

Hall Ticket Number :																			
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R-20

Code: 20AC12T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

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) List any two conditions for sustained interference pattern. | | CO1 | L1 |
| b) Name the various types of dielectric polarization. | | CO2 | L1 |
| c) Define critical angle and total internal reflection. | | CO3 | L1 |
| d) Name the semiconductor with majority charge carriers as holes. | | CO4 | L1 |
| e) Define superconductivity. | | 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) Determine the wavelength of a monochromatic light source by forming the Newton rings. | 8M | CO1 | L3 |
| b) In Newton ring's experiment the diameters of 4 th and 12 th dark rings are 0.400cm and 0.700cm respectively. Evaluate the diameter of 20 th dark ring. | 4M | CO1 | L5 |

OR

- | | | | |
|---|----|-----|----|
| 3. a) Explain polarization of light by double refraction with a neat ray diagram. | 8M | CO1 | L2 |
| b) Decide the number of lines per cm in a diffraction grating if a green line of mercury of wavelength 5460Å is seen in first order spectrum at an angle 19°8'. The grating is receiving light at normal incidence. | 4M | CO1 | L5 |

UNIT-II

- | | | | |
|---|----|-----|----|
| 4. a) Determine the expression for electronic polarizability. | 8M | CO2 | L3 |
| b) Define dielectric susceptibility and dielectric constant. | 4M | CO2 | L1 |

OR

5. a) Illustrate the hysteresis loop exhibited by ferromagnetic materials and explain coercivity and retentivity. 8M CO2 L4
 b) Differentiate between soft and hard magnetic materials. 4M CO2 L2

UNIT-III

6. a) State Gauss divergence theorem and Stoke's theorem. 4M CO3 L3
 b) Derive the differential forms of any two Maxwell's equations. 8M CO3 L2

OR

7. a) Deduce an expression for numerical aperture of an optical fiber. 8M CO3 L3
 b) Describe fiber optics sensors. 4M CO3 L2

UNIT-IV

8. Develop an expression for density of electrons in conduction band of an intrinsic semiconductor. 12M CO4 L5

OR

9. a) Distinguish between direct and indirect band gap semiconductors. 8M CO4 L4
 b) Show the applications of semiconductors. 4M CO4 L3

UNIT-V

10. a) Explain any two properties of superconductors. 4M CO5 L2
 b) Analyze DC and AC Josephson effects. 8M CO5 L4

OR

11. a) Explain any two general properties of nano materials. 4M CO5 L2
 b) Discuss the ball milling method to synthesize nanomaterials with a neat diagram 8M CO5 L2

*** End ***

Hall Ticket Number :									
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R-20

Code: 20A312T-B

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Engineering Drawing

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer *five full* questions by choosing one question from each unit (5 x 14 = 70 Marks)

Marks	CO	BL
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UNIT-I

1. The major and minor axes of an ellipse are 100 mm and 70 mm. Draw an ellipse by using concentric circles method. Also draw normal and tangent to the curve at any point P on the curve.

14M	CO1	L1
-----	-----	----

OR

2. A circle of 50 mm diameter rolls along a straight line without slipping. Draw the curve traced out by a point P on the circumference, for one complete revolution of the circle. Name the curve. Draw a tangent to the curve at a point on it 40 mm from the line.

14M	CO1	L2
-----	-----	----

UNIT-II

3. A line PQ 75 mm long has its end P in the V.P. and the end Q in the H.P. The line is inclined at 30° to the H.P. and at 60° to the V.P. Draw its projections.

14M	CO2	L1
-----	-----	----

OR

4. A line AB, 90 mm long, is inclined at 45° to the HP and its top view makes an angle of 60° with the VP. The end A is in the HP and 12 mm in front of the VP. Draw its front view and find its true inclination with the VP.

14M	CO2	L2
-----	-----	----

UNIT-III

5. Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60 degrees to the V.P., and its surface making an angle of 45 degrees with the H.P.

14M	CO3	L2
-----	-----	----

OR

6. A semi-circular lamina of 60mm diameter has its straight edge in VP and inclined at an angle of 45° to HP. The surface of the lamina makes an angle of 30° with VP. Draw the projections

14M	CO3	L3
-----	-----	----

UNIT-IV

7. A Square prism, base 40 mm side and height 65 mm, has its axis inclined at 45° to the H.P. and has an edge of its base on H.P and inclined at 30° to the V.P. Draw its projections.

14M CO4 L2

OR

8. Draw the projections of a cone, base 45 mm diameter and axis 60 mm long, when it is resting on the ground on a point of its base circle with the axis making an angle 30° with the H.P and 45° to the V.P

14M CO4 L3

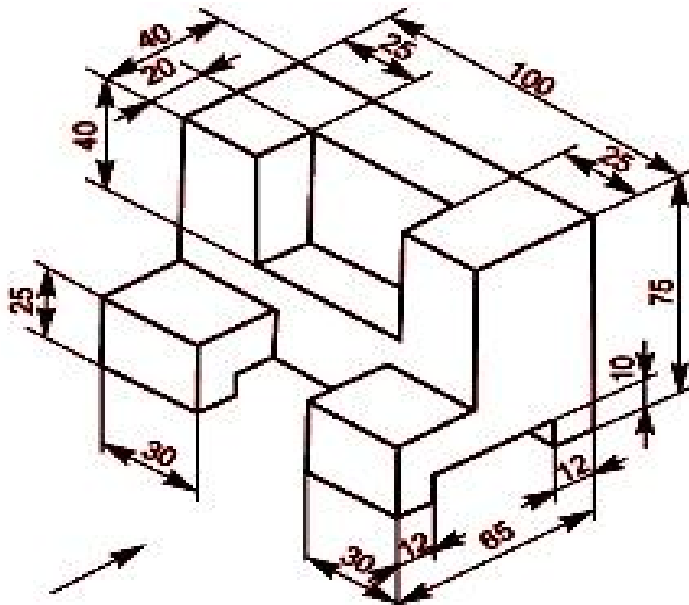
UNIT-V

9. Draw the isometric projection of a pentagonal prism, with side of base 35 mm and length of axis 65 mm, when its axis is (i) parallel to vertical and (ii) parallel to horizontal.

14M CO5 L2

OR

10. Draw the (i) front view, (ii) top view and (iii) side view of the following object.



14M CO5 L3

*** End ***

Hall Ticket Number :

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R-20

Code: 20A211T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

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 mark**.
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 B-H curve. | 1 | L2 |
| b) State Kirchhoff's laws. | 2 | L2 |
| c) How to measure frequency using an oscilloscope? | 3 | L2 |
| d) What is a nuclear reactor? | 4 | L2 |
| e) What is photovoltaic Effect? | 5 | L2 |

PART-B

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

Marks CO BL

UNIT-I

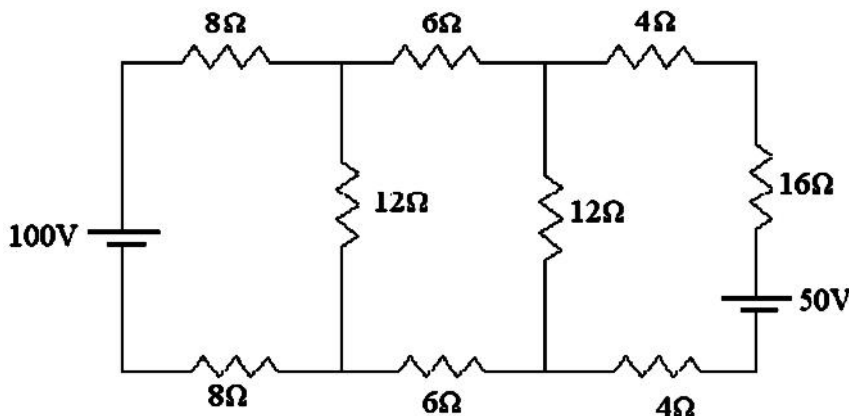
- | | | | |
|---|----|---|----|
| 2. a) State the Difference permanent magnets and electro magnets | 6M | 1 | L2 |
| b) Explain about Lenz's law, Cork screw rule, Right hand thumb rule and Right hand palm rule. | 6M | 1 | L2 |

OR

- | | | | |
|---|----|---|----|
| 3. a) Discuss about B-H curve and Magnetic Hysteresis with neat Graphs. | 6M | 1 | L2 |
| b) State and explain Faradays laws of Electromagnetic Induction. | 6M | 1 | L2 |

UNIT-II

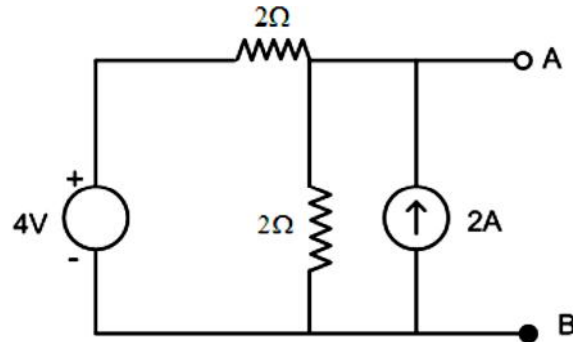
4. Using mesh analysis find current through all the elements in the circuit shown and also find power absorbed by all the resistors.



12M 2 L4

OR

5. a) Explain the star-to-delta transformation for a resistive network. 6M 2 L4
- b) Find the equivalent voltage and current source representation of the following network across AB.



6M 2 L4

UNIT-III

6. a) Explain the classification of measuring instruments. 6M 3 L2
- b) Write short notes on Frequency and Phase measurements. 6M 3 L2

OR

7. Explain types of wires and cables. 12M 3 L2

UNIT-IV

8. With a neat layout diagram, explain the working of thermal power station. 12M 4 L2

OR

9. a) Draw the typical layout of hydro power station and explain the operation. 6M 4 L2
- b) Discuss the factors involved in the selection of site for a hydro power plant. 6M 4 L2

UNIT-V

10. With a neat diagram, explain wind electric generating plant. 12M 4 L2

OR

11. a) Explain I-V characteristics of solar cell. 6M 5 L2
- b) What is solar cell? Explain its principle of operation. 6M 5 L2

*** End ***

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R-20

Code: 20A511T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

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 mark**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

- | | | |
|---|-----------|-----------|
| 1. Answer the following (5 X 2 = 10M) | CO | BL |
| a) Differentiate an algorithm and a flowchart. | CO1 | L2 |
| b) Differentiate do-while and while statements. | CO2 | L2 |
| c) Describe the scope of variables in C program. | CO3 | L2 |
| d) Define predefined functions realloc() and free() | CO4 | L2 |
| e) Illustrate the use of enumerated data type in C programming. | CO5 | L3 |

PART-B

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

Marks CO BL

UNIT-I

- | | | | |
|---|----|---|----|
| 2. a) Illustrate the use of ternary or conditional operator to find the maximum of three given integers | 6M | 1 | L4 |
| b) Describe the concept of Associativity and Precedence of operators. | 6M | 1 | L2 |

OR

- | | | | |
|---|-----|---|----|
| 3. Explain the structure of a C program | 12M | 1 | L2 |
|---|-----|---|----|

UNIT-II

- | | | | |
|--|----|---|----|
| 4. a) Develop a C program for Binary search. | 6M | 2 | L4 |
| b) Apply bubble sort on the following list of elements
30, 60, 80, 10, 50, 90, 70, 20 | 6M | 2 | L3 |

OR

- | | | | |
|--|----|---|----|
| 5. a) Model a C program for matrix multiplication | 8M | 2 | L3 |
| b) Discuss the loop control statements in C programming. | 4M | 2 | L2 |

UNIT-III

6. a) Differentiate call by value and call by reference with example. 8M 3 L3
 b) Illustrate the concept of recursion. 4M 3 L3

OR

7. a) Discuss the preprocessor directives. 8M 3 L2
 b) Develop a C program to find the LCM of two integers. 4M 3 L5

UNIT-IV

8. a) Define a pointer and list the advantages and disadvantages of pointers. 6M 4 L3
 b) Differentiate malloc() and calloc() with examples 6M 4 L2

OR

9. a) Develop a c program to swap two integer variables using swap function. 6M 4 L6
 b) Illustrate the concept of pointer arithmetic. 6M 4 L4

UNIT-V

10. a) Differentiate structure and union with examples. 4M 5 L3
 b) Develop a c program to display the content of unformatted text file. 8M 5 L5

OR

11. a) Outline the concept of self-referential structures. 6M 5 L3
 b) Demonstrate the passing of structures to functions as parameters. 6M 5 L3

*****END*****

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R-20

Code: 20AC11T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

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 |
| a) Define the rank of the matrix. | 1 | 2 |
| b) State Caley Hamilton Theorem. | 2 | 2 |
| c) Expand $\cos x$ using by Maclaurin's series. | 3 | 2 |
| d) Evaluate $\int_0^2 \int_1^3 \int_1^2 x y^2 z dz dy dx$ | 4 | 3 |
| e) Find the value of $(1, 1/2)$ | 5 | 3 |

PART-B

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

Marks CO BL

UNIT-I

- | | | |
|--|----|--------|
| 2. a) Reduce the following matrix into the matrix Echelon form and hence find its rank | | |
| $R = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ | | |
| | 6M | 1 3 |
| b) Test for consistency and solve | | |
| $\begin{aligned} 5x+3y+7z &= 4 \\ 3x+26y+2z &= 9 \\ 7x+2y+10z &= 5 \end{aligned}$ | | |
| | 6M | 1 3 |

OR

- | | | |
|---|-----|--------|
| 3. Find the eigenvalues and eigenvectors of matrix | | |
| $A = \begin{bmatrix} -1 & 4 \\ 3 & -1 \\ 2 & 1 \end{bmatrix}$ | | |
| | 12M | 1 3 |

UNIT-II

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

12M 2 3

OR

5. Reduce the quadratic form $2x^2 + 2xy + 2y^2$ to a canonical form by an orthogonal reduction and discuss its nature. Also, find the modal matrix.

12M 2 3

UNIT-III

6. If $x = u(1-v)$, $y = uv$ then prove that $\frac{\partial(x,y)}{\partial(u,v)} = \frac{\partial(u,v)}{\partial(x,y)}$ where $J = \frac{\partial(x,y)}{\partial(u,v)}$ & $J' = \frac{\partial(u,v)}{\partial(x,y)}$

12M 3 3

OR

7. Examine the following function for extreme values: $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$

12M 3 3

UNIT-IV

8. Characterize the order of integration $I = \int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}}$ $dy dx$ and hence evaluate

12M 4 3

OR

9. Evaluate

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz \, dx dy dz$$

12M 12M 4 3

UNIT-V

10. Show that $\beta(p,q) = \int_0^{\infty} \frac{y^{q-1}}{(1+y)^{p+q}} dy = \int_0^1 \left[\frac{x^{p-1} + x^{q-1}}{(1+x)^{p+q}} \right] dx$

12M 5 3

OR

11. Prove that (i) $\beta(m, 1/2) = 2^{2m-1} \beta(m, m)$
(ii) $\Gamma(m)\Gamma(m + 1/2) = \frac{\sqrt{\pi}}{2^{2m-1}} \Gamma(2m)$

12M 5 3

*** End ***