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R-20

Code: 20AC12T

I B.Tech. I Semester Supplementary Examinations June 2024

Applied Physics

(Common to EEE, ECE and AI&ML)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(**Compulsory question**)

- | | | |
|---|-----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) Define interference and mention types | CO1 | L1 |
| b) Define dipole moment and write its equation | CO2 | L1 |
| c) Define divergence of vector field with equation | CO3 | L1 |
| d) State Hall effect | CO4 | L2 |
| e) State Meissner's effect. | CO5 | L2 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

- | | Marks | CO | BL |
|---|-------|-----|----|
| UNIT-I | | | |
| 2. What is diffraction and explain Fraunhofer diffraction due to double slit. | 12M | CO1 | L2 |
| OR | | | |
| 3. Describe the theory of Newton's ring experiment. | 12M | CO1 | L2 |
| UNIT-II | | | |
| 4. a) Explain frequency dependence of polarizability. | 6M | CO2 | L2 |
| b) Deduce Clausius – Mossotti Relation. | 6M | CO2 | L4 |
| OR | | | |
| 5. Differentiate the dia, para, ferro, anti-ferro and ferrites. | 12M | CO2 | L3 |
| UNIT-III | | | |
| 6. a) Explain divergence of vector field. | 4M | CO3 | L2 |
| b) State and prove Poincaré theorem. | 8M | CO3 | L3 |
| OR | | | |
| 7. a) Describe working of optical fiber with neat diagram. | 4M | CO3 | L2 |
| b) Explain optical fiber communication with block diagram. | 8M | CO3 | L2 |
| UNIT-IV | | | |
| 8. a) Distinguish n-type and p-type semiconductors. | 6M | CO4 | L4 |
| b) Derive the conductivity of semiconductor. | 6M | CO4 | L3 |
| OR | | | |
| 9. Derive Hall voltage and write their applications. | 12M | CO4 | L3 |
| UNIT-V | | | |
| 10. a) Discuss BCS theory of superconductivity. | 8M | CO5 | L2 |
| b) Write the applications of superconductors. | 4M | CO5 | L3 |
| OR | | | |
| 11. a) Explain basic principles of nanomaterials | 6M | CO5 | L2 |
| b) How nanomaterials synthesis by chemical vapor deposition method | 6M | CO5 | L2 |

*** End ***

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R-20

Code: 20A211T

I B.Tech. I Semester Supplementary Examinations June 2024

Basic Electrical Engineering
(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two marks**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

- | | | |
|---|----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) What is meant by Charge? | 1 | L1 |
| b) Write down the formula for a star connected network is converted into a delta network? | 2 | L2 |
| c) Classify different types of wires and cables. | 3 | L2 |
| d) List out different components of Thermal power station | 4 | L1 |
| e) Define photovoltaic Effect. | 5 | L1 |

PART-B

Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks)

- | | Marks | CO | BL |
|--|-------|----|----|
| UNIT-I | | | |
| 2. a) Discuss about B-H curve and Magnetic Hysteresis with neat graphs. | 6M | 1 | L2 |
| b) Differentiate between statically induced emf and dynamically induced emf? | 6M | 1 | L2 |
| OR | | | |
| 3. Discuss the classification of electrical elements and distinguish between voltage and current sources. | 12M | 1 | L2 |
| UNIT-II | | | |
| 4. a) Explain about source transformation briefly. | 6M | 2 | L2 |
| b) Explain the star-to-delta transformation for a resistive network. | 6M | 2 | L2 |
| OR | | | |
| 5. Find the total current passed through the circuit consisting of three resistors connected in parallel across the supply of 30V. Where $R_1=15$, $R_2=12$, $R_3=20$. Also find the current through individual resistances R_1 , R_2 and R_3 | 12M | 2 | L3 |
| UNIT-III | | | |
| 6. a) Explain with the help of schematic diagram the construction and operation of oscilloscope? | 6M | 3 | L2 |
| b) Distinguish between Wires and Cables. | 6M | 3 | L2 |
| OR | | | |
| 7. a) Elaborate on the concept of earthing in electrical systems. | 6M | 3 | L2 |
| b) Write a short notes on Multimeter. | 6M | 3 | L2 |
| UNIT-IV | | | |
| 8. Examine the factors that have influenced the evolution of power systems, including technological innovations and societal needs. | 12M | 4 | L3 |
| OR | | | |
| 9. a) Discuss the working principle of Thermal power station. | 6M | 4 | L2 |
| b) Explain the factors involved in the selection of site for a hydro power plant. | 6M | 4 | L2 |
| UNIT-V | | | |
| 10. Explain the principle of solar radiation and its significance in solar power generation. | 12M | 5 | L2 |
| OR | | | |
| 11. Explain the differences between horizontal and vertical axis wind turbines in terms of design, efficiency, and practical applications. | 12M | 5 | L2 |

*** End ***

Code: 20A312T

I B.Tech. I Semester Supplementary Examinations June 2024

Engineering Drawing

(Common to CE, 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) Divide a line of 100 mm into (i) 15 equal parts (ii) 7 equal parts. 7M 1 1
 b) Draw a pentagon of side 40 mm with one side vertical. 7M 1 1

OR

2. Construct a rectangular hyperbola, when a point P on it is at a distance of 18mm and 34mm from two asymptotes. Also draw a tangent to a curve at a point 20mm from an asymptote. 14M 1 1

UNIT-II

3. a) Draw the projections of a line BC, 75mm long in the following positions
 Parallel and 30mm above HP and in the VP. 7M 2 1
 b) Inclined at 45° to the VP, in the HP and its one end in the VP 7M 2 1

OR

4. A line PQ, 70mm long is parallel to H.P and inclined at 30° to V.P. The end P is 25mm above H.P and 40mm in front of V.P. Draw the projections of the straight line. 14M 2 1

UNIT-III

5. A regular pentagon of 25mm side has one side on the ground. Its plane is inclined at 45° to the HP and perpendicular to the VP. Draw its projections. 14M 3 1

OR

6. A regular hexagonal plane of 35mm side has a corner at 20mm from V.P and 50mm from H.P. Its surface is inclined at 45° to V.P and perpendicular to H.P. Draw the projections of the plane. 14M 3 2

UNIT-IV

7. A cube of 40mm side, is resting with a face on HP such that when one of its vertical faces is inclined at 30° at VP. 14M 4 2

OR

8. A square pyramid, base 40mm side and axis 60mm long has a triangular face in the V.P. The front view of the axis making an angle of 60° with XY (the apex downwards). Draw its projections. 14M 4 2

UNIT-V

9. Draw the Front view, Top view and side view for the following figure 1.

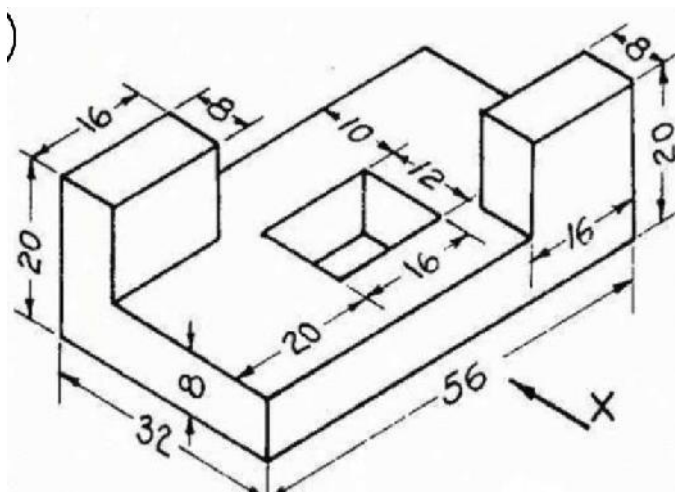


Figure 1.

14M 5 1

OR

10. Draw the isometric view of a pentagonal pyramid of base side 30mm and height is 75mm, when its axis is perpendicular to H.P. 14M 5 1

Hall Ticket Number :									
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R-20

Code: 20A511T

I B.Tech. I Semester Supplementary Examinations June 2024

Problem Solving through C Programming

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(**Compulsory question**)

- | | | |
|---|-----|----|
| 1. Answer all the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) List the various steps that are involved in solving a problem | CO1 | L1 |
| b) What are selection statements? | CO2 | L1 |
| c) What is the difference between strlen() and sizeof the string? | CO3 | L1 |
| d) What is pointer and how to declare and initialize pointer. | CO4 | L1 |
| e) How do we identify the end of file in C. Illustrate with an example? | CO5 | L1 |

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

- | | | | |
|--|----|-----|----|
| 2. a) Briefly explain about the basic data types that C language supports. | 6M | CO1 | L2 |
| b) What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart | 6M | CO1 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 3. a) Illustrate the Relational Operators and Logical operators in C. | 6M | CO1 | L3 |
| b) Explain the operator precedence and Associativity with examples in C. | 6M | CO1 | L2 |

UNIT-II

- | | | | |
|--|----|-----|----|
| 4. a) In what way a do...while is different from while looping statement. Explain. | 6M | CO2 | L2 |
| b) Write a C program to find the factorial of a number using while loop. | 6M | CO2 | L3 |

OR

- | | | | |
|---|----|-----|----|
| 5. a) Sort the following list of elements using bubble sorting technique. -2,45,0,11,-9 | 6M | CO2 | L4 |
| b) Briefly explain Binary Search algorithm. | 6M | CO2 | L2 |

UNIT-III

6. a) Write a C program to count the number of vowels and consonants, digits spaces and special characters in a line of string. 6M CO3 L3
- b) Illustrate the concept of Towers of Hanoi Problem. How recursion helps to solve this problem. 6M CO3 L3

OR

7. a) Discuss the preprocessor directives. 6M CO3 L2
- b) Write a C program to find the LCM of two integers. 6M CO3 L3

UNIT-IV

8. a) What is pointer arithmetic? Illustrate with an example 6M CO4 L3
- b) Write a c program to swap two integer variables using swap function. 6M CO4 L3

OR

9. Explain in detail about Dynamic Memory Allocation functions with an examples in C programming. 12M CO4 L2

UNIT-V

10. a) How to represent union in Structure? Explain with an example. 6M CO5 L2
- b) Illustrate file positioning functions in C with example. 6M CO5 L3

OR

11. a) What are self-referential structures? Explain them with an example 6M CO5 L2
- b) Write a program to copy one file data into another file. 6M CO5 L3

*** End ***

Hall Ticket Number :									
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R-20

Code: 20AC11T

I B.Tech. I Semester Supplementary Examinations June 2024

Algebra and Calculus
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer **all** the following short answer questions (5 X 2 = 10M)

CO BL
CO1 L1

a) If $A = \begin{bmatrix} 1 & 4 & 5 \\ 0 & 6 & 8 \\ 0 & 0 & 22 \end{bmatrix}$ then find the rank of A

- b) State Cayley-Hamilton theorem.

CO2 L2

- c) Obtain Maclaurin's series for $f(x) = \sin x$

L3
CO3

- d) Write the area enclosed by a plane curve in xy-plane

CO4 L2

- e) Define Beta function

CO5 L1

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

2. Reduce the following matrix into its normal form and hence find its rank.

$$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

12M CO1 L1

OR

3. a) Show that a square matrix **A and A^T** have the same Eigen values

6M CO1 L2

- b) If } is Eigen value of an Orthogonal matrix, then show that is also its Eigen value.

6M CO1 L2

UNIT-II

4. Reduce the quadratic form $2x_1x_2 + 2x_1x_3 - 2x_3x_2$ to canonical form by an orthogonal reduction and discuss its Nature. Also find the model matrix.

12M CO2 L3

OR

5. Show that the matrix $\begin{bmatrix} 1 & -2 & 2 \\ 1 & -2 & 3 \\ 0 & -1 & 2 \end{bmatrix}$ satisfies its characteristic equation. Hence find A^{-1} . 12M CO2 L2

UNIT-III

6. a) Expand the Taylor's series expansion of $\sin x$ in powers of $\left(x - \frac{\pi}{2}\right)$ 6M CO3 L3
- b) If $U = f(2x - 3y, 3y - 4z, 4z - 2x)$ then find the value of $\frac{1}{2} \frac{\partial U}{\partial x} + \frac{1}{3} \frac{\partial U}{\partial y} + \frac{1}{3} \frac{\partial U}{\partial z}$ 6M CO3 L3

OR

7. A rectangular box open at the top is to have volume of 32 cubic ft. find the dimensions of the box requiring least material for its construction. 12M CO3 L3

UNIT-IV

8. Evaluate the double integral $\iint_R xy dx dy$ where 'R' is the region bounded by the lines x - axis, the line $y = 2x$ and $y = \frac{x}{4a}$ 12M CO4 L5

OR

9. Evaluate the integral by changing the order of integration $\int_0^a \int_{\frac{x}{a}}^{2a-x} xy^2 dy dx$ 12M CO4 L5

UNIT-V

10. a) Show that $\int_0^1 x^m (\log x)^n dx = \frac{(-1)^n n!}{(m+1)^{n+1}}$ where n is a positive integer and $m > -1$ 6M CO5 L2
- b) Evaluate $\int_0^{\frac{\pi}{2}} \sin^{10} \theta d\theta$ 6M CO5 L5

OR

11. Express the following integrals in terms of gamma function
 (i) $\int_0^1 \left(\frac{1}{\sqrt{1-x^2}}\right) dx$ (ii) $\int_0^{\frac{\pi}{2}} \sqrt{\tan \theta} d\theta$ 12M CO5 L2

*** End ***