

Hall Ticket Number :

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R-19

Code: 19AC12T

I B.Tech. I Semester Supplementary Examinations June 2024

Applied Physics

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks CO BL

UNIT-I

1. a) A parallel beam of monochromatic light is allowed to incident normally on a plane transmission grating having 5000 lines per cm and second order spectral line is found to be diffracted through 30° . Calculate the wavelength of light. 5M CO1 L3
- b) Demonstrate the experimental procedure of Newton's ring method to determine radius of curvature of plano convex lens. 9M CO1 L3

OR

2. a) Derive the expression for to determine wavelength of light by newton's rings method. 10M CO1 L2
- b) Distinguish between the interference and diffraction. 4M CO1 L4

UNIT-II

3. a) A solid elemental dielectric with 3×10^{28} atoms/m³ shows an electronic polarizability of 10^{-40} Fm². Assuming the internal electric field to be a Lorentz field. Calculate the dielectric constant of the material. 5M CO2 L3
- b) Distinguish between soft and hard magnetic materials. 9M CO2 L4

OR

4. a) Brief about ferroelectricity? 7M CO2 L1
- b) Explain frequency dependency of polarizability of dielectric materials 7M CO2 L2

UNIT-III

5. a) Explain signal propagation in multimode graded index optical fiber 9M CO3 L2
- b) Write are the applications of optical fiber. 5M CO3 L3

OR

6. a) Discuss about importance of the Poynting theorem. 9M CO3 L3
- b) Explain total internal reflection in optical fiber. 5M CO3 L2

UNIT-IV

7. a) Deduce Einstein's relation in semiconductors. 6M CO4 L3
- b) Explain direct and indirect band gap semiconductors. 8M CO4 L2

OR

8. a) Analyze the characteristic features to distinguish between n-type and p-type semiconductors. 8M CO4 L4
- b) Define Hall effect and write its applications. 6M CO4 L3

UNIT-V

9. Explain Josephson effects in superconductors and draw the I-V characteristics of Josephson effect. 14M CO5 L2

OR

10. a) Analyze the characterization of nanomaterials by scanning electron microscope. 8M CO5 L4
- b) Write various applications of nanomaterials. 6M CO5 L3

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R-19

Code: 19A511T

I B.Tech. I Semester Supplementary Examinations June 2024

Problem Solving and C Programming

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. a) Describe Structure of C Program 5M
b) What are identifiers? What are the rules for declaring identifiers? Give example. 9M

OR

2. a) What is an algorithm? Describe the characteristics of an Algorithm 6M
b) What is data type? Explain basic data types and their sizes used in a C Language 8M

UNIT-II

3. a) Describe Conditional Statements Used in C Language 7M
b) Write a program on calculating area and perimeter of square 7M

OR

4. a) Explain various iterative statements available in C language with examples. 8M
b) Write a program to find out whether the given number is Armstrong or not? 6M

UNIT-III

5. a) Define string. Explain declaration of string. Explain any three string handling functions with neat syntax and example. 8M
b) Write C program to concatenate two strings without using strcat() function 6M

OR

6. a) Explain the following key words with example. i) auto ii) register iii) static iv) extern. 8M
b) Write a c program to illustrate functions with arguments and returning value. 6M

UNIT-IV

7. a) Define pointer. Explain pointer arithmetic operations. 7M
b) Explain call by reference with an example program. 7M

OR

8. a) Explain dynamic memory allocation functions. 7M
b) Write a C program to demonstrate array of pointers. 7M

UNIT-V

9. a) Define structure and union. Explain the syntax and accessing elements from structure and union with an example. 8M
b) Write a C program to maintain a record of n students with four fields (Roll no, name, marks and grade). Print the student details using structures. 6M

OR

10. a) Define file. Write a C program copy contents from one file to another file. 8M
b) Discuss about file operations. 6M

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Code: 19AC11T

I B.Tech. I Semester Supplementary Examinations June 2024

Algebra and Calculus
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks CO BL

UNIT-I

1. Solve the system of equations by matrix method

$$x + y + z = 6, 2x + 3y - 2z = 2, 5x + y + 2z = 13$$

14M CO1 L3

OR

2. Find the Eigen values and Eigen vectors of the matrix

$$A = \begin{bmatrix} 2 & 2 & 0 \\ 2 & 5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

14M CO1 L3

UNIT-II

3. Diagonalize the matrix
- $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$

14M CO2 L2

OR

4. Verify Cayley-Hamilton theorem for the matrix
- $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$
- and hence

find A^{-1} using Cayley-Hamilton theorem.

14M CO2 L2

UNIT-III

5. Find the minimum value of
- $x^2 + y^2 + z^2$
- given
- $x + y + z = 3a$

14M CO3 L3

OR

6. a) Find the first and second partial derivatives of
- $z = x^3 + y^3 - 3axy$

7M CO3 L3

- b) If
- $z = f(x+ct) + g(x-ct)$
- then prove that
- $\frac{\partial^2 z}{\partial t^2} = c^2 \frac{\partial^2 z}{\partial x^2}$

7M CO3 L2

UNIT-IV

7. Trace the curve
- $r^2 = a^2 \cos 2\theta$

14M CO4 L4

OR

8. a) Using Maclaurin's series, expand
- $\sin x$
- in powers of
- x
- .

7M CO4 L3

- b) Using Taylor's theorem, express the polynomial
- $2x^3 + 7x^2 + x - 6$
- in powers of
- $(x-1)$
- .

7M CO4 L3

UNIT-V

9. Evaluate
- $\int_0^{\frac{\pi}{2}} \int_0^{\sin \theta} r \, dr \, d\theta$

14M CO5 L3

OR

10. Evaluate
- $\int_0^{\frac{\pi}{2}} \sin^6 \theta \cos^7 \theta \, d\theta$

14M CO5 L3
