

Hall Ticket Number :									
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<b>R-20</b>
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**Code: 20AC12T**

I B.Tech. I Semester Supplementary Examinations November 2021

**Applied Physics**  
( Common to EEE & ECE )

Max. Marks: 70

Time: 3 Hours

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- 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)

- |  |                 |  |     |  |                 |
|--|-----------------|--|-----|--|-----------------|
| <b>1. Answer ALL the following short answer questions</b>                | ( 5 X 2 = 10M ) |  | CO  |  | Blooms<br>Level |
| a) Distinguish between interference and diffraction.                     |                 |  | CO1 |  |                 |
| b) Explain Ferroelectricity and with examples. Mention its applications. |                 |  | CO2 |  |                 |
| c) State four Maxwell's equations.                                       |                 |  | CO3 |  |                 |
| d) Mention the applications of semiconductors                            |                 |  | CO4 |  |                 |
| e) Define Nanotechnology, Nano scale.                                    |                 |  | CO5 |  |                 |

**PART-B**

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

- |   | Marks | CO  | Blooms<br>Level |
|---|-------|-----|-----------------|
| <b>UNIT-I</b>   |       |     |                 |
| 2. a) Explain the construction working and application of Nicol's Prism   | 5M    | CO1 |                 |
| b) Mathematically evaluate that the brightness and bright fringe width changes with the order in Diffraction through single slit.                 | 7M    | CO1 |                 |
| <b>OR</b>   |       |     |                 |
| 3. a) Explain Newton's rings experiment by reflection. Comment on the brightness of the central fringe and the fringe width of the Newton's rings | 8M    | CO1 |                 |
| b) Two coherent sources whose intensity is 81:1 produce interference fringes. Deduce the ratio of maximum intensity to minimum intensity.         | 4M    | CO1 |                 |
| <b>UNIT-II</b>  |       |     |                 |
| 4. a) Define local/internal field and deduce an expression for local/internal field in dielectrics.   | 7M    | CO2 |                 |
| b) What are soft and hard magnetic materials? Give their characteristic properties and applications   | 5M    | CO2 |                 |
| <b>OR</b>   |       |     |                 |
| 5. a) Define electronic polarization and derive an expression for electronic polarizability.  | 6M    | CO2 |                 |
| b) What is Hysteresis? How would you use the hysteresis curve for selecting the material for use as permanent magnet?                             | 6M    | CO2 |                 |

**UNIT-III**

6. a) Derive the Electro Magnetic wave equation for non-conducting medium 6M CO3  
b) Explain the different types optical fibers based on refractive index profile in detail. 6M CO3

**OR**

7. a) State and prove Gauss divergence theorem 6M CO3  
b) Provide a detailed description of an optical fiber used in communication system with block diagram. 6M CO3

**UNIT-IV**

8. a) Deduce an expression for the concentration of electrons in the conduction band of an 'n' type semiconductor. 7M CO4  
b) Explain the terms carrier generation, recombination, Drift, diffusion 5M CO4

**OR**

9. a) Define Hall effect. And how it is used to find the type of semiconductor by an experiment. 7M CO4  
b) Discuss the dependence of Fermi energy on carrier concentration and temperature 5M CO4

**UNIT-V**

10. a) Explain Meissner effect. Discuss DC and AC Josephson effect. 7M CO5  
b) In detail explain one of the methods of fabrication of Nanomaterials. Mention any four applications of Nanotechnology. 5M CO5

**OR**

11. a) What are Type-I and Type-II superconductors? Explain 6M CO5  
b) Discuss about surface to volume ratio and quantum confinement. 6M CO5

\*\*\* End \*\*\*

Hall Ticket Number :										
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**R-20**

**Code: 20A411T**

I B.Tech. I Semester Supplementary Examinations November 2021

**Basic Electrical and Electronics Engineering**

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

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- 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)

- |  |                 |     |              |
|--|-----------------|-----|--------------|
| <b>1. Answer ALL the following short answer questions</b>            | ( 5 X 2 = 10M ) | CO  | Blooms Level |
| a) State the Ohm's law.  |                 | CO1 | L1, L2       |
| b) State Kirchhoff's Voltage law.                                    |                 | CO2 | L1, L2       |
| c) What is a Insulator, Semiconductor and a Conductor?               |                 | CO3 | L1, L2       |
| d) Define Peak Inverse Voltage (PIV).                                |                 | CO4 | L1, L2       |
| e) For common base configuration, $\beta = \underline{\hspace{2cm}}$ |                 | CO5 | L1, L2       |

**PART-B**

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

Marks    CO    Blooms Level

**UNIT-I**

- |  |    |     |        |
|--|----|-----|--------|
| 2. a) What is an Active and Passive Element? Explain briefly.                    | 6M | CO1 | L1, L2 |
| b) What is a function generator? Briefly explain its working principle and uses. | 6M | CO1 | L1, L2 |

**OR**

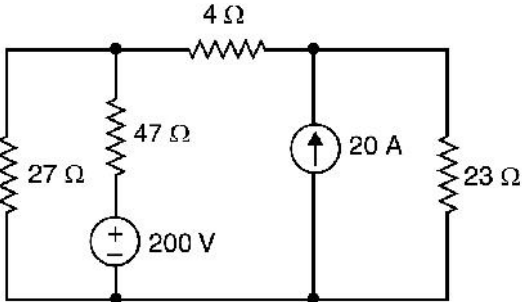
- |  |     |     |        |
|--|-----|-----|--------|
| 3. What is a CRO? Elaborate in detail about the construction and working of a CRO. | 12M | CO1 | L1, L2 |
|--|-----|-----|--------|

**UNIT-II**

- |  |    |     |        |
|--|----|-----|--------|
| 4. a) Explain briefly about Maximum power theorem.                               | 6M | CO2 | L1, L2 |
| b) Discuss about Kirchhoff's voltage and Current laws with the help of examples. | 6M | CO2 | L1, L2 |

**OR**

- |  |    |     |        |
|--|----|-----|--------|
| 5. a) State Thevenin's theorem.  | 2M | CO2 | L1, L2 |
| b) Apply superposition theorem, find the current in 23 $\Omega$ resistor in the circuit shown in Figure. |    |     |        |



10M    CO2    L2, L3

**UNIT-III**

6. a) Write in detail about classification of semi-conductors. 6M CO3 L1, L2  
b) What is meant by Zener breakdown and explain the operation of a Zener diode. 6M CO3 L1, L2

**OR**

7. a) With the help of necessary diagrams, explain the formation of a P-N Junction Diode. 6M CO3 L1, L2  
b) Discuss the Volt-Ampere characteristics of a P-N Diode under reverse-bias condition. 6M CO3 L1, L2

**UNIT-IV**

8. a) What are rectifiers? Classify them. 6M CO4 L1, L2  
b) Construct and explain the Half-wave rectifier in detail. 6M CO4 L1, L2

**OR**

9. a) Describe the L-Section (Choke) filter with help of a diagram. 6M CO4 L1, L2  
b) Elaborate on Capacitor filter with necessary figures. 6M CO4 L1, L2

**UNIT-V**

10. Write in detail about NPN Transistor and PNP Transistor. 12M CO5 L1, L2

**OR**

11. Explain in detail the operation, Input and output characteristics of a transistor in Common Base Configuration. 12M CO5 L1, L2

**\*\*\* End \*\*\***

**Code: 20A312T**

I B.Tech. I Semester Supplementary Examinations November 2021

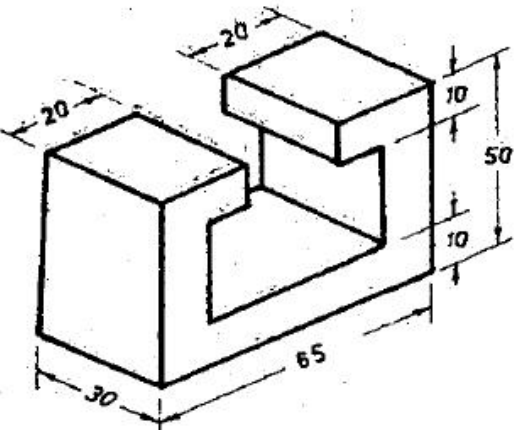
**Engineering Drawing**  
( Common to CE, EEE & ECE )

Max. Marks: 70

Time: 3 Hours

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

		Marks	CO	Blooms Level
<b>UNIT-I</b>				
1.	Construct a parabola with the distance of the focus from the directrix as 50. Also draw normal and tangent to the curve at a point 40 from the directrix	14M	CO1	L1,L2
<b>OR</b>				
2.	A coin of 40mm diameter rolls over a horizontal table without slipping. A point on the circumference of the coin is in contact with the table surface in the beginning and after one complete revolution. Draw the path traced by the point. Draw a tangent and normal at any point on the curve.	14M	CO1	L1,L2
<b>UNIT-II</b>				
3.	A point 'P' is 15 mm above the H.P and 20 mm in front of the V.P. Another point 'Q' is 25 mm behind the V.P and 40 mm below the H.P. Draw the projections of 'P' and 'Q' keeping the distance between the projectors equal to 90 mm. Draw straight lines joining (a) their top views and (b) their front views.	14M	CO2	L1,L2
<b>OR</b>				
4.	A line CD of length 70 mm has its end 'C' 25 above the H.P and 20 mm in front of the V.P and its end 'D' is 70 mm above the H.P and 40 mm in front of the V.P. Draw its projections. Also determine its inclination with the two planes.	14M	CO3	L2,L1,L4
<b>UNIT-III</b>				
5.	A regular pentagon ABCDE of side 30 mm has one of its edges parallel to the V.P. and inclined at 30° to H.P. The pentagon is inclined at 45° to the V.P. Draw the projections	14M	CO3	L2,L1,L4
<b>OR</b>				
6.	A circular lamina of 50 mm diameter is resting on the HP such that the surface of the lamina is inclined at 30° to the HP. The diameter through the point on which the lamina rests on the HP is inclined at 60° to VP. Draw its projections.	14M	CO4	L2,L3
<b>UNIT-IV</b>				
7. a)	Draw the projections of a triangular prism, side of base 30mm and axis 50mm long is resting on H.P. on one of its bases when a face perpendicular to V.P.	7M	CO4	L2,L1,L4
b)	Draw the projections of a cone of base 30mm diameter and axis 50mm long, when it is resting on H.P. on its base.	7M	CO4	L2,L1,L4
<b>OR</b>				
8.	A hexagonal pyramid, base 25 mm and axis 50 mm long, has an edge of its base on the ground. Its axis is inclined at 30° to the ground and parallel to the VP. Draw its projections.	14M	CO5	L2,L3
<b>UNIT-V</b>				
9.	Draw the isometric view of a pentagonal prism of base 60mm side, axis 100 mm long and resting on its base with a vertical face perpendicular to V.P.	14M	CO5	L2,L3
<b>OR</b>				
10.	Draw the FV, TV and LSV of the following figure			
				
		14M	CO1	L2,L3

\*\*\* End \*\*\*

Hall Ticket Number :

R-20

Code: 20A511T

I B.Tech. I Semester Supplementary Examinations November 2021

**Problem Solving through C Programming**

( Common to All Branches)

Max. Marks: 70

Time: 3 Hours

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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. | <b>Answer ALL the following short answer questions</b>  | ( 5 X 2 = 10M ) | CO  | Blooms Level |
| a) | Evaluate the expressions given below if a=10, b=20:<br>(i) $a/b + (a / (2 * b))$ (ii) $a \% 6 / b\%3$ |                 | CO1 | L5           |
| b) | Differentiate between break and continue.   |                 | CO2 | L2           |
| c) | Discuss about some string functions   |                 | CO3 | L2           |
| d) | Define structures.  |                 | CO4 | L4           |
| e) | Write any five functions used in file i/o operations.   |                 | CO5 | L2           |

**PART-B****Answer any five full questions by choosing one question from each unit ( 5 x 12 = 60 Marks )**

- |                |  | Marks | CO  | Blooms Level |
|----------------|--|-------|-----|--------------|
| <b>UNIT-I</b>  |  |       |     |              |
| 2.             | a) Draw a flowchart for displaying the sum of n numbers. Accept 'n' from user.   | 6M    | CO1 | L6           |
|                | b) What is a conditional expression operator? Use conditional expression operator to determine smallest of two numbers.  | 6M    | CO1 | L1           |
| <b>OR</b>      |  |       |     |              |
| 3.             | a) Write an algorithm and draw flowchart for finding greatest among three given numbers.   | 6M    | CO1 | L3           |
|                | b) Explain about type conversions. Why there is a need to have them? Explain with suitable example.  | 6M    | CO1 | L2           |
| <b>UNIT-II</b> |  |       |     |              |
| 4.             | a) What is the need of the iterations and selection? Explain each of the statements with examples.   | 6M    | CO2 | L1           |
|                | b) Write a program that asks user an arithmetic operator ('+', '-', '*' or '/') and two operands and perform the corresponding calculation on the operands. Use a switch statement | 6M    | CO2 | L3           |
| <b>OR</b>      |  |       |     |              |
| 5.             | a) Differentiate between entry- control and exit-control loops with an example   | 6M    | CO2 | L2           |
|                | b) Write a program to find smallest and largest numbers in a given array using Bubble Sort.  | 6M    | CO2 | L3           |

UNIT-III
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- |    |   |    |     |    |
|----|---|----|-----|----|
| 6. | a) How to declare string? Differentiate between character array and strings?      | 6M | CO3 | L1 |
|    | b) Demonstrate about different string functions which can be performed on strings | 6M | CO3 | L3 |

OR

- |    |  |    |     |    |
|----|--|----|-----|----|
| 7. | a) Write a C program to find the average of n numbers using functions                | 6M | CO3 | L3 |
|    | b) How many types of storage classes does C supports? What is the necessity of each? | 6M | CO3 | L1 |

UNIT-IV
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- |    |  |    |     |    |
|----|--|----|-----|----|
| 8. | a) Write a program to swap two numbers using pointers.                 | 6M | CO4 | L1 |
|    | b) Elaborate the importance of dynamic memory allocation with example. | 6M | CO4 | L2 |

OR

- |    |  |    |     |    |
|----|--|----|-----|----|
| 9. | a) How can a pointer be used to access individual elements of an array? Explain with an example. | 6M | CO4 | L1 |
|    | b) Explain Advantages and Drawbacks of Pointers.   | 6M | CO4 | L2 |

UNIT-V
--------

- |     |   |    |     |    |
|-----|---|----|-----|----|
| 10. | a) Differentiate union and structures? Explain both with examples.                                | 6M | CO5 | L1 |
|     | b) Define and declare a structure to store date, which including day, month and year and explain. | 6M | CO5 | L2 |

OR

- |     |   |    |     |    |
|-----|---|----|-----|----|
| 11. | a) Differentiate between text files and binary files? Discuss about the concept of a file | 6M | CO5 | L2 |
|     | b) Write a program to open a file and read the file and print the file contents.          | 6M | CO5 | L1 |

\*\*\* End \*\*\*

Hall Ticket Number :										
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<b>R-20</b>
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**Code: 20AC11T**

I B.Tech. I Semester Supplementary Examinations November 2021

**Algebra and Calculus**  
( Common to All Branches )

Max. Marks: 70

Time: 3 Hours

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- 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. <b>Answer ALL the following short answer questions</b> ( 5 X 2 = 10M )	CO	Blooms Level
a) Find the Rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix}$	1	1,2
b) State Cayley-Hamilton theorem	2	1
c) Obtain Meclaurin's series for $f(x) = \sin x$	3	1,2
d) Find $\int_0^1 \int_0^1 (x + y) dx dy$	4	1,2
e) Define Beta function	5	1

**PART-B**

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

	Marks	CO	Blooms Level
<b>UNIT-I</b>			
2. a) Find the rank of the matrix $\begin{bmatrix} 1 & -2 & 0 & 1 \\ 2 & -1 & 1 & 0 \\ 3 & -3 & 1 & 1 \\ -1 & -1 & -1 & 1 \end{bmatrix}$ by echelon form	6M	1	1,2
b) Find whether the following equations are consistent, if so solve them. $x+y+2z=4; 2x-y+3z=9; 3x-y-z=2$	6M	1	1,2

**OR**

3. Find the eigen values and the corresponding eigen vectors of			
$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	12M	1	1,2

**UNIT-II**

4. Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ and hence find $A^{-1}$ and $A^4$	12M	2	1,2
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**OR**



5. Reduce the quadratic form  $3x^2+5y^2+3z^2-2xy-2yz+2zx$  to the normal form by orthogonal transformation 12M 2 1,2

## UNIT-III

6. a) If  $u = x^2 - 2y, v = x + y + z, w = x - 2y + 3z$  then  $\frac{\partial(u, v, w)}{\partial(x, y, z)}$  6M 3 1,2  
 b) Find the maximum and minimum values of  $f(x, y) = x^3 + y^3 - 3axy$  6M 3 1,2

## 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 3 1,2

## UNIT-IV

8. a) Evaluate  $\int_0^a \int_0^{\sqrt{a^2-y^2}} \sqrt{a^2-x^2-y^2} dx \cdot dy$  6M 4 1,2  
 b) Evaluate  $\int_0^{\frac{f}{4}} \int_0^{a \sin r} \frac{r}{\sqrt{a^2-r^2}} dr \cdot d_{\theta}$  6M 4 1,2

## OR

9. Change the order of integration and evaluate  $\int_0^1 \int_{x^2}^{2-x} x y dx \cdot dy$  12M 4 1,2

## UNIT-V

10. a) Evaluate  $\int_0^{\infty} e^{-2x} \cdot x^{5/2} dx$  ii) Show that  $\int_0^{\infty} x^4 e^{-x^2} dx = \frac{3\sqrt{f}}{8}$  6M 5 1,2  
 b) State and prove Relation between Beta and Gamma functions 6M 5 1,2

## OR

11. a) Evaluate  $\int_0^{\infty} \frac{x^2}{\sqrt{1-x^5}} dx$  in terms of S function 6M 5 1,2  
 b) Show that  $\int_0^{\frac{f}{2}} \sin^2 \theta \cos^4 \theta d_{\theta} = \frac{f}{32}$  6M 5 1,2

\*\*\* End \*\*\*