतल ध्रुवित प्रकाश – उत्पादन व विश्लेषण। रेखिक, वृत्तीय व दीर्घवृत्तीय ध्रुवण का वर्णन। विद्युत चुम्बकीय तरंग का असंमागी माध्यम में संचरण, एक–अक्षीय व द्वि–अक्षीय क्रिस्टल, परावैद्युत टेन्सर की सममित प्रकृति, द्वि–अपर्वतन, हाइगन का सिद्धांत, साधारण व असाधारण वर्तनांक, फ्रेनल का सूत्र, एक अक्षीय क्रिस्टल में प्रकाश संचरण। निकॉल प्रिज्म, वृत्तीय व दीर्घवृत्तीय प्रकाश का उत्पादन व विश्लेषण, बेबिनेट संकारक व अनुप्रयोग, प्रकाशीय धूर्णन व पोलारीमीटर से इसका मापन।

Unit-V Laser and Photo Sensors [15 Lectures]

A brief history of lasers, characteristics of laser light, Einstein prediction, Relationship between Einstein's coefficients (qualitative discussion), Pumping schemes, Resonators, Ruby laser. He-Ne laser, Applications of lasers, Principle of Holography. Photodiodes, Phototransistors, and Photomultipliers.

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इकाई–5 **लेज़र व फोटो सेन्सर्स** **[15 Lectures]**

लेज़र का संक्षिप्त इतिहास, लेज़र प्रकाश के अभिलाक्षणिक गुण, आइन्सटीन की संकल्पना, आइन्सटीन गुणांको में सम्बन्ध (गुणात्मक विवेचना), पम्पिंग प्रणालियाँ, रेज़ोनेटर्स, रूबी लेज़र, हीलियम–निआन लेज़र, लेज़र के उपयोग, होलोग्राफी का सिद्धांत। फोटोडायोड, फोटो ट्रांजिस्टर व फोटो मल्टीप्लायर।

References Books:

1. **Fundamentals of Optics**: F.A. Jenkins and H. E. White, 1976, McGraw-Hill.
2. **Principles of Optics**: B. K. Mathur, 1995. Gopal Printing.
3. **University Physics**: F.W. Sears. M.W. Zemansky and H.D. Young, 13/e. 1986. Addison-Wesley.
4. **Optics**: A. K. Ghatak, McGraw Hill Publications.
5. **Principles of Optics**: Max Born and Wolf, Pregmon Press.
6. **Optics and Atomic Physics,** D. P. Khandelwal. Himalaya Publication.
7. **Lasers: Theory and Applications**: K. Thyagrajan and A. K. Ghatak.

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Subject : **Physics**
Paper : 2
Title of Paper : **Electrostatics, Magneto statics and Electrodynamics**

Unit-1 Electrostatics [15 Lectures]

Coulombs law in vacuum expressed in vector forms, calculations of electric field **E** for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field and electric potential ($E = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding **E** for symmetric charge distributions. Capacitors, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector **P**, relation between displacement vector **D**, **E** and **P**. Molecular interpretation of Claussius-Mossotti equation.

इकाई–1 स्थिरविद्युतिकी [15 Lectures]

निर्वात में कूलम्ब का नियम – सदिश रूप में, विद्युत क्षेत्र **E** की स्थिर आवेश के सरल द्विध्रुव व चतुर्ध्रुव आघूर्ण वितरण हेतु गणना। स्थिर विद्युत क्षेत्र में किसी आवेश पर किया गया कार्य एवं उसे रेखिक समाकलन रूप में लिखना, स्थिर विद्युत क्षेत्र की संरक्षी प्रकृति। विद्युत क्षेत्र और विभव में संबंध ($E = -\nabla V$), एक समान विद्युतीय क्षेत्र में द्विध्रुव का आघूर्ण व इसकी उर्जा। विद्युत क्षेत्र का फ्लक्स, गॉस का नियम व इसका सममित आवेश वितरण हेतु **E** के परिकलन में उपयोग। संधारित्र, समरूप विद्युत क्षेत्र में गोलकार चालक, किसी पृथ्वीकृत अनन्त चालक के सम्मुख बिन्दु पर आवेश। पराविद्युत, पराविद्युत की उपस्थिति में समानांतर प्लेट संधारित्र, परावैद्युतांक, ध्रुवण व ध्रुवण सदिश **P**, विस्थापन सदिश **D**, **P** एवं **E** में संबंध, क्लासियस–मोसाटी समीकरण की आणविक व्याख्या।

Unit-2 Magnetostatics [15 Lectures]

Force on a moving charge, Lorentz force equation and definition of **B**, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot and Savart's law, calculation of **H** for simple geometrical situations such as Solenoid, Anchor ring. Ampere's Law, $\nabla \times \mathbf{B} = \mu_0 \mathbf{J}$, $\nabla \cdot \mathbf{B} = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (**M**), relationship between **B**, **H** and **M**. Derivation of the relation $\nabla \times \mathbf{M} = \mathbf{J}$ for non-uniform magnetization.

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24/7/17

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Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

इकाई–2 स्थिर चुम्बकत्व [15 Lectures]

किसी गतिमान आवेश पर बल: लारेंज बल समीकरण एवं **B** की परिभाषा, सीधे धारावाही चालक को चुम्बकीय क्षेत्र में रखने पर बल, धारा लूप पर बल आधूर्ण, चुम्बकीय बल आधूर्ण, कोणीय संवेग व जाइरोमैग्नेटिक अनुपात, बायोट–सेवार्ट का नियम, सरल ज्यामितीय परिस्थितियों में **H** की गणना (परनलिका एवं एंकर वलय), एम्पीयर का परिपर्थीय नियम, $\nabla\times\mathbf{B} = \mu_0\mathbf{J}$ व $\nabla.\mathbf{B} = 0$, चुम्बकीय द्विध्रुव द्वारा बद्ध व मुक्त धाराएँ, चुम्बकन सदिश (**M**): **B**, **H** एवं **M** में संबंध, असमरूप से चुम्बकित पदार्थ हेतु $\nabla\times\mathbf{M} = \mathbf{J}$ का निगमन।

Unit-3 Current Electricity and Bio electricity [15 Lectures]

Steady current, current density **J**, non-steady currents and continuity equation, Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power. Electricity observed in living systems, Origin of bioelectricity.

इकाई–3 विधुत धारा व बायो–धारा [15 Lectures]

स्थाई धारा, धारा घनत्व **J**, अस्थाई धारा समीकरण एवं सांतत्य समीकरण, किरचॉफ के नियम व मल्टीलूप परिपथ विश्लेषण, LR व CR परिपथ में धारा की वृद्धि व क्षय, क्षय–नियतांक, LCR परिपथ। AC परिपथ, सम्रिश्र संख्याएं और उनके अनुप्रयोग द्वारा AC परिपथ में सम्रिश्र प्रतिबाधा, रीएक्टेंस, श्रेणी एवं समानांतर अनुनाद को हल करना। Q गुणांक, AC परिपथ द्वारा शक्ति का उपयोग, शक्ति गुणांक, Y एवं Δ नेटवर्क व विद्युत शक्ति का प्रेषण। जैविक निकायों में विद्युत का अवलोकन, जैव विद्युत की उत्पति।

Unit-4 Motion of Charged Particles in Electric and Magnetic Fields [15 Lectures]

(Note: The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.)

E as an accelerating field, electron gun, discharge tube, linear accelerator. **E** as deflecting field - CRO, Sensitivity of CRO. Transverse **B** field; 180° deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination for nuclear particles; Principle and working of Cyclotron. Mutually perpendicular and parallel **E** & **B** fields: Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing (lenses).

इकाई–4 विद्युत व चुम्बकीय क्षेत्र में अविशित कणों की गति [15 Lectures]

(यहाँ उपकरणों के वर्णन की अपेक्षा उनके यांत्रिकीय पक्ष पर अधिक ध्यान दिया जाना चाहिए।)

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त्वरण क्षेत्र के रूप में **E**, इलेक्ट्रान गन, विर्सजन नलिका, रेखीय त्वरक, **E** विक्षेपक क्षेत्र के रूप में CRO, CRO की सुग्राहिता। अनुप्रस्थ **B** क्षेत्र; 180° विचलन, द्रव्यमान स्पेक्ट्रोग्राफ या वेग सिलेक्टर, नाभिकीय कणों के संसूचन हेतु कणों के पथों की वक्रता, साइक्लोट्रॉन (उर्जा मापन) का सिद्धांत व कार्य पद्धति, समानान्तर व लम्बवत **E** व **B** क्षेत्र, धन–किरण के परवलय, आइसोटोप की खोज, द्रव्यमान स्पेक्ट्रोग्राफ के मूलतत्व, चुम्बकीय फोकस का सिद्धांत (लैंस)।

Unit-5 Electrodynamics [15 Lectures]

Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density, Poynting vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media, Reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarization by reflection and total internal reflection, Waves in a conducting medium, Reflection and refraction by the ionosphere.

इकाई–5 विद्युत गतिकी [15 Lectures]

विद्युत चुम्बकीय प्रेरण, फेराडे के नियम, विद्युत वाहक बल, फेराडे नियम के अवकलन व समाकलन रूप, स्वः व अन्योन्य प्रेरण, ट्रान्सफार्मर, स्थिर विद्युत क्षेत्र में उर्जा, मेक्सवैल की विस्थापन धारा घनत्व की संकल्पना, मैक्सवेल की समीकरणों की स्थापना, विद्युत चुम्बकीय क्षेत्र का उर्जा धनत्व। पॉयंटिग सदिश, विद्युत चुम्बकीय तरंग समीकरण, निर्वात एवं परावैधुत माध्यम में समतल विद्युत चुम्बकीय तरंग, परावैद्युत की समतल सतह से परावर्तन, फ्रेनेल के नियम, परावर्तन से ध्रुवण व पूर्ण आंतरिक परावर्तन, चालक माध्यम में तरंग, आयनमण्डल के द्वारा परावर्तन व अपवर्तन।

References:

1. **Berkley Physics Course**, Electricity and Magnetism Ed. E. M. Purcell Mcgraw Hill
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3. **Introduction to Electrodynamics:** D. J. Griffiths, 4th Edition, Printice Hall.
4. **Electricity and Magnetism:** S. S. Atwood Dover.
5. **Electrodynamics:** Emi Cossor and Bassin Lorraine, Asahi Shimbunsha Publishing Ltd.
6. **From Neuron to Brain:** Kuffler and Nicholas, Sinauer Associates, Inc Pub. Sunderland, Masschuetts.
7. **Schaums Outline of Begining Physics II: Electricity and Magnetism**

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B.Sc. Second Year

24/7/17

Dr P.K. Khare (VVC Murty) D Varshney

Department of Higher Education, Government of Madhya Pradesh
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(w.e.f. session 2018-2019)

उच्च शिक्षा विभाग, मध्यप्रदेश शासन
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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Study of interference using biprism.
2. Study of diffraction at straight edge.
3. Use of plane diffraction grating to determine D_1, D_2 lines of Sodium lamp.
4. Resolving power of telescope.
5. Polarization by reflection and verification of Brewster's Law.
6. Study of optical rotation in Sugar solution.
7. Refractive index and dispersive power of prism using spectrometer.
8. Absorption spectrum of material using constant deviation spectrograph.
9. Beam divergence of He-Ne Laser.
10. Determination of wavelength of Laser by diffraction.
11. Determination of radius of curvature of plano-convex lense by Newton's rings.
12. Characteristics of a Ballistic galvanometer.
13. Setting up and using an electroscope or electrometer.
14. Measurement of low resistance by Carey-Foster bridge or otherwise.
15. Measurement of inductance using impedance at different frequencies.
16. Measurement of capacitance using, impedance at different frequencies.
17. Response curve for LCR circuits and response frequencies.
18. Sensitivity of a cathode- ray oscilloscope.
19. Use of a vibration magnetometer to study a field.
20. Study of Magnetic field due to current using Tangent Galvanometer.
21. Study of decay of currents in LR and RC circuits.
22. Study of Lissajous figures using CRO.
23. Verification of Network theorems.

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D K Soni
(Mahadev Singh)
Dr P.K Khan
Dr S K Khan
S. Jain
(R. Kalare)
24/7/17
D Vandhoray
Seema Singh
(V V S Murty)
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Department of Higher Education, Government of Madhya Pradesh

Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2017-2018)

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Acedmic Year (2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. **For Regular students :**

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. **For Private students :**

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

(Malhotra)

Dr S Khan

S C Dubey

DILSON

Dr (Mrs) Seema

24/2/17

(D Varshney)

(Sanjay)

Dr R.K. Verma

(R. Kalani)

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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 1
Title of Paper : **Optics**

Unit-I Geometrical Optics [15 Lectures]

Reflection and refraction, Fermat's Principle, Refraction at a spherical surface, Aplanatic points and its applications, Lens formula, Combination of thin lenses and equivalent focal length. Dispersion and dispersive power, chromatic aberration and achromatic combination, different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.

इकाई–1 ज्यामितीय प्रकाशिकी [15 Lectures]

परावर्तन और अपवर्तन, फर्मेट का सिद्धांत, गोलाकार सतह पर अपवर्तन, अपलेनेटिक बिन्दु एवं अनुप्रयोग, लैंस सूत्र, पतले लैंसों का संयोजन व समतुल्य फोकस दूरी। विक्षेपण व विक्षेपण क्षमता, वर्ण विपथन व अवर्णक संयोजन। विभिन्न प्रकार के विपथन (गुणात्मक) एवं उनका समाधान, नेत्रिका में बहुल लैंस निकाय की आवश्यकता। रेम्सडन व हाइगन नेत्रिकाएं।

Unit-II Interference of light [15 Lectures]

The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations, Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, thin films, interference by a film with two non-parallel reflecting surfaces, Newton's rings. Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.

इकाई–2 प्रकाश का व्यतिकरण [15 Lectures]

अध्यारोपण का सिद्धांत, द्विस्लिट व्यतिकरण, स्त्रोतों की कला संबद्वता की आवश्यकता, प्रकाशीय पथ का मंदन, फ्रिंजों का पार्श्विक विस्थापन, रेले का रिफ्रेक्ट्रोमीटर व अन्य अनुप्रयोग, स्थानीकृत फ्रिंजे, पतली फिल्म, दो असमानान्तर परावर्तक सतह से बनी फिल्म से व्यतिकरण, न्यूटन वलय। हैडिन्जर फ्रिंजे (समान झुकाव की फ्रिंजे), माइकल्सन व्यतिकरणमापी, इसके द्वारा प्रकाश की तरंगदैर्ध्य (λ), दो अत्यंत समीपस्थ तरंगदैर्ध्य का अंतर तथा वर्णक्रम रेखा की चौड़ाई का परिशुद्ध निर्धारण। बहुल पुंज व्यतिकरण में तीव्रता का वितरण, फेब्री पैरो व्यतिकरणमापी एवं इटालॉन।

Unit-III Diffraction [15 Lectures]

Fresnel's theory of half period zone, diffraction at straight edge, rectilinear propagation. Diffraction at a slit, phasor diagram and integral calculus methods.

R. Kalare

(DrSKKhan)

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(w.e.f. session 2018-2019)

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Class: B.Sc. Second Year
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Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy. Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.

इकाई–3 विवर्तन [15 Lectures]

फ्रेनल के अर्द्धकालिक कटिबंध का सिद्धांत, सीधी कोर पर विवर्तन, सरलरेखीय गमन। एकल झिरी पर विवर्तन का आरेख एवं समाकलन विधियां, वृत्तीय द्वारक, वृत्तीय चकती पर विवर्तन, प्रतिबिम्बों के विभेदन की रैले की कसौटी। दूरदर्शी व सूक्ष्मदर्शी की विवेदन क्षमता, फेज़ कन्ट्रास्ट सूक्ष्मदर्शी की सामान्य रूपरेखा। N समानान्तर झिर्रियों पर विवर्तन, तीव्रता विवरण, समतल विवर्तन ग्रेटिंग, परावर्तन ग्रेटिंग, ग्रेटिंग की विभेदन क्षमता तथा इसकी प्रिज्म व फेब्री पैरो इटलॉन की विभेदन क्षमता से तुलना।

Unit-IV Polarisation [15 Lectures]

Transverse nature of light waves, Polarization of electromagnetic waves, Plane polarised light – production and analysis. Description of Linear, circular and elliptical polarisation. Propagation of electro magnetic waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor, Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal. Nicol prism, Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter.

इकाई–4 ध्रुवण [15 Lectures]

प्रकाश तरंग की अनुप्रस्थ प्रकृति, विद्युत चुम्बकीय तरंग का ध्रुवण, समतल ध्रुवित प्रकाश – उत्पादन व विश्लेषण। रेखिक, वृत्तीय व दीर्घवृत्तीय ध्रुवण का वर्णन। विद्युत चुम्बकीय तरंग का असंमागी माध्यम में संचरण, एक–अक्षीय व द्वि–अक्षीय क्रिस्टल, परावैद्युत टेन्सर की सममित प्रकृति, द्वि–अपर्वतन, हाइगन का सिद्धांत, साधारण व असाधारण वर्तनांक, फ्रेनल का सूत्र, एक अक्षीय क्रिस्टल में प्रकाश संचरण। निकॉल प्रिज्म, वृत्तीय व दीर्घवृत्तीय प्रकाश का उत्पादन व विश्लेषण, बेबिनेट संकारक व अनुप्रयोग, प्रकाशीय धूर्णन व पोलारीमीटर से इसका मापन।

Unit-V Laser and Photo Sensors [15 Lectures]

A brief history of lasers, characteristics of laser light, Einstein prediction, Relationship between Einstein's coefficients (qualitative discussion), Pumping schemes, Resonators, Ruby laser, He-Ne laser. Applications of lasers. Principle of Holography. Photodiodes, Phototransistors, and Photomultipliers.

(WSM)

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(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

इकाई–5 लेज़र व फोटो सेन्सर्स **[15 Lectures]**

लेज़र का संक्षिप्त इतिहास, लेज़र प्रकाश के अभिलाक्षणिक गुण, आइन्सटीन की संकल्पना, आइन्सटीन गुणांको में सम्बन्ध (गुणात्मक विवेचना), पम्पिंग प्रणालियाँ, रेज़ोनेटर्स, रूबी लेज़र, हीलियम–निआन लेज़र, लेज़र के उपयोग, होलोग्राफी का सिद्धांत। फोटोडायोड, फोटो ट्रांजिस्टर व फोटो मल्टीप्लायर।

References Books:

1. **Fundamentals of Optics**: F.A. Jenkins and H. E. White, 1976, McGraw-Hill.
2. **Principles of Optics**: B. K. Mathur, 1995, Gopal Printing.
3. **University Physics**: F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley.
4. **Optics**: A. K. Ghatak, McGraw Hill Publications.
5. **Principles of Optics**: Max Born and Wolf, Pregmon Press.
6. **Optics and Atomic Physics,** D. P. Khandelwal, Himalaya Publication.
7. **Lasers: Theory and Applications**: K. Thyagrajan and A. K. Ghatak.

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Class: B.Sc. Second Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 2
Title of Paper : **Electrostatics, Magneto statics and Electrodynamics**

Unit-1 Electrostatics [15 Lectures]

Coulombs law in vacuum expressed in vector forms, calculations of electric field **E** for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field and electric potential ($\mathbf{E} = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding **E** for symmetric charge distributions. Capacitors, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector **P**, relation between displacement vector **D**, **E** and **P**. Molecular interpretation of Claussius-Mossotti equation.

इकाई–1 स्थिरविद्युतिकी [15 Lectures]

निर्वात में कूलम्ब का नियम – सदिश रूप में, विद्युत क्षेत्र **E** की स्थिर आवेश के सरल द्विध्रुव व चतुर्ध्रुव आघूर्ण वितरण हेतु गणना। स्थिर विद्युत क्षेत्र में किसी आवेश पर किया गया कार्य एवं उसे रेखिक समाकलन रूप में लिखना, स्थिर विद्युत क्षेत्र की संरक्षी प्रकृति। विद्युत क्षेत्र और विभव में संबंध ($\mathbf{E} = -\nabla V$), एक समान विद्युतीय क्षेत्र में द्विध्रुव का आघूर्ण व इसकी उर्जा। विद्युत क्षेत्र का फ्लक्स, गॉस का नियम व इसका सममित आवेश वितरण हेतु **E** के परिकलन में उपयोग। संधारित्र, समरूप विद्युत क्षेत्र में गोलकार चालक, किसी पृथ्वीकृत अनन्त चालक के सम्मुख बिन्दु पर आवेश। पराविद्युत, पराविद्युत की उपस्थिति में समानांतर प्लेट संधारित्र, परावैद्युतांक, ध्रुवण व ध्रुवण सदिश **P**, विस्थापन सदिश **D**, **P** एवं **E** में संबंध, क्लासियस–मोसाटी समीकरण की आणविक व्याख्या।

Unit-2 Magnetostatics [15 Lectures]

Force on a moving charge, Lorentz force equation and definition of **B**, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio, Biot and Savart's law, calculation of **H** for simple geometrical situations such as Solenoid, Anchor ring, Ampere's Law. $\nabla\times\mathbf{B} = \mu_0\mathbf{J}$, $\nabla.\mathbf{B} = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (**M**), relationship between **B**, **H** and **M**. Derivation of the relation $\nabla\times\mathbf{M} = \mathbf{J}$ for non-uniform magnetization.

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इकाई–2 स्थिर चुम्बकत्व [15 Lectures]

किसी गतिमान आवेश पर बलः लारेंज बल समीकरण एवं **B** की परिभाषा, सीधे धारावाही चालक को चुम्बकीय क्षेत्र में रखने पर बल, धारा लूप पर बल आधूर्ण, चुम्बकीय बल आधूर्ण, कोणीय संवेग व जाइरोमैग्नेटिक अनुपात, बायोट–सेवार्ट का नियम, सरल ज्यामितीय परिस्थितियों में **H** की गणना (परनलिका एवं एंकर वलय), एम्पीयर का परिपर्थीय नियम, $\nabla\times\mathbf{B} = \mu_0\mathbf{J}$ व $\nabla.\mathbf{B} = 0$, चुम्बकीय द्विध्रुव द्वारा बद्ध व मुक्त धाराएँ, चुम्बकन सदिश (**M**): **B**, **H** एवं **M** में संबंध, असमरूप से चुम्बकित पदार्थ हेतु $\nabla\times\mathbf{M} = \mathbf{J}$ का निगमन।

Unit-3 Current Electricity and Bio electricity [15 Lectures]

Steady current, current density **J**, non-steady currents and continuity equation, Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits. decay constants, LCR circuits. AC circuits. complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power. Electricity observed in living systems, Origin of bioelectricity.

इकाई–3 विद्युत धारा व बायो–धारा [15 Lectures]

स्थाई धारा, धारा घनत्व **J**, अस्थाई धारा समीकरण एवं सांतत्य समीकरण, किरचॉफ के नियम व मल्टीलूप परिपथ विश्लेषण, LR व CR परिपथ में धारा की वृद्धि व क्षय, क्षय–नियतांक, LCR परिपथ। AC परिपथ, सम्मिश्र संख्याएं और उनके अनुप्रयोग द्वारा AC परिपथ में सम्मिश्र प्रतिबाधा, रीएक्टेंस, श्रेणी एवं समानांतर अनुनाद को हल करना। Q गुणांक, AC परिपथ द्वारा शक्ति का उपयोग, शक्ति गुणांक, Y एवं Δ नेटवर्क व विद्युत शक्ति का प्रेषण। जैविक निकायों में विद्युत का अवलोकन, जैव विद्युत की उत्पति।

Unit-4 Motion of Charged Particles in Electric and Magnetic Fields [15 Lectures]

(Note: The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.)

E as an accelerating field, electron gun, discharge tube, linear accelerator. **E** as deflecting field - CRO, Sensitivity of CRO. Transverse **B** field; 180° deflection, Mass spectrograph and velocity selector, Curvatures of tracks for energy determination for nuclear particles; Principle and working of Cyclotron. Mutually perpendicular and parallel **E** & **B** fields: Positive ray parabolas, Discovery of isotopes, Elements of Mass Spectrographs, Principle of magnetic focusing (lenses).

इकाई–4 विद्युत व चुम्बकीय क्षेत्र में अविशित कणों की गति [15 Lectures]

(यहाँ उपकरणों के वर्णन की अपेक्षा उनके यान्त्रिकीय पक्ष पर अधिक ध्यान दिया जाना चाहिए।)

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(Mahendra Singh)
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Class: B.Sc. Second Year
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त्वरण क्षेत्र के रूप में **E**, इलेक्ट्रान गन, विर्सजन नलिका, रेखीय त्वरक, **E** विक्षेपक क्षेत्र के रूप में CRO, CRO की सुग्राहिता। अनुप्रस्थ **B** क्षेत्र; 180° विचलन, द्रव्यमान स्पेक्ट्रोग्राफ या वेग सिलेक्टर, नाभिकीय कणों के संसूचन हेतु कणों के पथों की वक्रता, साइक्लोट्रॉन (उर्जा मापन) का सिद्धांत व कार्य पद्धति, समानान्तर व लम्बवत **E** व **B** क्षेत्र, धन–किरण के परवलय, आइसोटोप की खोज, द्रव्यमान स्पेक्ट्रोग्राफ के मूलतत्व, चुम्बकीय फोकस का सिद्धांत (लैंस)।

Unit-5 Electrodynamics [15 Lectures]

Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density. Poynting vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media, Reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarization by reflection and total internal reflection. Waves in a conducting medium, Reflection and refraction by the ionosphere.

इकाई–5 विद्युत गतिकी [15 Lectures]

विद्युत चुम्बकीय प्रेरण, फेराडे के नियम, विद्युत बाहक बल, फेराडे नियम के अवकलन व समाकलन रूप, स्वः व अन्योन्य प्रेरण, ट्रान्सफार्मर, स्थिर विद्युत क्षेत्र में उर्जा, मेक्सवैल की विस्थापन धारा घनत्व की संकल्पना, मैक्सवेल की समीकरणों की स्थापना, विद्युत चुम्बकीय क्षेत्र का उर्जा धनत्व। पॉयंटिग सदिश, विद्युत चुम्बकीय तरंग समीकरण, निर्वात एवं परावैधुत माध्यम में समतल विद्युत चुम्बकीय तरंग, परावैद्युत की समतल सतह से परावर्तन, फ्रेनेल के नियम, परावर्तन से ध्रुवण व पूर्ण आंतरिक परावर्तन, चालक माध्यम में तरंग, आयनमण्डल के द्वारा परावर्तन व अपवर्तन।

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2. **Physics Volume 2**, D. Halliday and R. Resnick
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4. **Electricity and Magnetism:** S. S. Atwood Dover.
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6. **From Neuron to Brain:** Kuffler and Nicholas, Sinauer Associates, Inc Pub. Sunderland, Masschuetts.
7. **Schaums Outline of Begining Physics II: Electricity and Magnetism**

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24/7/2019

Department of Higher Education, Government of Madhya Pradesh
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(w.e.f. session 2018-2019)

उच्च शिक्षा विभाग, मध्यप्रदेश शासन
स्नातक कक्षाओं के लिए पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2018-2019 से लागू)

Class: B.Sc. Second Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Study of interference using biprism.
2. Study of diffraction at straight edge.
3. Use of plane diffraction grating to determine D_1, D_2 lines of Sodium lamp.
4. Resolving power of telescope.
5. Polarization by reflection and verification of Brewster's Law.
6. Study of optical rotation in Sugar solution.
7. Refractive index and dispersive power of prism using spectrometer.
8. Absorption spectrum of material using constant deviation spectrograph.
9. Beam divergence of He-Ne Laser.
10. Determination of wavelength of Laser by diffraction.
11. Determination of radius of curvature of plano-convex lense by Newton's rings.
12. Characteristics of a Ballistic galvanometer.
13. Setting up and using an electroscope or electrometer.
14. Measurement of low resistance by Carey-Foster bridge or otherwise.
15. Measurement of inductance using impedance at different frequencies.
16. Measurement of capacitance using, impedance at different frequencies.
17. Response curve for LCR circuits and response frequencies.
18. Sensitivity of a cathode- ray oscilloscope.
19. Use of a vibration magnetometer to study a field.
20. Study of Magnetic field due to current using Tangent Galvanometer.
21. Study of decay of currents in LR and RC circuits.
22. Study of Lissajous figures using CRO.
23. Verification of Network theorems.

(Mahendra Soni) (Dr S K Khan) (Sanjay Sathe)

(R Kalani) DR R K Khan (Mrs) Seema UVS Murty D Varshney 24/7/17

Department of Higher Education, Government of Madhya Pradesh
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उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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Acedmic Year (2017-2018)

B.Sc I/[✓ II]/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students :

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. For Private students :

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

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(49)

(3)

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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 1
Title of Paper : **Quantum Mechanics and Spectroscopy**

Unit-I: Quantum Mechanics-1 [15 Lectures]

Particles and Waves: Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.

इकाई–1: क्वांटम यांत्रिकी–1 [15 Lectures]

कण एवं तरंग: प्रकाश विद्युत प्रभाव, कृष्ण पिण्ड विकिरण, क्राम्पटन प्रभाव, डी–ब्रोगली परिकल्पना, तरंग–कण द्वैतता, डेवीस जर्मर प्रयोग, तरंग पैकेट, तरंग व समूह वेग की अभिधारणा, इलेक्ट्रॉन का द्वि–स्लिट प्रयोग, प्रायिकता, तरंग आयाम व तरंग फलन, हाइज़नबर्ग का अनिश्चितता का सिद्धांत व उदाहरण, श्रोडिंज़र समीकरण व उसकी मूलभूत अवधारणाएँ। आइगन मान, तरंग फलन की प्रायिकता आधारित व्याख्या, सातत्य समीकरण, प्रायिकता धारा धनत्व, तरंग फलन पर सीमांत शर्तें। तरंग फलन का प्रसामान्यीकरण।

Unit-II: Quantum Mechanics-2 [15 Lectures]

Time independent Schrodinger equation: One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator.

इकाई–2 क्वांटम यांत्रिकी–2 [15 Lectures]

समय अनिर्भर श्रोडिंजर समीकरण: एक–विमीय विभव कूप व प्राचीर, सीमांत शर्तें, बद्ध व अबद्ध अवस्थाएँ, आयाताकार प्राचीर (I-D) से परावर्तन व पारगमन गुणांक। α–क्षय की व्याख्या, सुरंगन की क्वाटंम घटना। एक–विमीय बाक्स में मुक्त कण, मुक्त कण हेतु आइगन फलन एवं आइगन मान। एक विमीय सरल आवर्त दौलित्र, हरमाइट अवकल समीकरण से उसके आइगन मान, मूल अवस्था का आइगन फलन, गोलीय सममित विभव में कण, दृढ़ धूर्णक।

Unit-III: Atomic Spectroscopy [15 Lectures]

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(R. Kalosh)

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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, **L-S** and **J-J** coupling. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.

इकाई–3 परमाणु स्पेक्ट्रोस्कोपी [15 Lectures]

विद्युतीय व चुम्बकीय क्षेत्र में परमाणु – क्वांटम संख्यांक, बोहर मॉडल व वरण (Selection) के नियम, स्टर्न–गर्लक प्रयोग, चक्रण – मूलभूत (Intrinsic) क्वांटम संख्या। चक्रण की चिरसम्मत सिद्धांत से असंगति। कक्षीय कोणीय संवेग, फाइन स्ट्रेक्चर कुल कोणीय संवेग, पाऊली का अपर्वजन सिद्धांत। एक विमीय बाक्स में बहुलकण–सममिती व असममिती तरंग फलन, परमाणु कोश मॉडल। परमाण्वीय अवस्था हेतु स्पेक्ट्रमी संकेतन, स्पिन आरबिट कपलिंग, L-S व J-J युग्मन, जीमन प्रभाव। सतत व अभिलाक्षणिक X-किरण स्पेक्ट्रा, मोसले का नियम।

Unit-IV: Molecular Spectroscopy [15 Lectures]

Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. Frank-Condon principle, singlet and triplet states. Fluorescence and phosphorescence.

इकाई–4 आणविक स्पेक्ट्रोस्कोपी [15 Lectures]

विभिन्न प्रकार के स्पेक्ट्रा (वर्णक्रम), धूर्णी स्पेक्ट्रा, वर्णक्रम रेखाओं की तीव्रता व द्वि–परमाणविक अणु की बद्ध दूरी, समस्थानिक प्रभाव/द्वि–परमाणविक अणु की कम्पन उर्जा, शून्य बिन्दु उर्जा, अनहार्मोनिसीटी (अनावृति)। मोर्स विभव, रमन प्रभाव। स्टोक व प्रति स्टोक रेखाएँ व इनकी तीव्रता, इलेक्ट्रॉनिक वर्णक्रम। बार्न ऑपनहायमर सन्निकटता, फ्रेंक कार्डन सिद्धांत, एकल व त्रिक अवस्थाएँ, प्रतिदीप्ति व स्फुरदीप्ति।

Unit-V: Nuclear Physics [15 Lectures]

Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra – velocity and energy of alpha particles. Geiger-Nuttal law. Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions, pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus, Bohr's postulate of compound nuclear reaction,

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(R.Kalar)

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Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Semi empirical mass formula, Shell model, Liquid drop model, Nuclear fission and fusion (concepts).

इकाई–5 नाभिकीय भौतिकी [15 Lectures]

नाभिक के मूलभूत गुणः न्युट्रॉन तथा आवेशित कणों की द्रव्य के साथ अनुक्रिया, नाभिकीय संसूचक–आयनन कोष्ठ, गाइगर मूलर गणक, अनुपातिक गणक, प्रस्फुरण गणक, अभ्रकोष्ठ, नाभिक के मूल गुण, नाभिक की आकृति, संहति, आवेश तथा आकार, नाभिक का स्थायित्व एवं बंधन ऊर्जा, अल्फा–कण का वेग एवं ऊर्जा, गाइगर–नेटल नियम, बीटा–किरण वर्णक्रम की प्रकृति, न्यूट्रीनों, ऊर्जा स्तर एवं क्षय पद्धति, पोजीट्रान उत्सर्जन एवं इलेक्ट्रॉन प्रग्रहण, चयन (वरण) नियम, बीटा अवशोषण एवं बीटा कण का परास, क्यूरी आरेख, नाभिकीय अभिक्रियाएँ, युग्म उत्पादन, Q-मान एवं नाभिकीय अभिक्रिया की देहली, नाभिकीय अभिक्रिया का अनुप्रस्थ काट, विभिन्न प्रकार की अभिक्रियाओं के उदाहरण एवं अभिलाक्षणिक, यौगिक नाभिक, यौगिक नाभिकीय अभिक्रिया की बोहर अभिकल्पना, अर्धमूलानुपाती सूत्र, द्रव बूंद मॉडल, कोश मॉडल, नाभिकीय विखंडन एवं संलयन।

References:

1. **Quantum Mechanics**: V. Devanathan, Narosa Publishing House, New Delhi, 2005
2. **Quantum Mechanics**: B. H. Bransden, Pearson Education, Singapore, 2005
3. **Quantum Mechanics**: Concepts and Applications, Nouredine Zettili, Jacksonville tate University, Jacksonville, USA, John Wiley and Sons, Ltd, 2009
4. **Physics of Atoms and molecules**: B.H. Bransden and C.J. Joachaim, Pearson Education, Singapore, 2003
5. **Fundamentals of Molecular Spectroscopy**: C.M. Banwell and M. McCash, McGraw Hill (U.K. edition).
6. **Introduction to Atomic Physics**, H. E. White
7. **Quantum Mechanics:** Schaums Outlines, Y. Peleg, R. Pnini, E. Zaarur, E. Hecht.

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : **2**
Title of Paper : **Quantum Mechanics and Spectroscopy**

Unit-I: Solid state Physics-1 [15 Lectures]

Crystal Structure and bonding: Crystalline and amorphous solids. Translational symmetry. Lattice and basis. Unit cell. Reciprocal lattice. Fundamental types of lattices (Bravias Lattice). Miller indices Lattice planes. Simple cubic. Face centered cubic. Body centered cubic lattices. Laue and Bragg's equations. Determination of crystal structure with X-rays, X-ray spectrometer. Ionic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids. Periodic potential and Bloch theorem. Kronig-Penny model (Qualitative).

इकाई–1: ठोस अवस्था भौतिकी–1 [15 Lectures]

क्रिस्टलीय, संरचना एवं आबंधनः क्रिस्टलीय व अक्रिस्टलीय ठोस, स्थानांतरण सममिति, जालक व आधार, इकाई सेल, व्युत्क्रम जालक, जालकों के मौलिक प्रकार (ब्रेवाइस लेटिस), मिलर सूचकांक, जालक तल। सरल घनाकार, फलक केन्द्रित घनाकार, अन्तः केन्द्रित घनाकार लेटिसेस। लॉवे व ब्रेग का समीकरण, X-किरणों से क्रिस्टल की संरचना ज्ञात करना, X-किरण स्पेक्ट्रममापी। आयनिक, सह–संयोजक, धात्विक वॉण्डरवाल एवं हायड्रोजन बंधन। ठोस पदार्थो के लिए बैण्ड सिद्धांत, आवर्ती विभव एवं ब्लॉच प्रमेय। क्रोनिंग–पैनी मॉडल (गुणात्मक विवेचना)।

Unit-II: Solid state Physics-2 [15 Lectures]

Lattice structure and properties: Dulong Petit. Einstein and Debye theories of specific heats of solids. Elastic and atomic force constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electrical resistivity. Specific heat of electron. Wiedemann-Franz law. Hall effect. Response of substances in magnetic field, dia-, para- and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains. Curie's law. Weiss' theory of ferromagnetism and ferromagnetic domains. Discussion of BH hysteresis.

इकाई–2: ठोस अवस्था भौतिकी–2 [15 Lectures]

विशिष्ट उष्मा का ड्यूलोंग–पेटिट, आइन्सटीन व डिबाई सिद्धांत, प्रत्यास्थ एवं परमाण्विक बल नियतांक। एक परमाण्विक व द्विपरमाण्विक कड़ी (Chain) का गतिक समीकरण, प्रकाशीय व ध्वनिकी विधाएँ, विद्युतीय प्रतिरोधकता, इलेक्ट्रॉन की विशिष्ट उष्मा, वाइडमेन–फ्रेंज नियम। हॉल प्रभाव, चुम्बकीय क्षेत्र में पदार्थों की अनुक्रिया। प्रति, अनु एवं लौह चुम्बकीय पदार्थ। प्रति एवं अनु चुम्बकीय डोमेन्स का चिरसम्मत सिद्धांत। क्यूरी का नियम, लौह चुम्बकत्व एवं लौह चुम्बकीय डोमेन्स के लिए Weiss का सिद्धांत। B-H शैथिल्यता की विवेचना।

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Unit-III: Semiconductor devices-1 [15 Lectures]

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Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
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उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Electronic devices: Types of Semiconductors (**p** and **n**). Formation of Energy Bands. Energy level diagram. Conductivity and mobility. Junction formation. Barrier formation in **p-n** junction diode. Current flow mechanism in forward and reverse biased diode (recombination), drift and saturation of drift velocity. Derivation of mathematical equations for barrier potential, barrier width. Single **p-n** junction device (physical explanation, current voltage characteristics and one or two applications). Two terminal devices. Rectification. Zener diode. Photo diode. Light emitting diode. Solar cell. Three terminal devices. Junction field effect transistor (JFET). Two junction devices. Transistors as **p-n-p** and **n-p-n**. Physical mechanism of current flow. Characteristics of transistor.

इकाई–3: अर्धचालक युक्तियां–1 [15 Lectures]

ऊर्जा बैण्डों का बनना, ऊर्जा स्तर का डायग्राम, अर्धचालक के प्रकार (p व n), चालकता और गतिशीलता, संधि का बनना, p-n संधि, डायोड में रोधिका विभव का बनना, अग्र व पश्च अभिनति डायोड में धारा प्रवाह (पुनः संयोजन), अनुगमन वेग व अनुगमन वेग की संतृप्तता, रोधिका विभव के गणितीय समीकरण की व्युत्पत्ति, रोधिका चौड़ाई, एकल p-n संधि। डायोड (भौतिकीय विवेचना), धारा–विभव अभिलाक्षणिक (एक–दो अनुप्रयोग), द्वि–टर्मीनल युक्ति, दिष्टकरण, जेनर डायोड, फोटो डायोड, प्रकाश उत्सर्जक डायोड, सोलर सेल, त्रि–टर्मीनल युक्ति, संधि क्षेत्र प्रभाव ट्रांजिस्टर (JFET), द्वि–संधि युक्तियाँ, p-n-p व n-p-n ट्रांजिस्टर, धारा–प्रवाह की भौतिकीय प्रक्रिया, ट्रांजिस्टर के अभिलाक्षणिक वक्र।

Unit-IV: Semiconductor devices-2 [15 Lectures]

Amplifiers (only bipolar junction transistor). CB. CE and CC configurations. Single stage CE amplifier (biasing and stabilization circuits). Q-point, equivalent circuit, input impedance, output impedance, voltage and current gain. Class **A**, **B**, **C** amplifiers (definitions). RC coupled amplifiers (frequency response). Class **B** push-pull amplifier. Feedback amplifiers. Voltage feedback and current feedback. Effect of negative voltage series feedback on input impedance. Output impedance and gain. Stability, distortion and noise. Principle of an Oscillator, Barkhausen criterion, Colpitts. RC phase shift oscillators. Basic concepts of amplitude, frequency and phase modulations and demodulation.

इकाई–4: अर्धचालक युक्तियां–2 [15 Lectures]

प्रवर्धक (द्वि–ध्रुव संधि ट्रांजिस्टर) CB, CE व CC विधा, एकल स्टेज (चरण) CE प्रवर्धक (अभिनन व स्थायीकरण परिपथ), Q बिन्दु समतुल्य परिपथ, निवेशी व निर्गत प्रतिबाधा, विभव एवं धारा लाभ। वर्ग A, B, C प्रवर्धक (परिभाषा), RC युग्मित प्रवर्धक (आवृत्ति अनुक्रिया वक्र), वर्ग–B पुश–पुल प्रवर्धक, पुर्ननिवेशन प्रवर्धक, विभव एवं धारा, पुर्ननिवेशन, निवेशी प्रतिबाधा पर ऋणात्मक विभव, श्रेणी फीडबेक, निर्गमन प्रतिबाधा एवं लाभ। स्थायित्व, विकृति व शोर, दोलित्र का सिद्धांत तथा बार्क–हाउसन का प्रतिबन्ध, कॉलपिट दोलित्र, RC कला विस्थापी दौलित्र, आयाम, आवृति एवं कला माडुलेशन एवं संसूचक की मूल अवधारणा।

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Solid State Physics, N. W. Ashcroft, and N. D. Mermin, Harcourt Asia (P) Ltd. 2001

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Unit-V: Nano materials [15 Lectures]

Nanostructures: Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D, 0D nanostructure materials and their density of states, Surface and Interface effects. Modelling of quantum size effect. Synthesis of nanoparticles - Bottom Up and Top Down approach, Wet Chemical Method. Nanolithography. Metal and Semiconducting nanomaterials. Essential differences in structural and properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterials.

इकाई–5: नैनो पदार्थ [15 Lectures]

नैनों संरचनाएं: नैनो टेक्नॉलाजी की प्रस्तावना, संरचना, आकार निर्भर गुण। 3D, 2D, 1D, 0D नैनो सरंचना प्रदार्थ एवं उनकी अवस्थाओं का घनत्व, सतह एवं अंतराफलक प्रभाव, क्वांटम आकार प्रभाव का प्रतिरूपण, नैनो कणों का संश्लेषण–नीचे से ऊपर (बॉटम अप) और ऊपर से नीचे (टॉप डाउन) विधियॉं, वेट रसायनिक विधि, नैनो लिथोग्राफी (नैनो मुद्रण), धातु एवं अर्द्ध चालकों के नैनो पदार्थ (गुणात्मक विवरण), विस्तृत (Bulk) और नैनो पदार्थों की संरचना एवं गुणों में अन्तर (गुणात्मक विवरण), प्राकृतिक रूप में पाये जाने वाले नैनो क्रिस्टल। नैनो पदार्थों के अनुप्रयोग।

References:

1. **Introduction to Solid State Physics**, C. Kittel, VIIIth Edition, John Wiley and Sons, New York, 2005.
2. **Intermediate Quantum theory of Crystalline Solids**, A. O. E. Animalu, Prentice–Hall of India private Limited, New Delhi 1977
3. **Solid State Electronic devices**, B. G. Streetman, II Edition Prentice Hall, India.
4. **Microelectronics**, J. Millman and A. Grabel McGraw Hill New York
5. **The Physics and Chemistry of Nanosolids**: Frank J. Owens, and Charles P. Poole Jr., Wiley Inter Science, 2008
6. **Physics of Low Dimensional Semiconductors**: An introduction; J.H. Davies, Cambridge University Press, U.K., 1998
7. **Electronic fundamentals and applications**, J. D. Ryder, Prentice Hall, India.

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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Specific resistance and energy gap of a semiconductor.
2. Study of half wave and full wave rectification.
3. Characteristics of Zener diode.
4. Characteristic of a tunnel diode.
5. Characteristics of JFET.
6. Characteristic of a transistor.
7. Study of regulated power supply.
8. Study of RC coupled amplifiers
9. Determination of Planck's constant.
10. Determination of **e**/m using Thomson's method.
11. Determination of **e** by Millikan's method.
12. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
13. Absorption spectrum of iodine vapour.
14. Study of Zeeman effect for determination of Lande g-factor.
15. Study of Raman spectrum using laser as an excitation source
16. To draw B-H curve of ferro-magnetic material with the help of CRO
17. Hysteresis curve a transformer core.
18. Hall probe method for measurement of resistivity.

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Acedmic Year (2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. **For Regular students :**

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. **For Private students :**

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

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(UVS Murty)

D.S.K.Khan

S.C.Dib

D.K.Soni

Dr (Mrs) Seema

(R. Kalam)

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24/7/17
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Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject	: **Physics**
Paper	: **1**
Title of Paper	: **Quantum Mechanics and Spectroscopy**

Unit-I: Quantum Mechanics-1 [15 Lectures]

Particles and Waves: Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.

इकाई–1: क्वांटम यांत्रिकी–1 [15 Lectures]

कण एवं तरंग: प्रकाश विद्युत प्रभाव, कृष्ण पिण्ड विकिरण, क्राम्पटन प्रभाव, डी–ब्रोगली परिकल्पना, तरंग–कण द्वैतता, डेवीस जर्मर प्रयोग, तरंग पैकेट, तरंग व समूह वेग की अभिधारणा, इलेक्ट्रॉन का द्वि–स्लिट प्रयोग, प्रायिकता, तरंग आयाम व तरंग फलन, हाइज़नबर्ग का अनिश्चितता का सिद्धांत व उदाहरण, श्रोडिंज़र समीकरण व उसकी मूलभूत अवधारणाएँ। आइगन मान, तरंग फलन की प्रायिकता आधारित व्याख्या, सातत्य समीकरण, प्रायिकता धारा धनत्व, तरंग फलन पर सीमांत शर्तें। तरंग फलन का प्रसामान्यीकरण।

Unit-II: Quantum Mechanics-2 [15 Lectures]

Time independent Schrodinger equation: One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator.

इकाई–2 क्वांटम यांत्रिकी–2 [15 Lectures]

समय अनिर्भर श्रोडिंजर समीकरण: एक–विमीय विभव कूप व प्राचीर, सीमांत शर्तें, बद्ध व अबद्ध अवस्थाएँ, आयाताकार प्राचीर (I-D) से परावर्तन व पारगमन गुणांक। α–क्षय की व्याख्या, सुरंगन की क्वाटंम घटना। एक–विमीय बाक्स में मुक्त कण, मुक्त कण हेतु आइगन फलन एवं आइगन मान। एक विमीय सरल आवर्त दौलित्र, हरमाइट अवकल समीकरण से उसके आइगन मान, गूल अवस्था का आइगन फलन, गोलीय सममित विभव में कण, दृढ़ धूर्णक।

Unit-III: Atomic Spectroscopy [15 Lectures]

Sudhir Jain

(V U S Murti)

(Dr S C Dubey)

(R K Kalare)

D S K Khare

(Mahendra Singh)

Dr P K Khare

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(58)

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए वार्षिक पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित

(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, **L-S** and **J-J** coupling. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.

इकाई–3 परमाणु स्पेक्ट्रोस्कोपी **[15 Lectures]**

विद्युतीय व चुम्बकीय क्षेत्र में परमाणु – क्वांटम संख्यांक, बोहर मॉडल व वरण (Selection) के नियम, स्टर्न–गर्लक प्रयोग, चक्रण – मूलभूत (Intrinsic) क्वांटम संख्या। चक्रण की चिरसम्मत सिद्धांत से असंगति। कक्षीय कोणीय संवेग, फाइन स्ट्रेक्चर कुल कोणीय संवेग, पाऊली का अपर्वजन सिद्धांत। एक विमीय बाक्स में बहुलकण–सममिती व असममिती तरंग फलन, परमाणु कोश मॉडल। परमाण्वीय अवस्था हेतु स्पेक्ट्रमी संकेतन, स्पिन आरबिट कपलिंग, L-S व J-J युग्मन, ज़ीमन प्रभाव। सतत व अभिलाक्षणिक X-किरण स्पेक्ट्रा, मोसले का नियम।

Unit-IV: Molecular Spectroscopy **[15 Lectures]**

Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. Frank-Condon principle. singlet and triplet states. Fluorescence and phosphorescence.

इकाई–4 आणविक स्पेक्ट्रोस्कोपी **[15 Lectures]**

विभिन्न प्रकार के स्पेक्ट्रा (वर्णक्रम), धूर्णी स्पेक्ट्रा, वर्णक्रम रेखाओं की तीव्रता व द्वि–परमाणविक अणु की बद्ध दूरी, समस्थानिक प्रभाव/द्वि–परमाणविक अणु की कम्पन उर्जा, शून्य बिन्दु उर्जा, अनहार्मोनिसीटी (अनावृति)। मोर्स विभव, रमन प्रभाव। स्टोक व प्रति स्टोक रेखाएँ व इनकी तीव्रता, इलेक्ट्रॉनिक वर्णक्रम। बार्न ऑपनहायमर सन्निकटता, फ्रेंक कार्डन सिद्धांत, एकल व त्रिक अवस्थाएँ, प्रतिदीप्ति व स्फुरदीप्ति।

Unit-V: Nuclear Physics **[15 Lectures]**

Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra – velocity and energy of alpha particles. Geiger-Nuttal law. Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions. pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus. Bohr's postulate of compound nuclear reaction.

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Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Semi empirical mass formula, Shell model, Liquid drop model, Nuclear fission and fusion (concepts).

इकाई–5 नाभिकीय भौतिकी [15 Lectures]

नाभिक के मूलभूत गुणः न्युट्रॉन तथा आवेशित कणों की द्रव्य के साथ अनुक्रिया, नाभिकीय संसूचक–आयनन कोष्ठ, गाइगर मूलर गणक, अनुपातिक गणक, प्रस्फुरण गणक, अभ्रकोष्ठ, नाभिक के मूल गुण, नाभिक की आकृति, संहति, आवेश तथा आकार, नाभिक का स्थायित्व एवं बंधन ऊर्जा, अल्फा–कण का वेग एवं ऊर्जा, गाइगर–नेटल नियम, बीटा–किरण वर्णक्रम की प्रकृति, न्यूट्रीनों, ऊर्जा स्तर एवं क्षय पद्धति, पोजीट्रान उत्सर्जन एवं इलेक्ट्रॉन प्रग्रहण, चयन (वरण) नियम, बीटा अवशोषण एवं बीटा कण का परास, क्यूरी आरेख, नाभिकीय अभिक्रियाएँ, युग्म उत्पादन, Q-मान एवं नाभिकीय अभिक्रिया की देहली, नाभिकीय अभिक्रिया का अनुप्रस्थ काट, विभिन्न प्रकार की अभिक्रियाओं के उदाहरण एवं अभिलाक्षणिक, यौगिक नाभिक, यौगिक नाभिकीय अभिक्रिया की बोहर अभिकल्पना, अर्धमूलानुपाती सूत्र, द्रव बूंद मॉडल, कोश मॉडल, नाभिकीय विखंडन एवं संलयन।

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5. **Fundamentals of Molecular Spectroscopy**: C.M. Banwell and M. McCash, McGraw Hill (U.K. edition).
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60

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2019-2020)

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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : **2**
Title of Paper : **Quantum Mechanics and Spectroscopy**

Unit-I: Solid state Physics-1 [15 Lectures]

Crystal Structure and bonding: Crystalline and amorphous solids. Translational symmetry. Lattice and basis. Unit cell. Reciprocal lattice. Fundamental types of lattices (Bravias Lattice). Miller indices Lattice planes. Simple cubic. Face centered cubic. Body centered cubic lattices. Laue and Bragg's equations. Determination of crystal structure with X-rays, X-ray spectrometer. Ionic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids. Periodic potential and Bloch theorem. Kronig-Penny model (Qualitative).

इकाई–1: ठोस अवस्था भौतिकी–1 [15 Lectures]

क्रिस्टलीय, संरचना एवं आबंधन: क्रिस्टलीय व अक्रिस्टलीय ठोस, स्थानांतरण सममिति, जालक व आधार, इकाई सेल, व्युत्क्रम जालक, जालकों के मौलिक प्रकार (ब्रेवाइस लेटिस), मिलर सूचकांक, जालक तल। सरल घनाकार, फलक केन्द्रित घनाकार, अन्तः केन्द्रित घनाकार लेटिसेस। लॉवे व ब्रेग का समीकरण, X-किरणों से क्रिस्टल की संरचना ज्ञात करना, X-किरण स्पेक्ट्रममापी। आयनिक, सह–संयोजक, धात्विक वॉण्डरवाल एवं हायड्रोजन बंधन। ठोस पदार्थो के लिए बैण्ड सिद्धांत, आवर्ती विभव एवं ब्लॉच प्रमेय। क्रोनिंग–पैनी मॉडल (गुणात्मक विवेचना)।

Unit-II: Solid state Physics-2 [15 Lectures]

Lattice structure and properties: Dulong Petit, Einstein and Debye theories of specific heats of solids. Elastic and atomic force constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electrical resistivity. Specific heat of electron. Wiedemann-Franz law. Hall effect. Response of substances in magnetic field. dia-, para- and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains. Curie's law. Weiss' theory of ferromagnetism and ferromagnetic domains. Discussion of BH hysteresis.

इकाई–2: ठोस अवस्था भौतिकी–2 [15 Lectures]

विशिष्ट उष्मा का ड्यूलोंग–पेटिट, आइन्सटीन व डिबाई सिद्धांत, प्रत्यास्थ एवं परमाण्विक बल नियतांक। एक परमाण्विक व द्विपरमाण्विक कड़ी (Chain) का गतिक समीकरण, प्रकाशीय व ध्वनिकी विधाएँ, विद्युतीय प्रतिरोधकता, इलेक्ट्रॉन की विशिष्ट उष्मा, वाइडमेन–फ्रेंज नियम। हॉल प्रभाव, चुम्बकीय क्षेत्र में पदार्थो की अनुक्रिया। प्रति, अनु एवं लौह चुम्बकीय पदार्थ। प्रति एवं अनु चुम्बकीय डोमेन्स का चिरसम्मत सिद्धांत। क्यूरी का नियम, लौह चुम्बकत्व एवं लौह चुम्बकीय डोमेन्स के लिए Weiss का सिद्धांत। B-H शैथिल्यता की विवेचना।

V.K. Srivastava

S.C.P. Dey

Unit-III: Semiconductor devices-1 [15 Lectures]

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61

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Electronic devices: Types of Semiconductors (**p** and **n**). Formation of Energy Bands. Energy level diagram. Conductivity and mobility. Junction formation. Barrier formation in **p-n** junction diode. Current flow mechanism in forward and reverse biased diode (recombination), drift and saturation of drift velocity. Derivation of mathematical equations for barrier potential, barrier width. Single **p-n** junction device (physical explanation, current voltage characteristics and one or two applications). Two terminal devices. Rectification. Zener diode. Photo diode. Light emitting diode. Solar cell. Three terminal devices. Junction field effect transistor (JFET). Two junction devices. Transistors as **p-n-p** and **n-p-n**. Physical mechanism of current flow. Characteristics of transistor.

इकाई–3: **अर्धचालक युक्तियां–1** **[15 Lectures]**

ऊर्जा बैण्डों का बनना, ऊर्जा स्तर का डायग्राम, अर्धचालक के प्रकार (p व n), चालकता और गतिशीलता, संधि का बनना, p-n संधि, डायोड में रोधिका विभव का बनना, अग्र व पश्च अभिनति डायोड में धारा प्रवाह (पुनः संयोजन), अनुगमन वेग व अनुगमन वेग की संतृप्तता, रोधिका विभव के गणितीय समीकरण की व्युत्पत्ति, रोधिका चौड़ाई, एकल p-n संधि। डायोड (भौतिकीय विवेचना), धारा–विभव अभिलाक्षणिक (एक–दो अनुप्रयोग), द्वि–टर्मीनल युक्ति, दिष्टकरण, जेनर डायोड, फोटो डायोड, प्रकाश उत्सर्जक डायोड, सोलर सेल, त्रि–टर्मीनल युक्ति, संधि क्षेत्र प्रभाव ट्रांजिस्टर (JFET), द्वि–संधि युक्तियाँ, p-n-p व n-p-n ट्रांजिस्टर, धारा–प्रवाह की भौतिकीय प्रक्रिया, ट्रांजिस्टर के अभिलाक्षणिक वक्र।

Unit-IV: Semiconductor devices-2 **[15 Lectures]**

Amplifiers (only bipolar junction transistor). CB, CE and CC configurations. Single stage CE amplifier (biasing and stabilization circuits), Q-point, equivalent circuit, input impedance, output impedance, voltage and current gain. Class **A**, **B**, **C** amplifiers (definitions). RC coupled amplifiers (frequency response). Class **B** push-pull amplifier. Feedback amplifiers. Voltage feedback and current feedback. Effect of negative voltage series feedback on input impedance. Output impedance and gain. Stability, distortion and noise. Principle of an Oscillator, Barkhausen criterion, Colpitts, RC phase shift oscillators. Basic concepts of amplitude, frequency and phase modulations and demodulation.

इकाई–4: **अर्धचालक युक्तियां–2** **[15 Lectures]**

प्रवर्धक (द्वि–ध्रुव संधि ट्रांजिस्टर) CB, CE व CC विधा, एकल स्टेज (चरण) CE प्रवर्धक (अभिनन व स्थायीकरण परिपथ), Q बिन्दु समतुल्य परिपथ, निवेशी व निर्गत प्रतिबाधा, विभव एवं धारा लाभ। वर्ग A, B, C प्रवर्धक (परिभाषा), RC युग्मित प्रवर्धक (आवृत्ति अनुक्रिया वक्र), वर्ग–B पुश–पुल प्रवर्धक, पुर्ननिवेशन प्रवर्धक, विभव एवं धारा, पुर्ननिवेशन, निवेशी प्रतिबाधा पर ऋणात्मक विभव, श्रेणी फीडबेक, निर्गमन प्रतिबाधा एवं लाभ। स्थायित्व, विकृति व शोर, दोलित्र का सिद्धांत तथा बार्क–हाउसन का प्रतिबन्ध, कॉलपिट दोलित्र, RC कला विस्थापी दौलित्र, आयाम, आवृति एवं कला माडुलेशन एवं संसूचक की मूल अवधारणा।

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(6) (62

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2019-2020)

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उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए वार्षिक पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित

(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Unit-V: Nano materials [15 Lectures]

Nanostructures: Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D, 0D nanostructure materials and their density of states, Surface and Interface effects. Modelling of quantum size effect. Synthesis of nanoparticles - Bottom Up and Top Down approach, Wet Chemical Method. Nanolithography. Metal and Semiconducting nanomaterials. Essential differences in structural and properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterials.

इकाई–5: नैनो पदार्थ [15 Lectures]

नैनों संरचनाएंः नैनो टेक्नॉलाजी की प्रस्तावना, संरचना, आकार निर्भर गुण। 3D, 2D, 1D, 0D नैनो सरंचना प्रदार्थ एवं उनकी अवस्थाओं का घनत्व, सतह एवं अंतराफलक प्रभाव, क्वांटम आकार प्रभाव का प्रतिरूपण, नैनो कणों का संश्लेषण–नीचे से ऊपर (बॉटम अप) और ऊपर से नीचे (टॉप डाउन) विधियॉं, वेट रसायनिक विधि, नैनो लिथोग्राफी (नैनो मुद्रण), धातु एवं अर्द्ध चालकों के नैनो पदार्थ (गुणात्मक विवरण), विस्तृत (Bulk) और नैनो पदार्थों की संरचना एवं गुणों में अन्तर (गुणात्मक विवरण), प्राकृतिक रूप में पाये जाने वाले नैनो क्रिस्टल। नैनो पदार्थों के अनुप्रयोग।

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Specific resistance and energy gap of a semiconductor.
2. Study of half wave and full wave rectification.
3. Characteristics of Zener diode.
4. Characteristic of a tunnel diode.
5. Characteristics of JFET.
6. Characteristic of a transistor.
7. Study of regulated power supply.
8. Study of RC coupled amplifiers
9. Determination of Planck's constant.
10. Determination of **e**/m using Thomson's method.
11. Determination of **e** by Millikan's method.
12. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
13. Absorption spectrum of iodine vapour.
14. Study of Zeeman effect for determination of Lande g-factor.
15. Study of Raman spectrum using laser as an excitation source
16. To draw B-H curve of ferro-magnetic material with the help of CRO
17. Hysteresis curve a transformer core.
18. Hall probe method for measurement of resistivity.

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2017-2018)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन

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Acedmic Year (2017-2018)

B.Sc I/II/III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students :

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. For Private students :

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

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65

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject : **Physics**
Paper : 1
Title of Paper : **Quantum Mechanics and Spectroscopy**

Unit-I: Quantum Mechanics-1 [15 Lectures]

Particles and Waves: Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.

इकाई–1: क्वांटम यांत्रिकी–1 [15 Lectures]

कण एवं तरंग: प्रकाश विद्युत प्रभाव, कृष्ण पिण्ड विकिरण, क्राम्पटन प्रभाव, डी–ब्रोगली परिकल्पना, तरंग–कण द्वैतता, डेवीस जर्मर प्रयोग, तरंग पैकेट, तरंग व समूह वेग की अभिधारणा, इलेक्ट्रॉन का द्वि–स्लिट प्रयोग, प्रायिकता, तरंग आयाम व तरंग फलन, हाइज़नबर्ग का अनिश्चितता का सिद्धांत व उदाहरण, श्रोडिंज़र समीकरण व उसकी मूलभूत अवधारणाएँ। आइगन मान, तरंग फलन की प्रायिकता आधारित व्याख्या, सातत्य समीकरण, प्रायिकता धारा धनत्व, तरंग फलन पर सीमांत शर्तें। तरंग फलन का प्रसामान्यीकरण।

Unit-II: Quantum Mechanics-2 [15 Lectures]

Time independent Schrodinger equation: One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator.

इकाई–2 क्वांटम यांत्रिकी–2 [15 Lectures]

समय अनिर्भर श्रोडिंजर समीकरण: एक–विमीय विभव कूप व प्राचीर, सीमांत शर्तें, बद्ध व अबद्ध अवस्थाएँ, आयाताकार प्राचीर (I-D) से परावर्तन व पारगमन गुणांक। α–क्षय की व्याख्या, सुरंगन की क्वाटंम घटना। एक–विमीय बाक्स में मुक्त कण, मुक्त कण हेतु आइगन फलन एवं आइगन मान। एक विमीय सरल आवर्त दौलित्र, हरमाइट अवकल समीकरण से उसके आइगन मान, मूल अवस्था का आइगन फलन, गोलीय सममित विभव में कण, दृढ़ धूर्णक।

Unit-III: Atomic Spectroscopy [15 Lectures]

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Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, **L-S** and **J-J** coupling. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.

इकाई–3 परमाणु स्पेक्ट्रोस्कोपी **[15 Lectures]**

विद्युतीय व चुम्बकीय क्षेत्र में परमाणु – क्वांटम संख्यांक, बोहर मॉडल व वरण (Selection) के नियम, स्टर्न–गर्लक प्रयोग, चक्रण – मूलभूत (Intrinsic) क्वांटम संख्या। चक्रण की चिरसम्मत सिद्धांत से असंगति। कक्षीय कोणीय संवेग, फाइन स्ट्रेक्चर कुल कोणीय संवेग, पाऊली का अपवर्जन सिद्धांत। एक विमीय बाक्स में बहुलकण–सममिती व असममिती तरंग फलन, परमाणु कोश मॉडल। परमाण्वीय अवस्था हेतु स्पेक्ट्रमी संकेतन, स्पिन आरबिट कपलिंग, L-S व J-J युग्मन, ज़ीमन प्रभाव। सतत व अभिलाक्षणिक X-किरण स्पेक्ट्रा, मोसले का नियम।

Unit-IV: Molecular Spectroscopy **[15 Lectures]**

Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. Frank-Condon principle, singlet and triplet states. Fluorescence and phosphorescence.

इकाई–4 आणविक स्पेक्ट्रोस्कोपी **[15 Lectures]**

विभिन्न प्रकार के स्पेक्ट्रा (वर्णक्रम), धूर्णी स्पेक्ट्रा, वर्णक्रम रेखाओं की तीव्रता व द्वि–परमाणविक अणु की बद्ध दूरी, समस्थानिक प्रभाव/द्वि–परमाणविक अणु की कम्पन उर्जा, शून्य बिन्दु उर्जा, अनहार्मोनिसीटी (अनावृति)। मोर्स विभव, रमन प्रभाव। स्टोक व प्रति स्टोक रेखाएँ व इनकी तीव्रता, इलेक्ट्रॉनिक वर्णक्रम। बार्न ऑपनहायमर सन्निकटता, फ्रेंक कार्डन सिद्धांत, एकल व त्रिक अवस्थाएँ, प्रतिदीप्ति व स्फुरदीप्ति।

Unit-V: Nuclear Physics **[15 Lectures]**

Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra – velocity and energy of alpha particles. Geiger-Nuttal law. Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions, pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus. Bohr's postulate of compound nuclear reaction.

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Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Semi empirical mass formula, Shell model, Liquid drop model, Nuclear fission and fusion (concepts).

इकाई–5 नाभिकीय भौतिकी [15 Lectures]

नाभिक के मूलभूत गुणः न्युट्रॉन तथा आवेशित कणों की द्रव्य के साथ अनुक्रिया, नाभिकीय संसूचक–आयनन कोष्ठ, गाइगर मूलर गणक, अनुपातिक गणक, प्रस्फुरण गणक, अभ्रकोष्ठ, नाभिक के मूल गुण, नाभिक की आकृति, संहति, आवेश तथा आकार, नाभिक का स्थायित्व एवं बंधन ऊर्जा, अल्फा–कण का वेग एवं ऊर्जा, गाइगर–नेटल नियम, बीटा–किरण वर्णक्रम की प्रकृति, न्यूट्रीनों, ऊर्जा स्तर एवं क्षय पद्धति, पोजीट्रान उत्सर्जन एवं इलेक्ट्रॉन प्रग्रहण, चयन (वरण) नियम, बीटा अवशोषण एवं बीटा कण का परास, क्यूरी आरेख, नाभिकीय अभिक्रियाएँ, युग्म उत्पादन, Q-मान एवं नाभिकीय अभिक्रिया की देहली, नाभिकीय अभिक्रिया का अनुप्रस्थ काट, विभिन्न प्रकार की अभिक्रियाओं के उदाहरण एवं अभिलाक्षणिक, यौगिक नाभिक, यौगिक नाभिकीय अभिक्रिया की बोहर अभिकल्पना, अर्धमूलानुपाती सूत्र, द्रव बूंद मॉडल, कोश मॉडल, नाभिकीय विखंडन एवं संलयन।

References:

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3. **Quantum Mechanics**: Concepts and Applications, Nouredine Zettili, Jacksonville tate University, Jacksonville, USA, John Wiley and Sons, Ltd, 2009
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5. **Fundamentals of Molecular Spectroscopy**: C.M. Banwell and M. McCash, McGraw Hill (U.K. edition).
6. **Introduction to Atomic Physics**, H. E. White
7. **Quantum Mechanics:** Schaums Outlines, Y. Peleg, R. Pnini, E. Zaarur, E. Hecht.

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.

(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Subject	: **Physics**
Paper	: **2**
Title of Paper	: **Quantum Mechanics and Spectroscopy**

Unit-I: Solid state Physics-1 [15 Lectures]

Crystal Structure and bonding: Crystalline and amorphous solids. Translational symmetry. Lattice and basis. Unit cell. Reciprocal lattice. Fundamental types of lattices (Bravias Lattice). Miller indices Lattice planes. Simple cubic. Face centered cubic. Body centered cubic lattices. Laue and Bragg`s equations. Determination of crystal structure with X-rays. X-ray spectrometer. Ionic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids. Periodic potential and Bloch theorem. Kronig-Penny model (Qualitative).

इकाई–1: ठोस अवस्था भौतिकी–1 [15 Lectures]

क्रिस्टलीय, संरचना एवं आबंधनः क्रिस्टलीय व अक्रिस्टलीय ठोस, स्थानांतरण सममिति, जालक व आधार, इकाई सेल, व्युत्क्रम जालक, जालकों के मौलिक प्रकार (ब्रेवाइस लेटिस), मिलर सूचकांक, जालक तल। सरल घनाकार, फलक केन्द्रित घनाकार, अन्तः केन्द्रित घनाकार लेटिसेस। लॉवे व ब्रेग का समीकरण, X-किरणों से क्रिस्टल की संरचना ज्ञात करना, X-किरण स्पेक्ट्रममापी। आयनिक, सह–संयोजक, धात्विक वॉण्डरवाल एवं हायड्रोजन बंधन। ठोस पदार्थो के लिए बैण्ड सिद्धांत, आवर्ती विभव एवं ब्लॉच प्रमेय। क्रोनिंग–पैनी मॉडल (गुणात्मक विवेचना)।

Unit-II: Solid state Physics-2 [15 Lectures]

Lattice structure and properties: Dulong Petit. Einstein and Debye theories of specific heats of solids. Elastic and atomic force constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electrical resistivity. Specific heat of electron. Wiedemann-Franz law. Hall effect. Response of substances in magnetic field, dia-, para- and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains. Curie's law. Weiss' theory of ferromagnetism and ferromagnetic domains. Discussion of BH hysteresis.

इकाई–2: ठोस अवस्था भौतिकी–2 [15 Lectures]

विशिष्ट उष्मा का ड्यूलोंग–पेटिट, आइन्सटीन व डिबाई सिद्धांत, प्रत्यास्थ एवं परमाण्विक बल नियतांक। एक परमाण्विक व द्विपरमाण्विक कड़ी (Chain) का गतिक समीकरण, प्रकाशीय व ध्वनिकी विधाएँ, विद्युतीय प्रतिरोधकता, इलेक्ट्रॉन की विशिष्ट उष्मा, वाइडमेन–फ्रेंज नियम। हॉल प्रभाव, चुम्बकीय क्षेत्र में पदार्थों की अनुक्रिया। प्रति, अनु एवं लौह चुम्बकीय पदार्थ। प्रति एवं अनु चुम्बकीय डोमेन्स का चिरसम्मत सिद्धांत। क्यूरी का नियम, लौह चुम्बकत्व एवं लौह चुम्बकीय डोमेन्स के लिए Weiss का सिद्धांत। B-H शैथिल्यता की विवेचना।

(S.C. Dubey)

Dr S K Khan

Unit-III: Semiconductor devices-1 [15 Lectures]

(Sanjay Saxena)

(R. Kolare)

Dr P.K. Khan

(69)

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
स्नातक कक्षाओं के लिए वार्षिक पाठ्यक्रम केन्द्रीय अध्ययन मण्डल द्वारा अनुशंसित तथा मध्यप्रदेश के राज्यपाल द्वारा अनुमोदित
(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Electronic devices: Types of Semiconductors (**p** and **n**). Formation of Energy Bands. Energy level diagram. Conductivity and mobility. Junction formation, Barrier formation in **p-n** junction diode. Current flow mechanism in forward and reverse biased diode (recombination), drift and saturation of drift velocity. Derivation of mathematical equations for barrier potential, barrier width. Single **p-n** junction device (physical explanation, current voltage characteristics and one or two applications). Two terminal devices. Rectification. Zener diode. Photo diode. Light emitting diode. Solar cell. Three terminal devices. Junction field effect transistor (JFET). Two junction devices. Transistors as **p-n-p** and **n-p-n**. Physical mechanism of current flow. Characteristics of transistor.

इकाई–3: **अर्धचालक युक्तियां–1** [15 Lectures]

ऊर्जा बैण्डों का बनना, ऊर्जा स्तर का डायग्राम, अर्धचालक के प्रकार (p व n), चालकता और गतिशीलता, संधि का बनना, p-n संधि, डायोड में रोधिका विभव का बनना, अग्र व पश्च अभिनति डायोड में धारा प्रवाह (पुनः संयोजन), अनुगमन वेग व अनुगमन वेग की संतृप्तता, रोधिका विभव के गणितीय समीकरण की व्युत्पत्ति, रोधिका चौड़ाई, एकल p-n संधि। डायोड (भौतिकीय विवेचना), धारा–विभव अभिलाक्षणिक (एक–दो अनुप्रयोग), द्वि–टर्मीनल युक्ति, दिष्टकरण, जेनर डायोड, फोटो डायोड, प्रकाश उत्सर्जक डायोड, सोलर सेल, त्रि–टर्मीनल युक्ति, संधि क्षेत्र प्रभाव ट्रांजिस्टर (JFET), द्वि–संधि युक्तियाँ, p-n-p व n-p-n ट्रांजिस्टर, धारा–प्रवाह की भौतिकीय प्रक्रिया, ट्रांजिस्टर के अभिलाक्षणिक वक्र।

Unit-IV: Semiconductor devices-2 [15 Lectures]

Amplifiers (only bipolar junction transistor). CB, CE and CC configurations. Single stage CE amplifier (biasing and stabilization circuits), Q-point, equivalent circuit, input impedance, output impedance, voltage and current gain. Class **A**, **B**, **C** amplifiers (definitions). RC coupled amplifiers (frequency response). Class **B** push-pull amplifier. Feedback amplifiers. Voltage feedback and current feedback. Effect of negative voltage series feedback on input impedance. Output impedance and gain. Stability, distortion and noise. Principle of an Oscillator, Barkhausen criterion, Colpitts, RC phase shift oscillators. Basic concepts of amplitude, frequency and phase modulations and demodulation.

इकाई–4: **अर्धचालक युक्तियां–2** [15 Lectures]

प्रवर्धक (द्वि–ध्रुव संधि ट्रांजिस्टर) CB, CE व CC विधा, एकल स्टेज (चरण) CE प्रर्वधक (अभिनन व स्थायीकरण परिपथ), Q बिन्दु समतुल्य परिपथ, निवेशी व निर्गत प्रतिबाधा, विभव एवं धारा लाभ। वर्ग A, B, C प्रवर्धक (परिभाषा), RC युग्मित प्रवर्धक (आवृत्ति अनुक्रिया वक्र), वर्ग–B पुश–पुल प्रवर्धक, पुर्ननिवेशन प्रवर्धक, विभव एवं धारा, पुर्ननिवेशन, निवेशी प्रतिबाधा पर ऋणात्मक विभव, श्रेणी फीडबेक, निर्गमन प्रतिबाधा एवं लाभ। स्थायित्व, विकृति व शोर, दोलित्र का सिद्धांत तथा बार्क–हाउसन का प्रतिबन्ध, कॉलपिट दोलित्र, RC कला विस्थापी दौलित्र, आयाम, आवृति एवं कला माडुलेशन एवं संसूचक की मूल अवधारणा।

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(R.Kalare)

70

Solid State Physics, N. W. Ashcroft, and N. D. Mermin, Harcourt Asia (P) Ltd. 2001

Class: B.Sc. Third Year
Max. Marks: 42½ + (CCE) 7½ = 50

Unit-V: Nano materials [15 Lectures]

Nanostructures: Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D, 0D nanostructure materials and their density of states, Surface and Interface effects. Modelling of quantum size effect. Synthesis of nanoparticles - Bottom Up and Top Down approach, Wet Chemical Method. Nanolithography. Metal and Semiconducting nanomaterials. Essential differences in structural and properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterials.

इकाई–5: नैनो पदार्थ [15 Lectures]

नैनों संरचनाएं: नैनो टेक्नॉलाजी की प्रस्तावना, संरचना, आकार निर्भर गुण। 3D, 2D, 1D, 0D नैनो सरंचना प्रदार्थ एवं उनकी अवस्थाओं का घनत्व, सतह एवं अंतराफलक प्रभाव, क्वांटम आकार प्रभाव का प्रतिरूपण, नैनो कणों का संश्लेषण–नीचे से ऊपर (बॉटम अप) और ऊपर से नीचे (टॉप डाउन) विधियाँ, वेट रसायनिक विधि, नैनो लिथोग्राफी (नैनो मुद्रण), धातु एवं अर्द्ध चालकों के नैनो पदार्थ (गुणात्मक विवरण), विस्तृत (Bulk) और नैनो पदार्थों की संरचना एवं गुणों में अन्तर (गुणात्मक विवरण), प्राकृतिक रूप में पाये जाने वाले नैनो क्रिस्टल। नैनो पदार्थों के अनुप्रयोग।

References:

1. **Introduction to Solid State Physics**, C. Kittel, VIIIth Edition, John Wiley and Sons, New York, 2005.
2. **Intermediate Quantum theory of Crystalline Solids**, A. O. E. Animalu, Prentice–Hall of India private Limited, New Delhi 1977
3. **Solid State Electronic devices**, B. G. Streetman, II Edition Prentice Hall, India.
4. **Microelectronics**, J. Millman and A. Grabel McGraw Hill New York
5. **The Physics and Chemistry of Nanosolids**: Frank J. Owens, and Charles P. Poole Jr., Wiley Inter Science, 2008
6. **Physics of Low Dimensional Semiconductors**: An introduction; J.H. Davies, Cambridge University Press, U.K., 1998
7. **Electronic fundamentals and applications**, J. D. Ryder, Prentice Hall, India.

(R.Kalare)

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Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2019-2020)

उच्च शिक्षा विभाग, मध्यप्रदेशशासन
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(शैक्षणिक सत्र 2019-2020 से लागू)

Class: B.Sc. Third Year
Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex–Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Specific resistance and energy gap of a semiconductor.
2. Study of half wave and full wave rectification.
3. Characteristics of Zener diode.
4. Characteristic of a tunnel diode.
5. Characteristics of JFET.
6. Characteristic of a transistor.
7. Study of regulated power supply.
8. Study of RC coupled amplifiers
9. Determination of Planck's constant.
10. Determination of **e**/m using Thomson's method.
11. Determination of **e** by Millikan's method.
12. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
13. Absorption spectrum of iodine vapour.
14. Study of Zeeman effect for determination of Lande g-factor.
15. Study of Raman spectrum using laser as an excitation source
16. To draw B-H curve of ferro-magnetic material with the help of CRO
17. Hysteresis curve a transformer core.
18. Hall probe method for measurement of resistivity.

(Sanjay Sahu)

(R. Kalare)

(Mahendra Singh)

Dr P.K. Khare

Dr S K Khan

Dr (Mrs) Seema

(W S Muth)

(D. Varshney)

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and Approved by Governor of M.P.
(w.e.f. session 2017-2018)

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Acedmic Year ([illegible] 2017-2018 [illegible])

B.Sc I/II/[✓ III]

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. **For Regular students :**

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. **For Private students :**

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

Dr S K Khan
S C Dubey
D. Varshney
(S. Jain)
D K Soni
(Sanjay Sathe)
Dr (Mrs) Seema
(W S Murty)
24/7/17
(D Varshney)
(R Kalane)

Scheme and Syllabus

of

B. Sc. (Computer Science)

I to VI Semester

w.e.f. July 2011
(2011 – 2014 Batch onwards)

Devi Ahilya Vishwavidyalaya,
Indore (M.P.), 452001

Proposed Syllabus & Scheme for B. Sc. (CS) SEMESTER SYSTEM
(Effective from July 2011 session for 2011-14 batch onwards)

CLASS /SEMESTER	B. Sc.(CS)	CCE	MIN. MARKS	TERM END EXAM	MIN. MARKS	TOTAL 100%	MIN. MARKS
FIRST SEM.	**CS/IT-1101**--Computer Organization	15	5	85	28	100	33
	CS/IT -1101P- Practical on Computer Org. & MS Office	---	---	---	---	50	17
SECOND SEM.	**CS/IT -1201**- Programming & Problem Solving through C.	15	5	85	28	100	33
	CS/IT -1201P- Practical on C Language	---	---	---	---	50	17
THIRD SEM.	**CS/IT -2301**-Data Structure using C Lang.	15	5	85	28	100	33
	CS/IT -2301P-Practical on Data Structure using C	---	---	---	---	50	17
FOURTH SEM.	**CS/IT -2401**-Data Base Management System	15	5	85	28	100	33
	CS/IT-2401P-Practical on Data Base Management System	---	---	---	---	50	17
FIFTH SEM	**CS/IT-3501** Object Oriented Programming using C++	15	5	85	28	100	33
	CS/IT-3501P-Practical on C++	---	---	---	---	50	17
SIXTH SEM	**CS-3601** Computer Networks	15	5	85	28	100	33
	CS- 3601P Practical on Computer Networks	---	---	---	---	50	17

PS :- CCE ----- CONTINUOUS COMPREHENSIVE EVALUATION, **INDIVIDUAL PASSING REQUIRED FOR THEORY AND PRACTICAL SUBJECTS**

CS/IT – 1101 COMPUTER ORGANIZATION
Commencing from 2011-12 onwards

UNIT I

Evolution of Computers and Computer Generations, Computer Classification Processing speed of a computer, Technology Trends, Measuring Computer Performance, MIPS.von Neumann Machine Architecture, Functional Units and Components in Computer Organization, Computers – Block diagram, Memory addressing capability of a CPU, Word length of a computer Basic components of a Digital Computer - Control unit, ALU, IO Subsystem of a Computer, Bus Structures, Uses of Program Development Tool, Editor, Compiler, Assembler, Interpreter)

UNIT II

Number systems – Decimal Number system, Binary number system and Hexa-decimal number system,1's & 2's complement, Representation of Positive and Negative Numbers Binary Fixed- Point Representation, Arithmetic operation on Binary numbers, Overflow & underflow. Floating Point Representation, Codes, ASCII Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates. Counters, Registers, Shift Registers

UNIT III

Storing data and Program in Memory, Memory Hierarchy in a Computer Internal Organization of Semiconductor Main Memory Chips, Semiconductor Memory RAM and ROM Auxiliary Memory Peripheral Devices, Secondary Storage Memory, Magnetic Memories and Hard Disk Optical Disks and CD Memories

UNIT IV

Algorithm, Flowchart, Logic Development & Problem solving. Algorithms for simple problems involving conditional manipulation of memory variables The 8085 Programming Model, 8085 Hardware Model, Block Diagram and uses of Registers, Accumulator, Flag, Program counter and stack pointer How to write, assemble and execute a simple program: Illustrate Program –Adding two hexadecimal numbers.

UNIT V

Input Devices, keyboard, Mouse, Output Devices, CRT Monitor, LCD Displays, Touch Screen Displays Print Devices Multiprocessor and Multi core Architecture Flynn Classification SISD, SIMD, MISD, MIMD.

TEXT BOOK
Computer Fundamentals – B. Ram – New Age International Publishers

REFERENCE BOOKS

1. Rashid Sheikh, "**Computer Organization & Architecture**"
2. William Stallings, "**Computer Organization & Architecture**", Pearson.
3. BARTEE, ***"Digital Computer Fundamentals"*** TMH Publication
4. *MORRIS MANO,* ***"Computer System Architecture"*** PHI
5. W. Hayes, Computer Architecture, McGraw-Hill

Problems Solving Skills Book

1. Nicholas P Carter, Schaum Outline on Computer Architecture and Organization, TMH, Special Indian Edition Adaptation,, 2010

Note: Faculty teaching the subject will also given to students the besides 50 hours teaching the appropriate exercises and assignments. .

CS/IT-1101P - Practical on Comp. Org. and MS-Office

Practical Session -01 - Practical on MS-OFFICE:

WINDOWS

1. Creating folder, cut, copy, paste, managing file and folder in windows.
2. Arrange icons, set display properties
3. Adding and removing software and hardware
4. Setting date and time, screen saver and appearance.
5. Using windows accessories.
6. Settings of all control panel items
7. Search file

MS-Word

1. Creating & Editing Document
2. Formatting Document
3. Use of Auto-text, Autocorrect, Spelling and Grammar Tool,
4. Page Formatting, Page Border, Background,
5. Creation of MS-Word-Mail Merge, Macros, Tables.
6. Practice of Printing, page setup etc.

MS-Excel

1. Creating & Editing Worksheet, Fill Handle
2. Use Formulas and Functions
3. Preparing Charts

MS-PowerPoint

1. Creating, Manipulating & Enhancing Slides,
2. Inserting Organizational Charts, Excel Charts
3. Using Word Art

4. Putting Animations and Sounds
5. Inserting Animated Pictures
6. Inserting Recorded Sound Effect

Computer Organization
Practical Session 02 - Using Debug/MASM/TASM

To Study of DEBUG visit the following website:
http://kipirvine.com/asm/debug/Debug_Tutorial.pdf

Practical on Flip-flops, Logic Gates and Registers.

Do the following tasks: -

1. Add 3, 4 and 7 and display result in only AX register
2. Add 3, 8 and 9 using three different registers and show result of all registers
3. Take dump of location 110 and display
4. Add your name and date of birth at location 120. Move only the date of birth to location 200. Search through 100 to 300 to find the date
5. Move 3 to AX register and multiply it with 3 to show the result.
6. Use int 21 in all your assembled codes
7. Use comparison command to compare the date of birth at location 120 and 100.

Write complete assembly codes for the following tasks. Submit code and output trace:

1. A program that displays your name and date of birth.
2. A program that adds the following numbers
a. 1000
b. 4000
c. 1700

3. A program that does the following
a. Add two numbers X and Y
b. Multiply the result with C
c. Increment the result

4. A program that subtracts
a. Two numbers X and Y such that X>Y
b. Two numbers X and Y such that Y>X

5. A program that divides
a. Two numbers X and Y such that X%Y = 0
b. Two numbers X and Y such that X%Y != 0
c. Two numbers X and Y such that Y = 0

CS/IT – 1201- PROGRAMMING AND PROBLEM SOLVING THROUGH C
Commencing from 2011-12 onwards

UNIT I

Algorithm, Flowchart, Logic Development & Problem Solving. Structure of C program, C declarations, keywords, identifiers, constants, variables, Data types, type conversion,

Types of operators and expressions, Input and output functions in C.

UNIT II

Decision Statement – IF-ELSE statement, break, continue, goto, switch() case and nested IF statement. Loop Control Statements – For loop, While loop , Do-while loop and nested loops. Arrays – Definition, Initialization, characteristics, One, Two, Three and Multi-dimensional Arrays Working with scanf, printf, Strings & Standard Functions.

UNIT III

Pointers – Introduction, Features, Declaration & Arithmetic operations on pointers. Pointers and Arrays, Array of pointers. Pointers to pointers, pointers and strings, Void pointers Functions – Declaration, Prototype, Types of functions, Call by value and reference, Function with operators

UNIT IV

Function with decision statements, function with Loop statements. Function with Arrays and Pointers.

Types of Storage Classes. Introduction to Files, Streams and File Types, Steps for file operations, File IO,

UNIT V

Files – Streams and file types, file operations Write and Other file functions.Command line arguments, Application of Command Line Arguments Structure and Union – Declaration, Initialization, structure within structure. Array of structure, Enumerated data types, Union of structure

TEXT BOOKS

1. *E. Balaguruswamy,* ***"Programming In C ",*** *TMH Publications*
2. *Kanetkar,* **"Let Us C" REFERENCES**

BOOKS

1. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education
2. Ashok N. Kamthane et. al., Computer Programming and IT (for RTU), Pearson Education, 2011 (ISBN 978-81-317-5970-7)
3. *Mahapatra,* ***" Thinking In C ",*** *PHI Publications*

Problem Solving Skills Book:

1. *Gottfried, Schaums Outline Series,* ***" Programming With C ",*** *TMH Publications*

Note: Faculty teaching the subject will also given to students the besides 50 hours teaching the appropriate exercises and assignments. l.

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT – 1201P - Practical on C Language

(*Student Must Write 50 Programs including following* **25** *Programs in their Computer Practical Book with* **Algorithm/Flowchart)**

1. Write a program for swapping two variables without using third variable.
2. Write a program to calculate simple Interest and Compound Interest.
3. Write a program to convert temperature entered into centigrade to Fahrenheit.
4. Write a program to find maximum of three numbers.
5. Write a program to read in a three digit number produce following output
(assuming that
the input is 539)
5 hundreds
3 tens
9 units
6. Write a program to find sum of digits of accepted number.
7. Write a program to find student grade using IF-ELSE ladder
8. Write a program that prints given three integers in ascending order using IF- ELSE
9. Write a program for simple calculator using switch/case loop.
10. Write a program for print Fibonacci series up to N number.
11. Write a program to find sum of first 50 odd numbers and even numbers.
12. Write a program to find reverse of given number.
13. Write a program to find factorial of accepted number.
14. Write a program to find all prime number between two given numbers
15. Write a program to find minimum, maximum, sum and average of given one dimensional array.
16. Write a program for sparse matrix.

17. Write a program to find addition, subtraction, multiplication of matrix.
18. Write a program to print terms of each of the following series
i. Sin(x) ii. Cos(x)
19. Display the following output on the screen

```
a. b. c.
* 1 A
** 12 AB
*** 123 ABC
**** 1234 ABCD
***** 12345 ABCDE
```

20. Write a program to read and write a structure.
21. Write a program for factorial function.
22. Write a program to read a string and print its reverse.
23. Write a program to find a_b using Call by reference.
24. Write a program for create, open and append a file.
25. Write a program to copy the contents of one file to another.

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT-2301 DATA STRUCTURE USING C
Commencing from 2012-13 onwards

Unit- I
Introduction to Data Structures: Definition of Data structure and Abstract data type
Classification of Data structures: Linear, non-linear, homogeneous, non-homogeneous, static & dynamic.
Arrays: Definition & types of array, Memory representation of one & two dimensional array, Operations: Insertion , Deletion, Traversal
Sparse Matrix: Definition & memory representation.

Unit- II
Stack: Definition, Array implementation of stack (static stack) : Operations PUSH, POP, TRAVERSE.
Applications of stack: Infix, Prefix , Postfix representation and evaluation using stack, Use of stack in recursive implementation.
Queue: Definition, Array implementation of queue (static queue): Operations INSERT, DELETE, TRAVERSE.
Introduction to Circular queue: Definition & implementation, Priority queue, Double ended queue
Applications of queue

Unit- III
Introduction to Linked List: Definition, advantages, Types of linked list: single, doubly, circular linked list
Operations: Creation, insertion, deletion & traversal of linked list

Unit- IV
Complexity of Algorithms: Time & space complexity, Best-case, worst-case, average-case, Big –oh notation.
Searching Algorithm: Linear or sequential search, Binary search, Interpolation search using array.
Complexity of Linear search, Binary search, Interpolation Search
Sorting Algorithm: Bubble sort, Selection sort, Insertion sort, Merge sort
Complexity of sorting algorithm.

Unit- V
Introduction to Tree: Definition, Binary tree: Definition, representation
Operations: Traversal, insertion, deletion
Binary search Tree (BST): Definition and creation, Search using BST
Introduction to B-Tree & B+ tree.

Text Books:
1. Yedidyah Langsam Moshe J. Augenstein, Aaron M. Tenenbaum, "**Data Structures using C & C++",** PHI New Delhi, 2nd Edition.

Reference Books:
1. G.S.Baluja, "**Data Structures Through C**",Dhanpat Rai & Co.,4th Edition
2. Seymour Lipschutz,"**Data Structures**", Schaum's Outline Series, Tata Mc Graw Hill Publishing Company Ltd.
3. Adam Drodzek, "**Data Structures & Algorithm in C++**", 2nd Edition

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT-2301P Practical exercise on Data Structure using C

1. Write a program for address calculation of an element in one and two dimensional array (row major order and column major order).
2. Write a program for insertion, deletion and traversal of elements of an array.
3. Write a program for sparse matrix implementation.
4. Write a program for complete implementation of stack using array with push, pop and traversal operations.
5. Write a program for conversion of an infix expression into postfix representation and evaluation of that postfix form.
6. Write a program for complete implementation of queue using array with insertion, deletion and traversal operations.
7. Write a program for complete implementation of circular queue using array with insertion, deletion and traversal operations.
8. Write a program for complete implementation of double ended queue using array with insertion, deletion and traversal operations.
9. Write a program to create singly link list (creation, insertion, deletion and traversal).
10. Write a program to create doubly link list (creation, insertion, deletion and traversal).
11. Write a program to create circular singly link list (creation, insertion, deletion and traversal).
12. Write a program to create circular doubly link list (creation, insertion, deletion and traversal).
13. Write a program for complete implementation of stack using link list with push, pop and traversal operations.
14. Write a program for complete implementation of queue using link list with insertion, deletion and traversal operations.
15. Write a program for implementation of binary tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
16. Write a program for implementation of binary search tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
17. Write a program for implementing graphs and showing depth first search and breadth first search traversals.
18. Write a program for linear search.
19. Write a program for Binary search.
20. Write a program for interpolation search.
21. Write a program for bubble sort.
22. Write a program for selection sort.
23. Write a program for insertion sort.
24. Write a program for merge sort.
25. Write a program for quick sort.

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT-2401 DATA BASE MANAGEMENT SYSTEM
Commencing from 2012-13 onwards

Unit – 1
Fundamentals of DBMS: Data, Information, Database & Computers, DBMS Definition, DBMS versus file processing system, Components of DBMS Environment, Instances & Schemas, Three Levels Architecture, Data Independence, Data Dictionary, Database Users, Data Administrators.

Unit – 2
Modeling the Real World, Various Data Models & their Comparison, Entity Relationship Models. RDBMS – Concept, Components, Data Integrity, Keys, Relational data Manipulations and Relational Algebra, Tuple Calculus.

Unit – 3
Normalization: Definition, Decomposition, Basic Concepts like FD, Objectives of Normalization. Normal Forms- First, Second, Third Normal Form, BCNF, Concept of Multi Valued Dependencies & Higher Normal Forms.

Unit – 4
Introduction to SQL, DDL, DML, and DCL statements, Creating Tables, Adding Constraints, Altering Tables, Update, Insert, Delete & various Form of SELECT- Simple, Using Special Operators for Data Access. Nested Queries & Exposure to Joins, Aggregate Functions.

Unit – 5
Transaction: Concept of Transaction, Concurrency Control-Problem & its Basis, Concurrency Control -Locks & Deadlocks. Recovery-Kind of Failures, Recovery Techniques, Security-Authentication, Authorization, Access Control

Text Book:
1.H. F. Korth & A. Silverschatz, Database concepts, Tata McGraw Hill, New Delhi.

Reference Books:
1. Elmasri & Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.
2. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
3. Hoffer, Prescott & McFadden, Modern Database Management, 8/e
4. Ivan Bayross, SQL, PL/SQL, BPB Publications , New Delhi.

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT-2401P-Practical on Data Base Management System

1. Write a command to create following table structure, item-master .

Column name	datatype
Itemcode	char(4)
Itemdesc	varchar(25)
No_of_item_available	int
Price	int.

Condition are:- (1) itemcode is primary key
(2) Itemdesc is not NULL
(3) No_of_item_available is non zero .
(4) Price value should be 200 Rs.

2. The Department of an employee Raj Sharma table changed from finance to marketing. The department code of marketing is 003 & the employee code of raj Sharma 0015.both the department code & employee code are of char data type. Write update statement to update table employee.

3. News paper attribute data type

News paper attribute	data type
Newspapercode	char (4)
Newspaper name	char(25)
Region	varchar(25)
Type of news paper	varchar(25)
City	char(20)
Country code	char(3)
Phnno	Char(15)
Second table	
Newpaperadver	
Newsadvo	varchar (4)
Adstart date	dates time

Write SQL command for:-
(a) Phnno should be [0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]
(b) Country code should be 001 by default.
(c) News paper code should primary key.
Modify table->
(a) Newsadvo Should be primary key
(b) News paper code should be foreign key.

4. Write a command to display the detail of all those employee who name at least 3-5 year experience.

Attribute	data type
Employ code	char
Employ name	char
Department code	char
DOJ	date
YOE	int
Employ grade	char

5. The employee tables contain the employee name, address, age, salary of each employ. Write SQL command for-

(a) Display all the detail of the employee
(b) Whose age less than 40 year.
(c) Salary is greater than 15000.

6. In a bank the customer table store's the detail of each customer. the bank has decided to give a 10% discount on all credit card's you want to generate a list of all customer who don't available the credit card facility. How do you generate the list? The structure of customer table.

Column	data type
Customecode	char
Customername	char
Customeraddress	char
Credit card	int

7. Consider title table with column name, title, title type pub ID of char type, while price advance, royalty, ytd-sales is off int type.
   (a) Display the highest advance paid.
   (b) Display the lower advance paid.
   (c) Display the total no. of book.
   (d) Display total sales of book.
8. Write appropriate SQL command for following-
   (a) Increase the price of all items by 5%.
   (b) Update the quantity hold to 500 for item code 1oo1.
   (c) Delete a row from the item table where item code is 1oo1.
   (d) Update the price of item to 20 RS .
9. Write SQL definition command for each of the following
   (a) How would you add an attribute, CLASS, to the STUDENT table.
   (b) How would you remove the IS_REGISTERED table?
   (c) How would you change the field for FACULTY_NAME from 25 characters to 40 characters?
10. Consider employee table
    Employee (empno., Name, depid, Basic, HRA, Deduction, Tax)
    (a) Get the name of employee in the department 'D1' and basic pay less than 6000.
    (b) Get the average HRA of an employee.
    (c) Find the total basic pay for all the employee in the department 'D1' whose basic pay is greater than 6000.
    (d) Find the name of the employee who get the maximum and minimum basic pay.

11. Consider the following table
    Emp_master(emp_no, fname, mname, lname, dept, design, branch_no)
    Branch_mastr(name, branch_no)
    List the employee details along with branch names to which they belong.
12. Consider the following table
    Cust_mstr (custno, fname, mname, lname)
    Addr_dtls (code_no,addr1,addr2,city,state,pincode)

List the customer along with their multiple address details.

13. Consider table

    Book (Bookid, title, author, Publisher, year, price)
    Order_details (Orderno, bookid, quantity)
    Publisher (pubid, name, city, country)
    Catalog (Bookid, title, authorid, pubid, category_id, year, price)
    Author (authorid, name, city, country)

    1. Get the title and price of all the books whose price is less than the average price of the books.
    2. Get the name of all authors who have more than two books in the catalog.
    3. Get the name of all the books for which an order has been placed.

14. Consider table Order (ordered, order_detail, qty, price)
    - a) Alter table Order add column amount.
    - b) Modify data type of price column from character to int.

15. Consider table

    Product_master(Product_no,description,profit_percent,unit_measure,qty_on_hand,reorder, sell _price, cost_price).
    Client_master(Clientno, name, city, pincode, state , bal_due)
    Salesman_master(Salesmanno, salesmanname,address1,address2, city, pincode , state , sal_amt, tgt_to_get, Ytd_sales, remark)

    1. Find out the names of all the clients.
    2. Retrieve the entire contents of the client_master table.
    3. Retrieve the list of names and the cities of all the clients.
    4. List the various products available from the product_master table.
    5. List all the clients who are located in Bombay.
    6. Find the names of the salesman who have a salary equal to Rs. 3000.

16. Consider table

    Client_master (Client_no, name, city, pincode, state, bal_due).
    Product_master (Product_no, description, profit_percent, unit_measure, qty_on_hand, reorder, sell _price, cost_price).
    Salesman_master (Salesmanno, salesmanname, address1, address2, city, pincode , state , sal_amt, tgt_to_get, Ytd_sales, remark)

    1. Change the city of client_no 'C00005' to 'Bombay'.
    2. Change the bal_due of client_no 'C00001' to Rs. 1000.
    3. Change the cost price of '1.22 Floppies' to Rs. 950.00.
    4. Change the city of the salesman to Mumbai.

17. Consider table

    Product_master(Product_no,description,profit_percent,unit_measure,qty_on_hand, reorder, sell _price, cost _price).
    Client_master(Clientno, name, city, pincode, state , bal_due)
    Salesman_master(Salesmanno, salesmanname,address1,address2, city, pincode , state , sal_amt, tgt_to_get, Ytd_sales, remark)

    1. Delete all salesman from salesman_master whose salaries are equal to Rs. 3500.
    2. Delete all products from product_master where the quantity on hand is equal to 100.

(Effective from July 2011 session for 2011-14 batch onwards)

   3. Delete from client_master where the column state hold the value ‘Tamil Nadu’.

18. Consider employee table
    Employee (empno, name, depid, basic, hra, deduction, tax)
    1. Get the number of rows in a table
    2. Find the department wise average pay of the employees.
    3. Find the name of the employees whose basic pay is greater than the average basic pay.
    4. Find the name of the employee who gets the basic pay.
19. The employee table stores the details of employees such as employee code, employee name, department code, date of joining, years of experience and the employee grade. Display only those grades in which the number of employees is more than 100.
    The table structure of the employee table is shown below:
    Employee(emp_code, emp_name, Dept_code, Doj, Yrs_exp, Emp_grade)

20. Explain set operation command with example.

CS/IT-3501 Object Oriented Programming using C++
Commencing from 2013-14 onwards

To introduce the concept of object oriented programming through C++.
UNIT I
Introduction, OOPS languages, characteristics of OOP’s languages, application of OOP’s, OOP’s paradigm, concepts: object, class, data abstraction, data encapsulation,inheritance, and polymorphism. Static and dynamic binding, message passing, benefits of OOP’s, disadvantage of OOP’s. Application of OOP’s.

UNIT II
C++ programming basics, basic program structure, preprocessor directive, data types, operators, manipulator, type conversions, C++ stream class.Control statement: for, do, while, do-while Decision statement if, if-else, switch-Case. Jump statement: break, continue, go to, exit.

UNIT III
Function and arrays. Classes and instances, defining classes in object oriented language, building and destroying instances (constructors and destructors), modifiers, friend and inline functions, string handling function.

UNIT IV
Data encapsulation, polymorphism, operator overloading, function overloading, virtual functions.

UNIT V
Inheritance, reusability of code through inheritance, type of inheritance, data abstraction, abstract classes. Templates and exception handling.

TEXT BOOK:

(Effective from July 2011 session for 2011-14 batch onwards)

1.Object oriented programming with C++ by Balaguruswamy, TMH Publishing.

REFERENCE BOOKS:

1. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
2. C++ Primer, 3rd Edition, S. B. Lippman and J. Lajoie, Pearson Education.
3. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
4. OOP in C++, 3rd Edition, T.Gaddis, J.Walters and G. Muganda, Wiley Dream Tech Press.
5. Object Oriented Programming in C++, 3rd Edition, R.Lafore, Galgotia Publications Pvt. Ltd.
6. Computer Science, A Structured Programming Approach Using C++, B. A .Forouzan and R. F. Gilberg, Thomson

CS/IT 3501P
PRACTICAL (OBJECT ORIENTED PROGRAMMING THROUGH C++)

1. Write a program to find the maximum of three using conditional operator.
2. Write a program to find the largest, second largest and third largest in a given array.
3. Write a program to generate Armstrong series.
4. Write a program to find the factorial of a given number.
5. Write a program to generate the Fibonacci series.
6. Write a program to check whether the given number is palindrome or not.
7. Write a program to find the GCD and LCM of two no's.
8. Write a program to print the diagonal elements of matrix.
9. Write a Program to demonstrate use of array of objects.
10. Program to demonstrate use of function overloading.
11. Write a function which accept object as a parameter and returns object.
12. Write a Program to demonstrate the virtual base class.
13. Write a Program to demonstrate use of polymorphism (virtual function).
14. Write a program to overload ++ operator to increment age of person by one month.
15. Write a program to illustrate the use of scope resolution operator.
16. Write a program to find the square root using inline function.
17. Write a program to illustrate the use of friend function.
18. Create two employee objects and display each object's yearly salary.
19. Give each employee a 10% raise and display each Employee's yearly salary again..
20. Write C++ program to create five object of book, get information of book using getdata() function including name, price, publication and author.

CS-3601 Computer Networks
Commencing from 2013-14 onwards

UNIT-I:
Computer Network, Goals and applications, Reference models-OSI & TCP/IP- A Comparative study. Network hardware- LAN, MAN & WAN and Topologies, LAN components – File server, Workstations, Network Adaptor cards, Connection oriented and connection less services.

UNIT-II
Data Communication System, Data Communication Links, Character codes, Digital Data rates, Serial Data formats, Encoded data formats, Error detection and correction. Transmission media – guided and unguided media, Switching Techniques – Circuit Switching, Packet Switching, Message Switching.

UNIT-III
Data Link Protocol, Character Oriented Protocol & Bit Oriented Protocol, Network architecture protocol, Ethernet, Token bus and Token Ring.

UNIT-IV
Internet basics- Elements of the web, viewing web pages with a browser, using a browser for a mail, news and chat, security and privacy issues. Internet: advantage & disadvantage. Internet Services, Web server and Proxy server, Web caches, web browser like internet explorer, netscape navigator and communication suite, internet security issues, embedded and software based firewall, data encryption and digital signature and certificates.

UNIT-V
The art of creating the web site and home page, the HTML programming basics, syntax & rules, tables, frames, forms, example of HTML page, choice of color, banners, linking with HTML page, Div, Span, met tags, Introduction to DHTML, Java script, use of java script, Java script syntax, Data type, Array, Variable, Operator & Expressions.

Text Books:

1. Data and Network communication by Michael A. Miller..

(Effective from July 2011 session for 2011-14 batch onwards)

Reference Books:

1. Deitel and Deitel, Goldberg, “Internet and World wide web – How to program,” Pearson education Asia, 2001.
2. “Computer Networks”, A. S. Tanenbaum.

CS-3601 P (Practical Exercise on Computer Networks)
Commencing from 2013-14 Onwards

1. Create a webpage that prints your name to the screen.
2. Create a webpage that print the numbers 1-10, each number being a different color
3. Print a paragraph with 4-5 sentences .Each sentence should be a different font.
4. Print two lists with any information you want. One list should be an ordered list, the other list should be an unordered list.
5. Print a paragraph that is a description of a book, include the title of the book as well as its Auther. Names and titles should be underlined, adjectives should be italicized and bolded
6. Print some performatted text of your choosing
7. Create a page with a link at the top of it that when clicked will jump all the way to bottom of the page.At the bottom of the page there should be a link to jump back to the top of the page
8. Display an image that has a border of size 2,a width of 200 and a height of 200.
9. Display five different images. Skip two lines between each image .Each image should have a title.
10. Display an image that when clicked will link to a search engine of your choice
11. Add a simple table to for storing Train information(Train no, Name, Source, Destination, Time)without borders .Do the following
    1. Add border value of 1, save and view.
    2. Add a border value of 5,save and view.
    3. Make the top row a table header, save and view
    4. Align all data elements to the middle of their cells, save and view.
    5. Divide Time into Departure Time , Arrival Time.
12. Write a java Script ,which calculate sum or product depending on the drop down menu selection of two numbers, accepted using textbox and display the result in the third textbox.The action perform on click event on button.
13. Write a Java script which display current date and time when page loads
14. Write a Java script that prompt the user for his or her name as the page load(via dialog box) and then welcome the user by name in the body of the page
15. Create a webpage using two image files , which switch between one another as mouse pointer mover over the images.

(Effective from July 2011 session for 2011-14 batch onwards)

16. Write a java script ,which calculates factorial of a number, accepted using textbox and displays the result in second textbox. The action perform on click event on button.
17. Write a java script which reverses the number accepted in text box.
18. Create an HTML form which has number of text boxes like first name, last name, address & PIN code. Write a Java script code to verify following on click event of a button.
    1. Pop up an alert indicating which text box has left empty and set focus on that specific text box.
    2. Give message “Thanks you” if all text boxes are filled.
    3. Pop Up an alert message if text within PIN code is not numeric value and greater than 6 digits and set focus on it till it is given proper value.

(Effective from July 2011 session for 2011-14 batch onwards)

14

Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Information Technology &
Approved by H E the Governor of Madhya Pradesh
Session 2017-18
JULY 2017 Onwards
Class: B.Sc. (Information Technology)

Paper Code		**Internal**			**Theory**	**Total**	**Practical**	**Grand Total**
	First Year	**Three Months**	**Six Months**	**Total**				
BSCIT11	Introduction to Information Technology & Computer Organization	10	10	20	40	80		100
BSCIT12	Programming & Problem Solving through C & C++				40			
BSCIT13P	Practicals on BSCIT11 & BSCIT12						50	50
	Second Year							
BSCIT21	Operating System Concepts & Computer Network	10	10	20	40	80		100
BSCIT22	Internet Programming Using JAVA				40			
BSCIT23P	Practicals on BSCIT21 & BSCIT22						50	50
	Third Year							
BSCIT31	DBMS & RDBMS Using Oracle	10	10	20	40	80		100
BSCIT32	Information Technology Trends				40			
BSCIT33P	Practicals on BSCIT31 & BSCIT32						50	50
							Grand Total	**450**

Remark: (i) Each theory paper contain five objective type question of 1 mark and
(ii) Five short answer type question of 2 marks and
(iii) Five long answer type question of 5 marks, with internal choice in (ii) and (iii)

Dr Nidhi Chubey

(Abhilasha Kumar)

(S Tanwani)

(Dr. Umesh Singh)

(S Kurariya)

(Dr Anuj Hundet)

Poonam Sinha

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Information Technology& Approved by H E the Governor of Madhya Pradesh
Session 2017-18 Onwards

B.Sc. (IT) First Year
First Paper
Introduction to Information Technology & Computer Organization

Maximum Marks: 40

Unit-I

Introduction to Computer: Types and Classification. Basic Anatomy of Computer: BlockDiagram. CPU: Function of each Unit. Memory: Primary, Cache, Flash, Storage Classification: Sequential, Random. Storage devices: Pen drive, Hard disk, and Optical Disk, Blue Ray Disc. Input/Output Peripherals: Input devices –Keyboard; Locator Device -Mouse, Joy Stick, Digitizing Tablet;Pick Device: Light Pen, Touch Screen, Track Ball;Voice Recognition: Microphone;Scanning: MICR, OCR, OMR, Barcode Reader;Vision Capturing: Webcam, Digital Camera, Point of Sale, Touch Pad, Smart Card;Printers: Dot Matrix, Laser and Inkjet Printers, Plotters.

Unit-II

Computer Software: What is Software? Relationship between Hardware and Software, Logical System Architecture showing relationship between hardware, Types of Software: System Software, Application Software, Firmware, Functions of System Software, and Type of System Software: Operating Systems, Language Translators, Utility Programs, Communications Software. Application Software, Commonly Used Application Software: Word Processing, Spreadsheet, Database, Graphics Personal Assistance, Education, Entertainment Software. Open Source Terminologies: Open Source Software, Freeware, Shareware, Proprietary Software, FLOSS, GNU, FSF, OSI.

Unit-III

Word Processing: Introduction to Word Processing. MS Word: features, Creating, Saving and Operating Multi document windows. Editing Text: selecting, Inserting, deleting moving text. Previewing documents,printing document.Formatting Documents: Paragraph formats, Aligning Text and Paragraph, Borders and Shading, Headers and Footers.
Introduction to Excel:

Worksheet basic, Creating worksheet, entering data into worksheet, heading information, data types: dates, alphanumeric values, saving & quitting worksheet.

Toolbars and Menus, keyboard shortcuts, Working with single and multiple workbooks coping, renaming, moving, adding and deleting. Working with formulas & cell referencing, Auto sum, coping formulas.

PowerPoint Presentations: Introduction to PowerPoint, Slide Show, Formatting, Creating a Presentation, Inserting SmartArt & Hyperlinks, Adding Objects, Applying Transition, Animation effects. Adding Table, Charts & Media files.

Unit-IV

Number systems – Decimal Number system, Binary number system and Hexa-decimal number system, 1's & 2's complement, Representation of Positive and Negative Numbers; Binary Fixed-Point Representation, Arithmetic operation on Binary numbers, Overflow & underflow. Floating Point Representation, Codes, ASCII, Logic Gates: AND, OR, NOT and their Truth tables, NOR, NAND & XOR gates. Counters, Registers, Shift Registers.

(Abhilasha Kumari Bamnani)

(Dr. Umesh Singh)

(Dr Anuj Hundet)

Rajan Pandey

(Dr. S. Kuraniya)

Unit-V

Storing data and Program in Memory, Memory Hierarchy in a Computer, Internal Organization of Semiconductor Main Memory Chips, Semiconductor Memory RAM and ROM, Auxiliary Memory, Peripheral Devices, Secondary Storage Memory, Magnetic Memories and Hard Disk, Optical Disks and CD Memories.

Output Devices: VDU, CRT Monitor, LCD Displays, Touch Screen Displays, Print Devices Multiprocessor and Multi core Architecture, Flynn Classification SISD, SIMD, MISD, MIMD.

TEXT BOOK:

1. Computer Fundamentals – B. Ram – New Age International Publishers
2. Digital logic and Computer Design by Malvino leach
3. Fundamentals of Computer by P.K.Sinha
4. W. Hayes, Computer Architecture, McGraw-Hill
5. Microsoft Office – Complete Reference – BPB Publication

REFERENCE BOOKS:

1. William Stallings, "Computer Organization & Architecture", Pearson.
2. BARTEE, "Digital Computer Fundamentals " TMH Publication
3. MORRIS MANO, "Computer System Architecture " PHI

Instruction to paper Setter:

Question paper should be framed in both English and Hindi version.

Lab for B.Sc. (IT) First Year based on paper-I

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel

PowerPoint Presentation:

Creating & editing of presentation; Inserting SmartArt, Object, Tables, Charts & Media files. Use of Transition & Animation in the presentations. Set up a slide Show

Student must do 50 Practical exercises on WORD, EXCEL & POWERPOINT in their practical notebook/Print file.

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Information Technology&
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Session 2017-18 Onwards

B.Sc. (IT) First Year
Second Paper
Programming & Problem Solving through C & C++

Maximum Marks: 40

Unit I

History of C, C Character Set, Keywords and Identifiers, Tokens, Basic Structure of C Program, Types of Constants, Data Types, Variables, Type Casting, Operators and Expressions, Input and Output Management in C.Control Statements: *if, if...else, switch....case, while, do...while, for* Loops, Nested Loops, *break*and *continue*, *exit* statements and *goto* statement.Functions: Definition, Library Functions User Defined Functions, Function Prototype, Function Definition, Function Call, Types of User Defined Functions.

Unit II

Arrays: Array Definition, One Dimensional Array, Two Dimensional Array, Arrays and Functions. String Handling: String Library Functions: *strlen, strcat, strcmp, strcpy, strrev.*

Pointer: Introduction to Pointer, Understanding Pointers, Declaring Pointer Variables, Pointer and Function (Call By Value and Call By Reference), Pointer and Arrays, Pointer and Strings, Pointer and Structure, Pointer to Pointer. Storage Class:Types of Storage Class:auto, register, static, extern.

Unit III

Object Oriented:Procedure-Oriented Programming versus Object-Oriented Programming, Basic concepts of OOPs, Advantages of OOPs, Object Oriented Languages. Introduction to C++ :Structure of C++ program. Classes and Objects Specifying a Class, Defining Member Functions, Inline Functions, Default Arguments, Function Overloading, Friend and Virtual Functions. Private Member Functions, Arrays within a Class, Memory Allocation for Objects, Static Data Members, Static Member Functions, Array of Objects, Objects as Function Arguments, Returning Objects, Pointers to Members.

Unit IV

Constructors and Destructors Constructors, Parametric Constructors, Multiple Constructors ina Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor, Destructors. Operator Overloading and Type Conversions Definition, Overloading Unary Operators, Binary Operators, Binary Operators using Friends, Rules for Overloading Operators. Inheritance Defining Derived Classes, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes. Inheritance Defining Derived Classes, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes.

Unit V

Pointers, Virtual Functions and Polymorphism Pointers to Objects, this Pointer, Pointersto Derived Classes, Virtual Functions, Pure Virtual Functions. Operations C++ Streams, C++ Stream Classes, Managing Output with Manipulators. Working with Files Classes for File Strewn Operations, Opening and Closing a File, Detecting EOF, File Pointers, Updating a File, Error Handling During FileOperations.

Text Books:

1. E. Balagurusamy, "Programming in ANSI C",TMH,5th Ed., ISBN 0-07-068182-1
2. A first course in Programming with C, T. Jeypoovan
3. Object Oriented Programming with C++ By E.Balagurusamy, TMH.

References Books:

1. Programming in C++ By Robert Lafore.
2. ISRD-Object Oriented Programming with C++ , TMH
3. C++ the complete reference By Herbert Schildt, TMH
4. Mastering C++, Venugopal, TMH
5. Let Us C ,Yashavant P. Kanetkar

Instruction to Paper Setter: Question Paper should be framed in both English and Hindi version.

Lab for B.Sc. (IT) First Year based on paper-II

Practicals:

1. A program to find simple and compound interest for the rate of interest.
2. A program to find corresponding temperature in Fahrenheit from a given temperature in Celsius.
3. A Program to accept decimal number and display equivalent number in Octal andHexadecimal.
4. A program to swap the contents of two variables.
5. Program to accept the distance between two cities in kilometres and print the distance in meter, feet, inches and centimetre.
6. Program to accept the two sides and angle included by these two sides to find area and third side of a Triangle.
7. A program to check whether a given number is even or odd.
8. A program for check whether a given year is leap year.
9. A program to find largest among any five given numbers with minimum condition.
10. A program to find roots of Quadratic equation ax^2+bx+c.
11. A program to print all the prime number between 10 to 100.
12. A Program to print multiplication Table of a number.
13. A program to print number, square and cube of the first 10 natural number.
14. A program to find the factorial of an integer number.
15. A program to generate and print Fibonacci sequence.
16. A program to find the GCD of two Positive integers by successive division.
17. A Program to find the number of Armstrong number between 123 to 425.
18. A program to print truth table from X* Y+Z.
19. A Program to generate a menu driven program using switch statement to 1) Add 2) Edit 3) Delete 4) Exit an element from a list of given n numbers stored in array..
20. A Program to find sum of two matrices having size m*n and p*q.
21. A Program to Transport the matrix of size M*N.
22. A Program to delete an element from list of N numbers.
23. A Program to find sum of each row and column of matrix and also find largest and smallest element in the given matrix.
24. A program to count number of characters including uppercase and lowercase letter, digits, punctuations, space and words that are entered in a given string.
25. A Program to accept the containing 10 number and pass it to function to print it.

Note: Student must write/run 50 programmes on their practical file & Computer lab.

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Information Technology& Approved by H E the Governor of Madhya Pradesh
Session 2017-18 Onwards

B.Sc. (IT) Second Year
First Paper
Operating System Concepts & Computer Network

Maximum Marks: 40

Unit - I

Introduction to Operating Systems, Operating system services, multiprogramming, time sharing system, real time systems, storage structures, system calls, multiprocessor system. Basic concepts of Process, states and process scheduling algorithms. Unix Commands:Files and Directories, File permission, Basic Operation on Files, Changing Permission Modes, Standard files, Processes Inspecting Files, Operating On Files, Printing Files, Rearranging Files, Sorting Files, Splitting Files, Translating Characters, On line communication, Off line communication. VI EDITORS General characteristics, Adding text and Navigation, changing text, searching for text, copying and Moving text.

Unit – II

Deadlock problem, deadlock prevention, deadlock avoidance, deadlock detection, Methods for deadlock handling. Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation. Concepts of virtual memory, demand paging, page replacement algorithms. Disk scheduling basics.

Unit-III

Computer Network: Definition and fundamentals of networks, Goals and Applications, Reference models – OSI and TCP/IP. A Comparative study. LAN, MAN and WAN and topologies, LAN components – File server, Workstations, Network Adapter Cards. Connection Oriented and Connection less services, Switching Techniques – Circuit Switching, Packet Switching.Data Link Layer: Error Detection: Parity Check, Check Sum and Cyclic Redundancy Check (CRC); Correction Technique: Hamming code, Ethernet, token bus & token ring.

Unit-IV

Data Link Protocols: Flow Control: An Unrestricted Simplex Protocol, Simplex Stop-and-Wait Protocol, Sliding Window Protocols: One-Bit Sliding Window Protocol Go Back N and Selective Repeat. MAC Sub layer: Multiple access protocols: Aloha, CSMA Protocols; Collision- Free Protocols; IEEE MAC Sub layer protocols: 802.3, 802.4, 802.5 and their management.

Unit - V

Routing Algorithms: Optimality Principle, Flooding, Distance Vector Routing. Link State Routing, The Network Layer in the Internet: Internet Protocol, Internet addressing and Internet Control protocols. Transport Layer: The Internet Transport Protocol UDP: Introduction to UDP. Introduction to TCP. Application layer: Client Server Architecture, DNS, WWW and HTTP, Cookies, Proxy Server. E-mail Protocols (SMTP, POP3, IMAP, MIME), FTP, TELNET.

Text Books:

1. Computer Networks, Andrew S. Tanenbaum, Addison-Wesley, 4th Ed.
2. Data Communications and Networking, B.A. Frouzan, McGraw-Hill.
3. Operating System Concepts by Silberschatz, Galvin and Gagne.

Choubey

Rajesh Pandey

ReferenceBook:

1. Operating system Design & Concept by Milan Milenkovic
2. Operating System by Peterson
3. Unix Operating Systems, Sumitabh Das, Tata McGraw Hills publication.
4. Unix System Administration Handbook (Second edition), Evi Nemeth, Garth Synder, Scott Seebass, Trent R Hein, Pearson Education - Asia, 2000.
5. Design of UNIX Operating System, Maurice J. Back, Pearson Education - Asia.

Instruction to Paper Setter:

Question Paper should be framed in both English and Hindi version.

Lab for B.Sc. (IT) Second Year based on paper-I

Exercises on Unix:

1:Demonstrate the following unix/linux commands:
- i) ls
- ii) cat
- iii) mkdir
- iv) cp
- v) pwd
- vi) chmod with its options, cal,date,who,tty, lp,stty.

2: Explain basic commands for following operations:
- i. Connecting to the system
- ii. Disconnecting from the system
- iii. Text and graphic mode
- iv. Changing your password
- v. Navigating through the file system
- vi. Determining file type
- vii. Looking at text files
- viii. Finding help
- ix. List the different types of file comparisons command.

3: Demonstrate all types of disk related commands.

4: Demonstrate following unix/linux commands:
(i) md (ii) rm (iii) file (iv) less

5: Demonstrate the following unix/linux commands
(i) head(ii) tail (iii) wc(iv) paste (v) sort

(Dr Poonam Sinha)

(Dr S Manke)

B.Sc. (IT) Second Year
Second Paper
Internet Programming using JAVA

Maximum Marks: 40

Unit-I

Introduction Static & Dynamic Web Pages & Web sites, HTML Forms, scripting languages, Introduction to HTTP, web Server and application Servers, Installation of Application servers, Configuration files, Web.xml. Internet and WWW, JAVA environment, JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Type Casting.
Operators: Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special etc. *If* statement, *if..else..* statement, Nesting of *if…else…* statements, *else…if* Ladder, Switch, Loops – *while, do, for* Loops.

Unit-II

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members.
Inheritance:Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.
Arrays: One Dimensional & Two Dimensional, strings, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variable, Packages (Basic Knowledge).

Unit-III

Local and Remote Applets v/s Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet,Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display.

Unit-IV

Java Servlet, Servlet Development Process, Deployment Descriptors, The Generic Servlet Lifecycle.Servlet Packages, Classes, Interfaces, and Methods. Handling Forms with Servlets. Various methods of Session Handling.
Java Database Connectivity: various steps in process of connection to the database, various type of JDBC Driver.

Unit-V

JSP Basics: JSP lifecycle, directives, scripting elements, standard actions, implicit objects. Writing JSPs. Expression Language (EL), Separating Business Logic and Presentation Logic, Connection of JSP with different database viz. Oracle, MS-SQL Server, MySQL.
java.sql Package. Type of Statements, Connectionpooling: multiple users and need of connection pooling, Session handling in JSP.

(Dr. Poonam Sinha)

(Dr S Mania)

Rajesh Pandey

TEXT BOOKS:

1. E. Balaguruswamy, “Programming In Java”, 2nd Edition, TMH Publications ISBN.
2. “Core Servlets and Java Server Pages”, 2nd edition, Marty Hall, Larry Brown, Pearson Education.
3. Marty Hall, Larry Brown, “Core Servlets and Java Server Pages”, 2nd edition, Pearson Education

REFERENCE BOOKS:

1. Peter Norton, “Peter Norton Guide To Java Programming”, Techmedia Publications.
2. “Prefessional Java Server Programming”, S. Allamaraju Wrox Press
3. “Struts Recipes”, G. Franciscus, Manning Press
4. “Hibernate in Action”, C. Bauer, G. King,Manning Press

Instruction to Paper Setter:

Question Paper should be framed in both English and Hindi version.

Lab for B.Sc. (IT) Second Year based on paper-II

Suggested List of Practical:

1. Write a servlet that prints "Hello World"
2. Write a servlet that knows to whom it's saying hello, This servlet must be called from an HTML page taking user name as input. (Use both get and post method)
3. Write a servlet that counts and displays the number of times it has been accessed since the last server reboot.
4. Write a servlet that counts the times it has been accessed, the number of instances created by the server, and the total times all of them have been accessed.
5. Write a servlet that counts and displays the number of times it has been accessed, and reads an init parameter to know what at what number to begin counting.
6. This servlet counts and displays the number of times it has been accessed, and saves the count to a file in its destroy() method to make the count persistent.
7. Write a servlet that searches for prime numbers above one quadrillion. The algorithm it uses couldn't be simpler: it selects odd-numbered candidates and attempts to divide them by every odd integer between 3 and their square root. If none of the integers evenly divides the candidate, it is declared prime. It's disabled to let the server's CPU handle important tasks.
8. Write a servlet that prints the name and value for all of its init parameters.
9. Write a servlet that displays information about its server (The process is called Snooping).
10. Write a servlet that snoops the server's servlet and Java version.

Notes: Student must write/run 50 programmes on their practical file & Computer lab.

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18 Onwards

B.Sc. (IT) Third Year
First Paper
DBMS and RDBMS using Oracle

Maximum Marks: 40

Unit-I

Traditional File Systems versus Modern Database Systems, Introduction and applications of DBMS, Purpose of data base, Data Independence, Schemas and Instances,Database System architecture, level of abstraction, Database users and DBA, Classification of Database Management Systems, Components of database system.

ER Model Concept, Components of an ER Model, Attributes, Relationships, Roles, Participation, Constraints on Relationship Types, Strong & Weak entity set, Advance ER Model Features.

Unit-II

Database Languages and Interfaces,Evaluation of SQL, Between clause, Distinct Clause, Order by Clause, Group by Clause, SQL Functions, Sub queries, Handling null value, Aggregate function, User Defied Function, View, Join Operations.

Introduction to Relational Algebra, Relational Model Constraints, Various operations on Relations. Relational Calculus, Introduction, Tuple Relational Calculus, Domain Relational Calculus.

Unit-III

Relational Database design, Features of good relational database design, Codd's Rule, Integrity constraints, Keys, Armstrong Axioms, Functional Dependency, Closure Set of Functional Dependency, Closure Set of Attributes, Canonical Cover, 1NF, 2NF, Transitive Dependency & 3NF, BCNF, Multivalue Dependency & 4NF, Join Dependency & 5NF.

Unit-IV

Transaction Management, ACID properties, Serializability, Concurrency Control, Lock and types of Locks, Two Phase Locking Protocol, Check Points, Recovery Techniques, Deferred and Immediate data modification.

Emerging Database Technology, Data Warehouse, Data Mining, Distributed database, Mobile Database, Object Oriented Database, Geographical Database, Query Processing and Query Optimization.

Unit-V

PL/SQL Programming using Oracle, Oracle Data types, Looping and Decision Making, Working with Stored Procedure, Trigger, Cursor, Package, Index, Synonym and Sequence. Various Programming Examples.

TEXT BOOK:

1. Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems",
2. Database Management System by Seema Kedar, Technical Publication

REFERENCE BOOK:

1. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems
2. Atul Kahate, "Introduction to Database Management Systems",
3. Raghu Ramakrishnan, "Database Management Systems",
4. G.K.Gupta, "Database Management Systems", Tata Mc Graw Hill, 2011.

Instruction to Paper Setter:

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B.Sc. (IT) Third Year
Second Paper
Information Technology Trends

Maximum Marks: 40

UNIT – I

DistributedSystems: Introduction, Distributing the processing and storage function, Concept of Parallel systems, Difference between parallel & Distributed systems, Advantages & Disadvantages of Parallel and Distributed system, wireless networks, Architecture of Distributed systems, Security of Distributed system, Services of distributed system.

E-Supply Chain Management: Introduction, E-Supply-Chain components, E-Supply-Chainarchitecture, Major Trends in E-SCM, Examples of using E-SCM.

E-Customer Relationship Management (E-CRM): Customer Relationship management concepts. How technology can help in this? E-CRM solutions, advantages, E-CRMcapabilities, DataMining & E-CRM, Examples of using E-CRM.

Enterprise Resource Planning concepts.

UNIT-II

DATAWAREHOUSE AND DATA MARTS: Introduction, Advantages ofdata warehouse, Data warehouse components, Summarised data,Current details, System of records, Integration and transformationprograms, Archives, Metadata, Structure of a data warehouse, Usesof a data warehouse, Standards reports and queries, Queries againstsummarised data, Data mining, Interface with other warehouse.

DATAMINING: Introduction, Evolution of data mining, Data mining –verification versus discovery, Advantages of data mining, Technologiesused in datamining.

Big Data concepts, Introduction to HADOOP

UNIT – III

Mobile Commerce: Introduction, Growth, Success stories of Mobile commerce,Technologies for mobile commerce, WAP & its basics, WAP programming model, other wireless technology, different generationsin wireless communications, GSM versus CDMA security issues,M-Commercein India.

GEOGRAPHIC INFORMATION SYSTEM (GIS): Components of a GIS -Hardware, software, data, People, Methods, Working of GIS,Geographic references, Vector and Raster Models, Data for GIS, GISand Related Technologies, Desktop Mapping, CAD, Remote sensingand GPS,

Virtual private Network: Concept of VPN, Elements and basic requirements of VPN, its uses.

Chaubey

UNIT - IV

Introduction and basic concepts of modern communication andtelephony technology: CDMA, WLL, GSM, VOIP, Blue-tooth, Wi-Fi. Communication Technology: 2G,3G,4G,5G.

Communication over Radio, Microwave systems, Communication satellites, Radar, Fiber optics, ISDN – their properties, pros & cons of each device.

Network Security: Aspects of Security, Privacy: Encryption and Decryprtion.

UNIT V

Multimedia: Concept, types of graphics-bitmap & vector graphics, graphic effects and techniques, sound, Music and Video, Uses of multimedia, advantage and Application of Multimedia.

Artificial Intelligence and Expert system- Concepts of AI & ExpertSystems, Building of Expert system, Merits and Demerits of Expertsystem, Application of Expert system and AI.

Introduction to virtual reality:Definition, Applications of VR in Defense, Media, Education & Business.

Elementary Concepts of IoT, Smart Systems, Embedded systems, Cloud Computing.

TEXTBOOKS AND REFERENCE BOOKS:

1. Fundamentals of Information Technology by Alex Leon & M. Leon,Vikas Publications, New Delhi.
2. Frontiers of Electronic Commerce, by Kalakota, Ravi, Stone, Tom,Whinston, Andrew B, Addison Wesley Publishing Co, ISBN8178080575
3. E-Commerce An Indian Perspective (Second Edition) – by P.T. Joseph,S.J. Prentice-Hall of India
4. Security in Computing, third edition, by C.P. Pfleeger, S.Pfleeger and S.Ware, Prentice Hall 2002
5. Mobile communications, Joschen Schiller, pearson education
6. Recent Magazines of Computers and Communication

Instruction to Paper Setter:

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Session 2017-18 Onwards

Lab for B.Sc. (IT) Third Year

Note: Solve the following queries using ORACLE.

1. List the name & salary of the employee who is working in deptno 30.
2. List the name & salary of the employee who is working as an Analyst in deptno 10.
3. List the name & job of the employee whos salary more than 1000 but less than 2000.
4. List all the deptno from EMP table.
5. List the name & salary of the employee who is working in deptno10, 20, and 30.
6. List the name & salary of the employee who is not working in deptno10, 20.
7. List the entire analyst who is working in deptno 20.
8. Display following output. "SCOTT IS A MANAGER IN DEPARTMENT NUMBER 10 "
9. List the entire clerk whose salary is more than 800 & not working for deptno 10.
10. Give bonus of Rs 500 to all employees working for deptno 30.
11. Find the total salary of the each employee working for deptno 20.
12. Find the oldest employee.
13. List the name of the employee whose salary is more than 1000 & working either in dept 10 or 20.
14. List the name & salary of the employee who are getting no commission for dept 10.
15. List the name & employee code of the employee whose salary is not in the range of 1000 & 1800.
16. List the id & job of the employee whose salary > 2000 & name starts with S.
17. List all employees who joined in 1981.
18. List all employee names and their salaries, whose salary lies between 1500/- and 3500/- both inclusive.
19. List all employees which start with either J or T.
20. List all employee names and jobs, whose job title includes M or P.
21. List all jobs available in employee table.
22. List all employees who belong to the department 10 or 20.
23. List all employee names, salary and 15% rise in salary.
24. List minimum, maximum, average salaries of employee.
25. Find how many job titles are available in employee table.
26. Find second highest salary
27. Display all employee names and salary whose salary is greater than minimum salary of the company and job title starts with 'M'.
28. Find how much amount the company is spending towards salaries

29. Display name of the department with deptno 20.
30. List ename whose commission is NULL.
31. List ename whose manager is not NULL.
32. Display the employee no and total salary for all the employees
33. Display the employee name and annual salary for all employees.
34. Display the names of employees who are working as clerks, salesman or analyst and drawing a salary more than 3000.
35. Display the names of the employees who are working in the company for the past 5 years;
36. Display the names of all tables from current user;
37. Display the name of the current user.
38. Display the names of employees working in depart number 10 or 20 or 40 or employees working as CLERKS, SALESMAN or ANALYST.
39. Display the names of employees whose names have second alphabet A in their names.
40. Display the names of the employee whose names is exactly five characters in length.

.... The End..................

Scheme and Syllabus

of

B. Sc. (IT)
I to VI Semester

w.e.f. July 2011
(2011 – 2014 Batch onwards)

Devi Ahilya Vishwavidyalaya,
Indore (M.P.), 452001

Proposed Syllabus & Scheme for B. Sc. (IT) SEMESTER SYSTEM
(Effective from July 2011 session for 2011-14 batch onwards)

CLASS /SEMESTER	B. Sc.(IT)	CCE	MIN. MARKS	TERM END EXAM	MIN. MARKS	TOTAL 100%	MIN. MARKS

FIRST SEM.	**CS/IT-1101**-- Computer Organization	15	5	85	28	100	33
	CS/IT-1101P- Practical on Computer Org. & MS Office	---	---	---	---	50	17
SECOND SEM.	**CS/IT -1201**- Prog. Problem Solving through C	15	5	85	28	100	33
	CS/IT -1201P- Practical on C Language	---	---	---	---	50	17
THIRD SEM.	**CS/IT -2301**-Data Structure using C	15	5	85	28	100	33
	CS/IT -2301P- Practical on Data Structure using C	---	---	---	---	50	17
	IT- 2302 Internet & Web Technology	8	3	42	14	50	17
FOURTH SEM.	**CS/IT -2401** –Data Base Management System	15	5	85	28	100	33
	CS/IT -2401P- Practical on Data Base Management System	---	---	---	---	50	17
FIFTH SEM	**CS/IT-3501**-Object oriented Programming using C++	15	5	85	28	100	33
	CS/IT-3501P- Practical on Object oriented Programming using C++	---	---	---	---	50	17
	IT-3502-S/w Engineering	08	3	42	14	50	17
SIXTH SEM	**IT-3601**-Java Programming	15	5	85	28	100	33
	IT-3601P-Minor Project Using Java/Web Tech	---	---	---	---	50	17

PS :- CCE ----- CONTINUOUS COMPREHENSIVE EVALUATION, **INDIVIDUAL PASSING REQUIRED FOR THEORY AND PRACTICAL SUBJECTS.**

CS/IT – 1101 COMPUTER ORGANIZATION

Commencing from 2011-12 onwards

UNIT I

Evolution of Computers and Computer Generations, Computer Classification Processing speed of a computer, Technology Trends, Measuring Computer Performance, MIPS.von Neumann Machine Architecture, Functional Units and Components in Computer Organization, Computers – Block diagram, Memory addressing capability of a CPU, Word length of a computer Basic components of a Digital Computer - Control unit, ALU, IO Subsystem of a Computer, Bus Structures, Uses of Program Development Tool, Editor, Compiler, Assembler, Interpreter)

UNIT II

Number systems – Decimal Number system, Binary number system and Hexa-decimal number system,1's & 2's complement, Representation of Positive and Negative Numbers Binary Fixed-Point Representation, Arithmetic operation on Binary numbers, Overflow & underflow. Floating Point Representation, Codes, ASCII Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates. Counters, Registers, Shift Registers

UNIT III

Storing data and Program in Memory, Memory Hierarchy in a Computer Internal Organization of Semiconductor Main Memory Chips, Semiconductor Memory RAM and ROM Auxiliary Memory Peripheral Devices, Secondary Storage Memory, Magnetic Memories and Hard Disk Optical Disks and CD Memories

UNIT IV

Algorithm, Flowchart, Logic Development & Problem solving. Algorithms for simple problems involving conditional manipulation of memory variables The 8085 Programming Model, 8085 Hardware Model, Block Diagram and uses of Registers, Accumulator, Flag, Program counter and stack pointer How to write, assemble and execute a simple program: Illustrate Program –Adding two hexadecimal numbers.

UNIT V

Input Devices, keyboard, Mouse, Output Devices, CRT Monitor, LCD Displays, Touch Screen Displays Print Devices Multiprocessor and Multi core Architecture Flynn Classification SISD, SIMD, MISD, MIMD.

TEXT BOOK

Computer Fundamentals – B. Ram – New Age International Publishers

REFERENCE BOOKS

1. Rashid Sheikh, "**Computer Organization & Architecture**"
2. William Stallings, "**Computer Organization & Architecture**", Pearson.
3. BARTEE, ***"Digital Computer Fundamentals"*** TMH Publication
4. *MORRIS MANO,* ***"Computer System Architecture"*** PHI
5. W. Hayes, Computer Architecture, McGraw-Hill

Problems Solving Skills Book

1. Nicholas P Carter, Schaum Outline on Computer Architecture and Organization, TMH, Special Indian Edition Adaptation,, 2010

Note: Faculty teaching the subject will also given to students the besides 50 hours teaching the appropriate exercises and assignments.

CS/IT-1101P - Practical on Comp. Org. and MS-Office

Practical Session -01 - Practical on MS-OFFICE:

WINDOWS

1. Creating folder, cut, copy, paste, managing file and folder in windows.
2. Arrange icons, set display properties
3. Adding and removing software and hardware
4. Setting date and time, screen saver and appearance.
5. Using windows accessories.
6. Settings of all control panel items
7. Search file

MS-Word

1. Creating & Editing Document
2. Formatting Document
3. Use of Auto-text, Autocorrect, Spelling and Grammar Tool,
4. Page Formatting, Page Border, Background,
5. Creation of MS-Word-Mail Merge, Macros, Tables.
6. Practice of Printing, page setup etc.

MS-Excel

1. Creating & Editing Worksheet, Fill Handle
2. Use Formulas and Functions
3. Preparing Charts

MS-PowerPoint

1. Creating, Manipulating & Enhancing Slides,
2. Inserting Organizational Charts, Excel Charts
3. Using Word Art
4. Putting Animations and Sounds
5. Inserting Animated Pictures
6. Inserting Recorded Sound Effect

Computer Organization

Practical Session 02 - Using Debug/MASM/TASM

To Study of DEBUG visit the following website:
http://kipirvine.com/asm/debug/Debug_Tutorial.pdf

Practical on Flip-flops, Logic Gates and Registers.

Do the following tasks: -

1. Add 3, 4 and 7 and display result in only AX register
2. Add 3, 8 and 9 using three different registers and show result of all registers
3. Take dump of location 110 and display
4. Add your name and date of birth at location 120. Move only the date of birth to location 200. Search through 100 to 300 to find the date
5. Move 3 to AX register and multiply it with 3 to show the result.
6. Use int 21 in all your assembled codes
7. Use comparison command to compare the date of birth at location 120 and 100.

Write complete assembly codes for the following tasks. Submit code and output trace:

1. A program that displays your name and date of birth.
2. A program that adds the following numbers
a. 1000 b.
4000 c. 1700

3. A program that does the following a.
Add two numbers X and Y
b. Multiply the result with C
c. Increment the result

4. A program that subtracts
a. Two numbers X and Y such that X>Y
b. Two numbers X and Y such that Y>X

5. A program that divides
a. Two numbers X and Y such that X%Y = 0
b. Two numbers X and Y such that X%Y != 0 c.
Two numbers X and Y such that Y = 0

CS/IT – 1201- PROGRAMMING AND PROBLEM SOLVING THROUGH C

Commencing from 2011-12 onwards

UNIT I

Algorithm, Flowchart, Logic Development & Problem Solving. Structure of C program, C declarations, keywords, identifiers, constants, variables, Data types, type conversion,
Types of operators and expressions, Input and output functions in C.

UNIT II

Decision Statement – IF-ELSE statement, break, continue, goto, switch() case and nested IF statement. Loop Control Statements – For loop, While loop , Do-while loop and nested loops. Arrays – Definition, Initialization, characteristics, One, Two, Three and Multi-dimensional Arrays Working with scanf, printf, Strings & Standard Functions.

UNIT III

Pointers – Introduction, Features, Declaration & Arithmetic operations on pointers. Pointers and Arrays, Array of pointers. Pointers to pointers, pointers and strings, Void pointers Functions – Declaration, Prototype, Types of functions, Call by value and reference, Function with operators

UNIT IV

Function with decision statements, function with Loop statements. Function with Arrays and Pointers. Types of Storage Classes. Introduction to Files, Streams and File Types, Steps for file operations, File IO,

UNIT V

Files – Streams and file types, file operations Write and Other file functions.Command line arguments, Application of Command Line Arguments Structure and Union – Declaration, Initialization, structure within structure. Array of structure, Enumerated data types, Union of structure

TEXT BOOKS

1. *E. Balaguruswamy, **"Programming In C ",** TMH Publications*
2. *Kanetkar,* **"Let Us C"**

REFERENCES BOOKS

1. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education
2. Ashok N. Kamthane et. al., Computer Programming and IT (for RTU), Pearson Education, 2011 (ISBN 978-81-317-5970-7)
3. *Mahapatra, **" Thinking In C ",** PHI Publications*

Problem Solving Skills Book:

1. *Gottfried, Schaums Outline Series, **" Programming With C ",** TMH Publications*

Note: Faculty teaching the subject will also given to students the besides 50 hours teaching the appropriate exercises and assignments. l.

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT – 1201P - Practical on C Language

(*Student Must Write 50 Programs including following* ***25*** *Programs in their Computer Practical Book with* **Algorithm/Flowchart)**

1. Write a program for swapping two variables without using third variable.
2. Write a program to calculate simple Interest and Compound Interest.
3. Write a program to convert temperature entered into centigrade to Fahrenheit.
4. Write a program to find maximum of three numbers.
5. Write a program to read in a three digit number produce following output
(assuming that
the input is 539)
5 hundreds
3 tens
9 units
6. Write a program to find sum of digits of accepted number.
7. Write a program to find student grade using IF-ELSE ladder
8. Write a program that prints given three integers in ascending order using IF- ELSE
9. Write a program for simple calculator using switch/case loop.
10. Write a program for print Fibonacci series up to N number.
11. Write a program to find sum of first 50 odd numbers and even numbers.
12. Write a program to find reverse of given number.
13. Write a program to find factorial of accepted number.
14. Write a program to find all prime number between two given numbers
15. Write a program to find minimum, maximum, sum and average of given one dimensional array.
16. Write a program for sparse matrix.

17. Write a program to find addition, subtraction, multiplication of matrix.
18. Write a program to print terms of each of the following series
i. Sin(x) ii. Cos(x)
19. Display the following output on the screen

```
a. b. c.
* 1 A
** 12 AB
*** 123 ABC
**** 1234 ABCD
***** 12345 ABCDE
```

20. Write a program to read and write a structure.
21. Write a program for factorial function.
22. Write a program to read a string and print its reverse.
23. Write a program to find a_b using Call by reference.
24. Write a program for create, open and append a file.
25. Write a program to copy the contents of one file to another.

(Effective from July 2011 session for 2011-14 batch onwards)

CS/IT-2301DATA STRUCTURE USING C
Commencing from 2012-13 onwards

Unit- I

Introduction to Data Structures: Definition of Data structure and Abstract data type Classification of Data structures: Linear, Non-linear, homogeneous, non-homogeneous, static & dynamic.Arrays: Definition & types of array, Memory representation of one & two dimensional array, Operations: Insertion ,Deletion, Traversal

Sparse Matrix: Definition & memory representation.

Unit- II

Stack: Definition, Array implementation of stack (static stack) : Operations PUSH, POP, TRAVERSE .

Applications of stack: Infix, Prefix, Postfix representation and evaluation using stack, Use of stack in recursive implementation.

Queue: Definition, Array implementation of queue (static queue): Operations INSERT, DELETE, TRAVERSE. Introduction to Circular queue: Definition & implementation, Priority queue, Double ended queue

Applications of queue

Unit- III

Introduction to Linked List: Definition, advantages, Types of linked list: single, doubly, circular linked list

Operations: Creation, insertion, deletion & traversal of linked list

Unit- IV

Complexity of Algorithms: Time & space complexity, Best-case, worst-case, average-case, Big –oh notation.

Searching Algorithm: Linear or sequential search, Binary search, Interpolation search using array. Complexity of Linear search, Binary search, Interpolation Search Sorting Algorithm: Bubble sort, Selection sort, Insertion sort, Merge sort Complexity of sorting algorithm.

Unit- V

Introduction to Tree: Definition, Binary tree: Definition, representation, Operations: Traversal, insertion, deletion Binary search Tree (BST): Definition and creation, Search using BST Introduction to B-Tree & B+ tree. Introduction to graph: Definition & representation, Graph Traversal: Depth First Search (DFS), Breadth First Search (BFS) algorithm.

Text Books:

1. Yedidyah Langsam Moshe J. Augenstein, Aaron M. Tenenbaum, “Data Structures using C & C++”, PHI New Delhi,2nd Edition

Reference Books:

1. Seymour Lipschutz,”Data Structures”,Schaum’s Outline Series,Tata Mc Graw Hill Publishing Company Ltd.
2. Adam Drodzek,”Data Structures & Algorithm in C++”, 2nd Edition

CS/IT-2301P Practical exercise on Data Structure using C

(Effective from July 2011 session for 2011-14 batch onwards)

1. Write a program for address calculation of an element in one and two dimensional array (row major order and column major order).
2. Write a program for insertion, deletion and traversal of elements of an array.
3. Write a program for sparse matrix implementation.
4. Write a program for complete implementation of stack using array with push, pop and traversal operations.
5. Write a program for conversion of an infix expression into postfix representation and evaluation of that postfix form.
6. Write a program for complete implementation of queue using array with insertion, deletion and traversal operations.
7. Write a program for complete implementation of circular queue using array with insertion, deletion and traversal operations.
8. Write a program for complete implementation of double ended queue using array with insertion, deletion and traversal operations.
9. Write a program to create singly link list (creation, insertion, deletion and traversal).
10. Write a program to create doubly link list (creation, insertion, deletion and traversal).
11. Write a program to create circular singly link list (creation, insertion, deletion and traversal).
12. Write a program to create circular doubly link list (creation, insertion, deletion and traversal).
13. Write a program for complete implementation of stack using link list with push, pop and traversal operations.
14. Write a program for complete implementation of queue using link list with insertion, deletion and traversal operations.
15. Write a program for implementation of binary tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
16. Write a program for implementation of binary search tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
17. Write a program for implementing graphs and showing depth first search and breadth first search traversals.
18. Write a program for linear search.
19. Write a program for Binary search.
20. Write a program for interpolation search.
21. Write a program for bubble sort.
22. Write a program for selection sort.
23. Write a program for insertion sort.
24. Write a program for merge sort.
25. Write a program for quick sort.

IT 2302 INTERNET & WEB TECHNOLOGY

(Effective from July 2011 session for 2011-14 batch onwards)

Commencing from 2012-13 onwards

Objective: To introduce the concept of Web Technology and internet.

Unit-I

Concept of the point to point and Broadcast Network, Bus, Ethernet LAN, FDDI LAN, Token Ring, Star, Hub, MAN, WAN, Routers, Gateways, Bridge, Switches, Subnet, Internet and Intranet.

Unit-II

Internet basics: - Elements of the web, viewing web pages with a browser, using a browser for a mail, News and chat, security and privacy issues. Internet: advantage and disadvantage. Internet Services.

Concept of ISP (Internet Service Provider), Internet Backbones, NAPs, Concepts of URL Address, Domain Names

Unit-III

Web server and proxy server, Web caches, FAQS, Web browser like Internet Explorer, Netscape Navigator and Communication Suit, Internet Security issues, Embedded and Software based firewall, Data encryption and Digital Signature and Certificates.

Unit-IV

The art of creating the website and home page, The HTML programming basics, Syntax and rules, Tables, Frames, Forms, Example of HTML page, Choice of color, banners, Linking with HTML page, Div, Span, meta tags.

Unit-V

WORLD WIDE WEB (WWW) - History, Working, Web Browsers and their versions, Its functions, URLs, web sites, Portals. FTP, NNTP. SMTP, Configuring a Computer for an email

Concept of Search Engines, Search engines types, searching the Web and Web Servers, client and server techniques.

Text book:

1. Deitel & Deitel, Goldberg, “Internet and World Wide Web – How to Program”, Pearson Education Asia, 2001.

Reference Book:

1. Computer Networks – A.S. Tanenbaum

CS/IT-2401 Data Base Management System

(Effective from July 2011 session for 2011-14 batch onwards)

Commencing from 2012-13 onwards

Unit – 1

Fundamentals of DBMS: Data, Information, Database & Computers, DBMS Definition, DBMS versus file processing system, Components of DBMS Environment, Instances & Schemas, Three Levels Architecture, Data Independence, Data Dictionary, Database Users, Data Administrators.

Unit – 2

Modeling the Real World, Various Data Models & their Comparison, Entity Relationship Models. RDBMS –Concept, Components, Data Integrity, Keys, Relational data Manipulations and Relational Algebra, Tuple Calculus.

Unit – 3

Normalization: Definition, Decomposition, Basic Concepts like FD, Objectives of Normalization. Normal Forms- First, Second, Third Normal Form, BCNF, Concept of Multi Valued Dependencies & Higher Normal Forms.

Unit – 4

Introduction to SQL, DDL, DML, and DCL statements, Creating Tables, Adding Constraints, Altering Tables, Update, Insert, Delete & various Form of SELECT- Simple, Using Special Operators for Data Access. Nested Queries & Exposure to Joins, Aggregate Functions.

Unit – 5

Transaction: Concept of Transaction, Concurrency Control-Problem & its Basis, Concurrency Control - Locks & Deadlocks. Recovery-Kind of Failures, Recovery Techniques, Security-Authentication, Authorization, Access Control.

Textbook:

1. H. F. Korth & A. Silverschatz, Database Concepts, Tata McGraw Hill, New Delhi

Reference Books:

1. Jeffrey, Hoffer, Prescott, Heikki Topi, Modern Database Management, 9th edition.
2. Elmasri & Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.
3. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
4. Ivan Bayross, SQL, PL/SQL, BPB Publications, New Delhi.

CS/IT-2401P-Practical on Data Base Management System

1. Write a command to create following table structure, item-master .

Column name	datatype
Itemcode	char(4)
Itemdesc	varchar(25)
No_of_item_available	int
Price	int.

Condition are:- (1) itemcode is primary key
(2) Itemdesc is not NULL
(3) No_of_item_available is non zero .
(4) Price value should be 200 Rs.

2. The Department of an employee Raj Sharma table changed from finance to marketing. The department code of marketing is 003 & the employee code of raj Sharma 0015.both the department code & employee code are of char data type. Write update statement to update table employee.

3. News paper attribute data type

News paper attribute	data type
Newspapercode	char (4)
Newspaper name	char(25)
Region	varchar(25)
Type of news paper	varchar(25)
City	char(20)
Country code	char(3)
Phnno	Char(15)
Second table	
Newpaperadver	
Newsadvo	varchar (4)
Adstart date	dates time

Write SQL command for:-

(a) Phnno should be [0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]
(b) Country code should be 001 by default.
(c) News paper code should primary key.
Modify table->
(a) Newsadvo Should be primary key
(b) News paper code should be foreign key.

4. Write a command to display the detail of all those employee who name at least 3-5 year experience.

Attribute	data type
Employ code	char
Employ name	char
Department code	char
DOJ	date
YOE	int
Employ grade	char

5. The employee tables contain the employee name, address, age, salary of each employ. Write SQL command for-
   (a) Display all the detail of the employee
   (b) Whose age less than 40 year.
   (c) Salary is greater than 15000.

6. In a bank the customer table store's the detail of each customer. the bank has decided to give a 10% discount on all credit card's you want to generate a list of all customer who don't available the credit card facility. How do you generate the list? The structure of customer table.

Column	data type
Customecode	char
Customername	char
Customeraddress	char
Credit card	int

7. Consider title table with column name, title, title type pub ID of char type, while price advance, royalty, ytd-sales is off int type.
   (a) Display the highest advance paid.
   (b) Display the lower advance paid.
   (c) Display the total no. of book.
   (d) Display total sales of book.
8. Write appropriate SQL command for following-
   (a) Increase the price of all items by 5%.
   (b) Update the quantity hold to 500 for item code 1oo1.
   (c) Delete a row from the item table where item code is 1oo1.
   (d) Update the price of item to 20 RS .
9. Write SQL definition command for each of the following
   (a) How would you add an attribute, CLASS, to the STUDENT table.
   (b) How would you remove the IS_REGISTERED table?
   (c) How would you change the field for FACULTY_NAME from 25 characters to 40 characters?
10. Consider employee table
    Employee (empno., Name, depid, Basic, HRA, Deduction, Tax)
    (a) Get the name of employee in the department 'D1' and basic pay less than 6000.
    (b) Get the average HRA of an employee.
    (c) Find the total basic pay for all the employee in the department 'D1' whose basic pay is greater than 6000.
    (d) Find the name of the employee who get the maximum and minimum basic pay.

11. Consider the following table
    Emp_master(emp_no, fname, mname, lname, dept, design, branch_no)
    Branch_mastr(name, branch_no)
    List the employee details along with branch names to which they belong.

(Effective from July 2011 session for 2011-14 batch onwards)

12. Consider the following table

    Cust_mstr (custno, fname, mname, lname)
    Addr_dtls (code_no,addr1,addr2,city,state,pincode)
    List the customer along with their multiple address details.

13. Consider table

    Book (Bookid, title, author, Publisher, year, price)
    Order_details (Orderno, bookid, quantity)
    Publisher (pubid, name, city, country)
    Catalog (Bookid, title, authorid, pubid, category_id, year, price)
    Author (authorid, name, city, country)

    1. Get the title and price of all the books whose price is less than the average price of the books.
    2. Get the name of all authors who have more than two books in the catalog.
    3. Get the name of all the books for which an order has been placed.

14. Consider table Order (ordered, order_detail, qty, price)

    a) Alter table Order add column amount.
    b) Modify data type of price column from character to int.

15. Consider table

    Product_master(Product_no,description,profit_percent,unit_measure,qty_on_hand,reorder, sell _price, cost_price).
    Client_master(Clientno, name, city, pincode, state , bal_due)
    Salesman_master(Salesmanno, salesmanname,address1,address2, city, pincode , state , sal_amt, tgt_to_get, Ytd_sales, remark)

    1. Find out the names of all the clients.
    2. Retrieve the entire contents of the client_master table.
    3. Retrieve the list of names and the cities of all the clients.
    4. List the various products available from the product_master table.
    5. List all the clients who are located in Bombay.
    6. Find the names of the salesman who have a salary equal to Rs. 3000.

16. Consider table

    Client_master (Client_no, name, city, pincode, state, bal_due).
    Product_master (Product_no, description, profit_percent, unit_measure, qty_on_hand, reorder, sell _price, cost_price).
    Salesman_master (Salesmanno, salesmanname, address1, address2, city, pincode , state , sal_amt, tgt_to_get, Ytd_sales, remark)

    1. Change the city of client_no ‘C00005’ to ‘Bombay’.
    2. Change the bal_due of client_no ‘C00001’ to Rs. 1000.
    3. Change the cost price of ‘1.22 Floppies’ to Rs. 950.00.
    4. Change the city of the salesman to Mumbai.

17. Consider table

    Product_master(Product_no,description,profit_percent,unit_measure,qty_on_hand, reorder, sell _price, cost _price).
    Client_master(Clientno, name, city, pincode, state , bal_due)
    Salesman_master(Salesmanno, salesmanname,address1,address2, city, pincode , state , sal_amt, tgt_to_get, Ytd_sales, remark)

1. Delete all salesman from salesman_master whose salaries are equal to Rs. 3500.
2. Delete all products from product_master where the quantity on hand is equal to 100.
3. Delete from client_master where the column state hold the value 'Tamil Nadu'.

18. Consider employee table

    Employee (empno, name, depid, basic, hra, deduction, tax)
    1. Get the number of rows in a table
    2. Find the department wise average pay of the employees.
    3. Find the name of the employees whose basic pay is greater than the average basic pay.
    4. Find the name of the employee who gets the basic pay.
19. The employee table stores the details of employees such as employee code, employee name, department code, date of joining, years of experience and the employee grade. Display only those grades in which the number of employees is more than 100.

    The table structure of the employee table is shown below:

    Employee(emp_code, emp_name, Dept_code, Doj, Yrs_exp, Emp_grade)

20. Explain set operation command with example.

CS/IT-3501 Object Oriented Programming using C++
Commencing from 2013-14 onwards

Objective: To introduce the concept of object oriented programming through C++.

UNIT I

Introduction, OOPS languages, characteristics of OOP's languages, application of OOP's, OOP's paradigm, concepts: object, class, data abstraction, data encapsulation, inheritance, and polymorphism. Static and dynamic binding, message passing, benefits of OOP's, disadvantage of OOP's. Application of OOP's.

UNIT II

C++ programming basics, basic program structure, preprocessor directive, data types, operators, manipulator, type conversions, C++ stream class .Control statement: for, do, while, do-while Decision statement if, if-else, switch-Case. Jump statement: break, continue, go to, exit.

UNIT III

Function and arrays. Classes and instances, defining classes in object oriented language, building and destroying instances (constructors and destructors), modifiers, friend and inline functions, string handling function.

UNIT IV

Data encapsulation, polymorphism, operator overloading, function overloading, virtual functions.

UNIT V

Inheritance, reusability of code through inheritance, type of inheritance, data abstraction, abstract classes. Templates and exception handling.

TEXT BOOK:

(Effective from July 2011 session for 2011-14 batch onwards)

1. Object oriented programming with c++ by Balaguruswamy.TMH Publishing

REFERENCE BOOKS:

1. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
2. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
3. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
4. OOP in C++, 3rd Edition, T.Gaddis, J.Walters and G.Muganda, Wiley DreamTech Press.
5. Object Oriented Programming in C++, 3rd Edition, R.Lafore, Galgotia Publications pvt ltd.
6. Computer Science, A Structured Programming Approach Using C++, B.A.Forouzan and R.F.Gilberg, Thomson

CS/IT 3501P PRACTICAL (OBJECT ORIENTED PROGRAMMING THROUGH C++)

1. Write a program to find the maximum of three using conditional operator.
2. Write a program to find the largest, second largest and third largest in a given array.
3. Write a program to generate Armstrong series.
4. Write a program to find the factorial of a given number.
5. Write a program to generate the Fibonacci series.
6. Write a program to check whether the given number is palindrome or not.
7. Write a program to find the GCD and LCM of two no's.
8. Write a program to print the diagonal elements of matrix.
9. Write a Program to demonstrate use of array of objects.
10. Program to demonstrate use of function overloading.
11. Write a function which accept object as a parameter and returns object.
12. Write a Program to demonstrate the virtual base class.
13. Write a Program to demonstrate use of polymorphism (virtual function).
14. Write a program to overload ++ operator to increment age of person by one month.
15. Write a program to illustrate the use of scope resolution operator.
16. Write a program to find the square root using inline function.
17. Write a program to illustrate the use of friend function.
18. Create two employee objects and display each object's yearly salary.
19. Give each employee a 10% raise and display each Employee's yearly salary again..
20. Write C++ program to create five object of book, get information of book using getdata () function including name, price, publication and author.

IT-3502 SOFTWARE ENGINEERING
Commencing from 2013-14 onwards

UNIT – I

General business environment, Business system concept, system development life cycle, A generic view of Software Engineering,, Software Characteristics, Application, Linear Sequential model, the prototyping model, RAD Model, Spiral and Evolutionary model.

UNIT – II

Project selection: Source of project request, managing project review & selection, preliminary investigation, system requirement specification & analysis: fact finding technique, Feasibility study, Cost & Benefit analysis & estimation

UNIT – III

Structured system analysis, Tools of Structured analysis, Software Design Fundamental, Data Flow Diagram, Object Oriented Design & Data Oriented design method.

UNIT – IV

Software Quality Assurance, Software testing techniques, software testing fundamentals, White Box Testing (Basis path Testing, Control Structured testing), Black Box Testing, Software Testing Strategies : A Strategic approach to software testing, Strategic issue unit testing, integration testing, Validation testing, System Testing, The art of Debugging.

UNIT – V

System Implementation & software Maintenance, Hardware & Software Selection.

(Effective from July 2011 session for 2011-14 batch onwards)

TEXT BOOK :

1.Software engineering :Ian Somerville,9th edition , pearson.

REFERENCE BOOKS :

1. Software Engineering by Roger S. Pressman, Mc- Graw Hill.
2. An Integrated Approach to software engineering Pankaj Jalote, 3rd edition, Springer.
3. System Analysis & design by Elias M. Awad, Galgotia Publications.

IT-3601 JAVA PROGRAMMING
Commencing from 2013-14 onwards

UNIT–I

C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment JAVA program structure, Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting. Operators: Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation If statement, if…else… statement, Nesting of if…else… statements, else…if Ladder, Switch,? Operators, Loops – While, Do, For, Jumps in Loops, Labeled Loops.

UNIT–II

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members Constructors, Methods Overloading, Static Members, Nesting of Methods Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control

UNIT–III

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Adding a Class to a Package, Hiding Classes.

UNIT–IV

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

(Effective from July 2011 session for 2011-14 batch onwards)

UNIT–V

Local and Remote Applets Vs Applications, Writing Applets, Applets Life Cycle, Creating an Executable Applet Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets, Aligning the Display, HTML Tags & Applets, Getting Input from the User

TEXT BOOKS:

1. E. Balaguruswamy, “Programming in Java”, 2nd edition, TMH Publications.

REFERENCE BOOKS:

1. Peter Norton, “Peter Norton Guide to Java Programming”, Techmedia Publications.

(Effective from July 2011 session for 2011-14 batch onwards)