

Hall Ticket Number :										
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R-20

Code: 20AC12T

I B.Tech. I Semester Regular & Supplementary Examinations April/May 2022

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 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	Blooms Level
a) Define double refraction in polarization. Give example.	CO1	L1
b) List the types of polarization in dielectrics	CO2	L1
c) State Poynting theorem of electromagnetic theory.	CO3	L1
d) Mention the applications of Hall Effect in semiconductors.	CO4	L1
e) Why magnetic flux expels from a superconductor in the superconducting state?	CO5	L3

PART-B

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

Marks	CO	Blooms Level
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UNIT-I

2. a) Explain Newton's rings in interference of light.	4M	CO1	L2
b) Deduce an equation for wavelength of light from Newton's rings.	8M	CO1	L3

OR

3. a) Discuss Fraunhofer diffraction due to single slit experiment.	6M	CO1	L2
b) Obtain maxima and minima conditions for single slit experiment.	6M	CO1	L3

UNIT-II

4. a) Explain frequency dependance of polarization in dielectrics.	6M	CO2	L2
b) Write a short note on ferroelectricity?	6M	CO2	L1

OR

5. a) Define magnetic susceptibility and permeability.	4M	CO2	L1
b) Classify magnetic materials based on their properties.	8M	CO2	L4

UNIT-III

6. a) Discuss Stoke's theorem and prove it. 8M CO3 L2
 b) Write electromagnetic wave propagation Maxwell equations. 4M CO3 L2

OR

7. a) Define acceptance angle and numerical aperture of a fibre. 4M CO3 L1
 b) Explain propagation of light through an optical fibre. 8M CO3 L2

UNIT-IV

8. a) Classify solids based on energy bands. 6M CO4 L4
 b) Calculate density of majority charge carriers of p-type semiconductor. 6M CO4 L3

OR

9. a) Define Hall Effect in semiconductors. 4M CO4 L1
 b) Derive an equation for Hall Coefficient. 8M CO4 L3

UNIT-V

10. a) Discuss the properties of superconductors. 6M CO5 L2
 b) Explain Meissner's effect of superconductors. 6M CO5 L2

OR

11. a) What is the basic significance of nanomaterials? 4M CO5 L1
 b) Explain the properties of nanomaterials. 8M CO5 L2

*** End ***

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R-20

Code: 20A511T

I B.Tech. I Semester Regular & Supplementary Examinations April/May 2022

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 ALL the following short answer questions (5 X 2 = 10M)	CO	Blooms Level
a) What is the difference between a pseudo code and flow chart? Show both notations for adding two natural numbers.	1	L2
b) What is the difference between while and do-while?	2	L2
c) Write the syntax of strlen() and strcat() functions.	3	L1
d) What is pointer and declare pointer array?	4	L1
e) What is the difference between structure and union?	5	L1

PART-B

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

	Marks	CO	Blooms Level
UNIT-I			
2. a) What are the various steps to solve a problem? Explain them by taking an example.	6M	1	L2
b) Draw a flow chart to find the largest of three numbers in C.	6M	1,5	L2
OR			
3. a) What are the various kinds of operators in C. Explain any four types with examples?	6M	1	L2
b) How can we classify different data types in C. Explain them.	6M	1	L2
UNIT-II			
4. a) Explain selection sort algorithm with an example.	6M	2,5	L2
b) What is an Array? How to declare and initialize an Array. Explain with an example.	6M	2,5	L3
OR			
5. a) Explain Binary Search Algorithm with an example.	6M	2,5	L2

- b) You are given the height H (in metres) and mass M (in kilograms) of your friend. The Body Mass Index (BMI) of a person is computed as M/H^2 .

Report the category into which your friend falls, based on his BMI:

Category 1: Underweight if BMI < 18

Category 2: Normal weight if BMI $\in \{19, 20, \dots, 24\}$

Category 3: Overweight if BMI $\in \{25, 26, \dots, 29\}$

Category 4: Obesity if BMI ≥ 30

6M 2,5 L3

UNIT-III

6. a) What are the advantages of using Functions? How do we declare Functions in C. 6M 3 L2
- b) Write a program to find the factorial of a given number using recursion. 6M 3,5 L3

OR

7. a) Explain various storage classes in C with an example. 6M 4 L2
- b) What is the role of Preprocessor in the Compilation process and explain two preprocessor directives. 6M 4 L2

UNIT-IV

8. a) Define void pointer. Where we use this concept? Give an example for it. 6M 4 L2
- b) Write a program to exchange two values using pointers. 6M 4 L3

OR

9. a) Distinguish between array of pointers and pointer to array with examples. 6M 4 L2
- b) List the functions used in the dynamic memory allocation. Explain each function with an example. 6M 4 L2

UNIT-V

10. a) Describe about various file opening modes in C. 6M 4 L2
- b) Write a program to compare two files, printing the first line where they differ. 6M 4,5 L3

OR

11. a) What are the different ways to access the members of structure elements in C. Give example for each case? 6M 4 L2
- b) Write a C program to perform average of three number using files. Assume input numbers are existing in a file with name input.txt and result need to be saved in another file with the name output.txt 6M 4,5 L3

*** End ***

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R-20

Code: 20A211T

I B.Tech. I Semester Regular & Supplementary Examinations April/May 2022

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 | Blooms Level |
|--|-----|--------------|
| a) Define Linear and Non Linear Elements. | CO1 | BL1 |
| b) Find the equivalent capacitance of Parallel combination of Three Capacitances with 2microfarads each. | CO2 | BL4 |
| c) Necessity of SFU. | CO3 | BL1 |
| d) What are the Components of Thermal power station? | CO4 | BL2 |
| e) Draw the VI Characteristics of PV Cell | CO5 | BL2 |

PART-B

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

- | | Marks | CO | Blooms Level |
|---|-------|-----|--------------|
| UNIT-I | | | |
| 2. a) Classify the circuit elements and write the voltage, current and power relations. | 8M | CO1 | L2 |
| b) Write short notes on BH curve. | 4M | CO1 | L1 |

OR

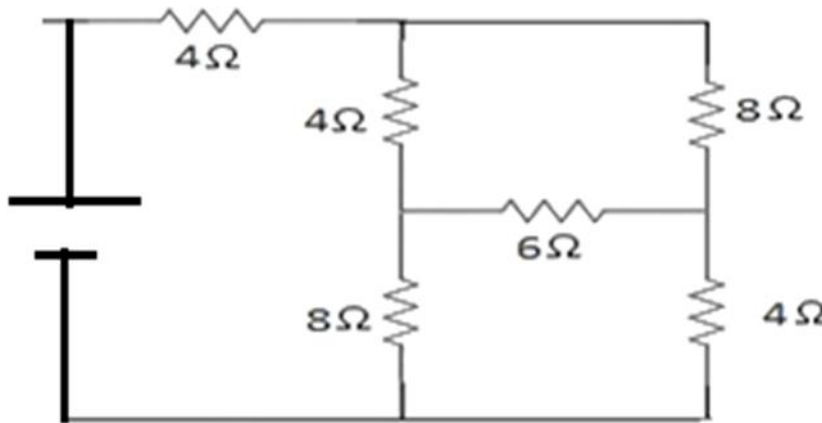
- | | | | |
|---|----|-----|-----|
| 3. a) Discuss the faradays law of electromagnetic induction with neat sketch. | 6M | CO1 | BL2 |
| b) Discuss about Cork screw rule. | 6M | CO1 | BL2 |

UNIT-II

- | | | | |
|--|----|-----|-----|
| 4. a) Find the total current passed through the circuit consisting of three resistors connected in parallel across the supply of 25V. Where $R_1=12$, $R_2=10$, $R_3=20$. Also find the current passed through individual resistances R_1 , R_2 and R_3 . | 8M | CO2 | BL4 |
| b) Write a short notes on voltage division rule. | 4M | CO2 | BL2 |

OR

5. a) Find the current supplied by the battery of 10V using star delta transformation for the given Circuit.



8M CO2 BL4

- b) Define i)KCL ii)KVL iii)Ohms Law

4M CO2 BL2

UNIT-III

6. a) Classify the Measuring instruments.
b) Distinguish between Wires and Cables.

05 CO3 BL2

07 CO3 BL2

OR

7. a) Distinguish between Electrical and Electronic Instruments
b) Write a short notes on i) Function Generator ii)Oscilloscope

07 CO3 BL2

05 CO3 BL2

UNIT-IV

8. a) Draw the structure of the power system
b) Discuss the working principle of Nuclear power station

6M CO4 BL2

6M CO4 BL2

OR

9. a) Discuss the Principle of Operation of Nuclear Reactor.
b) Discuss the working principle of Thermal power station

6M CO4 BL2

6M CO4 BL2

UNIT-V

10. Discuss the horizontal and vertical axis wind turbines with applications

12M CO5 BL2

OR

11. Discuss the i) Solar Power Generation ii) Wind power Generation

12M CO5 BL2

*** End ***

Hall Ticket Number :

R-20

Code: 20AC11T

I B.Tech. I Semester Regular & Supplementary Examinations April/May 2022

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

PART-A

(Compulsory question)

1. Answer ALL the following short answer questions (5X2= 10M)

CO Blooms Level

a) Find the rank of $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & 4 & -8 \end{bmatrix}$

CO1 L3

- b) Define index and signature of a quadratic form.

CO2 L2

- c) Define total derivative in partial differentiation

CO3 L2

d) Evaluate $\int_{x=0}^1 \int_{y=0}^2 \int_{z=0}^2 x^2 yz dx dy dz$

CO4 L3

- e) Define beta function and explain two properties

CO5 L2

PART-B

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

Marks CO Blooms Level

UNIT-I

2. a) Find the value of '}' such that the system
 $2x + y + 2z = 0, x + y + 3z = 0, 4x + 3y + \}z = 0$
has non trivial solutions

6M CO1 L3

- b) Find the Eigen values and Eigen vectors of the matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

6M CO1 L2

OR

3. a) Reduce the matrix $\begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 3 \\ 1 & 3 & 4 & 1 \end{bmatrix}$ to normal form and find its rank.

6M CO1 L3

- b) Find the Eigen values and the corresponding Eigen vectors

$$\text{of } A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$$

6M CO1 L2

UNIT-II

4. Verify Cayley – Hamilton theorem for

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \text{ and hence find } A^{-1} \text{ and } A^6$$

12M CO2 L3

OR

5. Reduce the quadratic form

$$Q = 6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 - 2x_2x_3 + 4x_3x_1$$

into canonical form and find its nature.

12M CO2 L3

UNIT-III

6. a) Expand the Taylor's series expansion of $\text{Sin}x$ in powers of

$$\left(x - \frac{f}{4}\right)$$

6M CO3 L3

- b) If $U = f(2x - 3y, 3y - 4z, 4z - 2x)$ then find the

$$\text{value of } \frac{1}{2} \frac{\partial U}{\partial x} + \frac{1}{3} \frac{\partial U}{\partial y} + \frac{1}{3} \frac{\partial U}{\partial z}$$

6M CO3 L2

OR

7. a) If $x = r \text{Sin} \theta \text{ Cos} \phi, y = r \text{Sin} \theta \text{ Sin} \phi, z = r \text{Cos} \theta$,

$$\text{then find } \frac{\partial(x, y, z)}{\partial(r, \theta, \phi)}$$

6M CO3 L3

- b) A rectangular open box of capacity 32 cubic units is to be prepared. Find the dimensions of the box, to minimize the cost of painting outside.

6M CO3 L2

UNIT-IV

8. a) Evaluate $\int \int (x^2 + y^2) dx dy$ in the positive quadrant for

$$\text{which } x + y \leq 1$$

6M CO4 L3

b) Evaluate $\int_{y=1}^e \int_{x=1}^{\log y} \int_{z=1}^{e^x} \log z \, dz \, dx \, dy$

6M CO4 L2

OR

9. Evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy \, dx$ by changing the order of the integration

12M CO4 L2

UNIT-V

10. a) Derive the relation between Beta and Gamma functions

6M CO5 L3

b) Evaluate $\int_0^{\infty} \sqrt{x} e^{-x^2} \, dx$

6M CO5 L4

OR

11. a) Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{f}$

6M CO5 L3

b) Evaluate $\int_0^{\frac{f}{2}} \sqrt{\cot u} \, du$

6M CO5 L4

*** End ***