B.Tech. I Semester Regular Examinations January 2024
Engineering Graphics
(CSE (AI) and ECE)

Max. Marks: 70   Time: 3 Hours

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

				Marks	CO	BL

UNIT-I

1. a) Construct a regular pentagon and hexagon of side 30mm by general method. — 10M — 1 — BL1

   b) Bisect a straight line AB of length 75mm. — 4M — 1 — BL1

OR

2. A circle of diameter 50mm rolls on the outside of another circle of diameter 180mm without slipping. Draw the path traced by appoint on the smaller circle and also draw the normal and tangent to the curve generated. — 14M — 1 — BL2

UNIT-II

3. Draw the projections of the following points on a common reference line keeping the distance between their projectors 25mm apart.
   a) Point A is 40mm above the H.P. and 25mm in front of the V.P.
   b) Point B is 40 mm above the H.P and on the V.P.
   c) Point C is 25 mm in front of V.P and on the H.P
   d) Point D is 25 mm above the H.P and 30 mm behind the V.P.
   e) Point E is on the H.P and 30 mm behind the V.P
   f) Point F is 40 mm below the H.P and 30 mm behind the V.P.
   g) Point G is 25 mm below the H.P and 40 mm in front of V.P — 14M — 2 — BL2

OR

4. One end P of a line PQ 55 mm long is 35 mm in front of VP and 25 mm above the HP. The line is inclined at 40° to the HP and 30° to the VP. Draw the Projections of the line P — 14M — 2 — BL2

UNIT-III

5. A hexagonal lamina of side 35 mm rests on the HP on one of its side perpendicular to the VP. Draw its projections when its surface is inclined at 50° to the HP. — 14M — 2 — BL2

OR

6. A cylinder of diameter 30 mm and axis length 50 mm is resting on the HP on it base point, so that is axis inclined at 45° to the HP and parallel to the VP. Draw its top and front view. — 14M — 3 — BL2

UNIT-IV

7. A square prism of base side 30 mm and axis length 70 mm rests on one of its ends on the HP with two base sides parallel to the VP. It is cut by a plane perpendicular to the VP and inclined at 30° to the HP. The cutting plane meets the axis at 30 mm from the top base. Draw the front view, sectional top view and true shape of the section. 14M 4 BL2
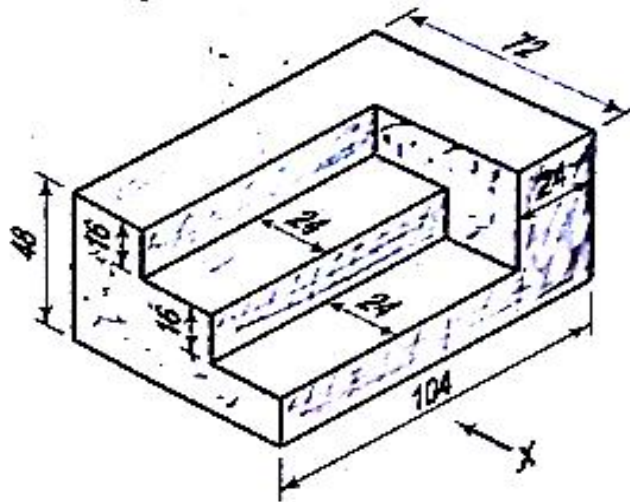
OR

8. A square prism of base side 25 mm and height 50 mm. Draw the development of all the surfaces of the prism. 14M 4 BL2
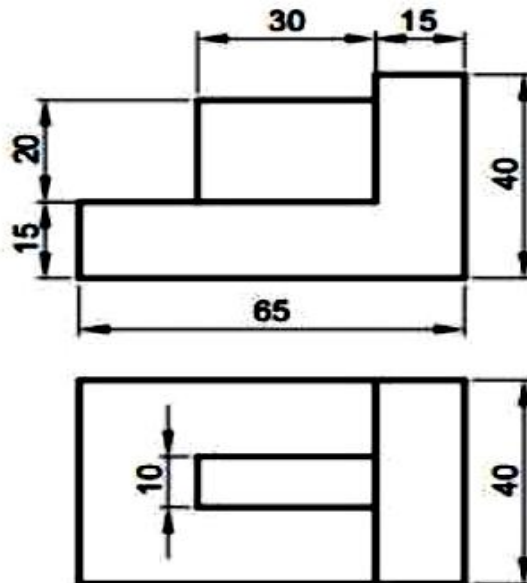
UNIT-V

9. Draw the (i) Front view (ii) Top View (iii) Side view of the Following Isometric Drawing.

14M 5 BL3

OR

10. Draw the isometric view of the following orthographic views.

14M 5 BL3

*** End ***

Q.P.Code: 23A0312T -B

R-23

B.Tech. I Semester Regular Examinations January 2024
Engineering Graphics
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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

		Marks	CO	BL

UNIT-I

1. Draw a parabola whose focus is at a distance of 50 mm from the directrix. Draw a normal and tangent to the parabola at a point 35mm from the focus. **14M 1 2**

OR

2. A circle of diameter 50 mm rolls inside of another circle of diameter 200 mm without slipping. Draw the path traced by appoint on the smaller circle and also draw the normal and tangent to the curve generated. **14M 1 2**

UNIT-II

3. Draw the projections of the following points on a common reference line keeping the distance between their projectors 30mm apart.
   a) Point A is 20 mm below the H.P and 50 mm in front of the V.P
   b) Point B is in the H.P and 40 mm behind the V.P.
   c) Point C is 30 mm in front of the V.P and in the H.P
   d) Point D is 50 mm above the H.P and 30 mm behind the V.P
   e) Point E is 20 mm below the H.P and 50 mm behind the V.P
   f) Point F is in the V.P. and 50 mm below the H.P.
   g) Point D is 50 mm above the H.P. and 30 mm In front the V.P. **14M 2 2**

OR

4. A line EF 85 mm long has its end E 25mm above the HP and 20mm in front o the VP. The top and front views of the line have lengths of 55 mm and 70 mm respectively. Draw the projections o the line and find its true inclinations with the VP and the HP. **14M 2 2**

UNIT-III

5. A circular lamina of diameter 60 mm is held vertical with its surface inclined at 45° to the VP. Its center is 40 mm above the HP and 30 mm in front of the VP. Draw its front view and top view. **14M 2 2**

OR

6. A hexagonal pyramid of base edge 40 mm and altitude 80 mm rests on one of its base edge on the HP with its axis inclined at 30° to the HP and parallel to the VP. Draw its projections. **14M 3 2**

UNIT-IV

7. A hexagonal pyramid of base side 25 mm and axis 55 long rests on its base on the HP with two base edges perpendicular to the VP. It is cut by a plane perpendicular to VP and inclined at 30° to the HP meeting the axis at 20 mm from the vertex. Draw the sectional top view and true shape of the section. 14M 4 2

OR

8. A cylinder of diameter 40 mm and height 50 mm is resting vertically on one of its base on the HP. It is cut by a plane perpendicular to the VP and inclined at 30° to the HP. The plane meets the axis at a point 30 mm from the base. Draw the development of the lateral surface of the lower portion of the truncated cylinder. 14M 4 2

UNIT-V

9. Draw the (i) Front view (ii) Top View (iii) Side view of the Following Isometric Drawings
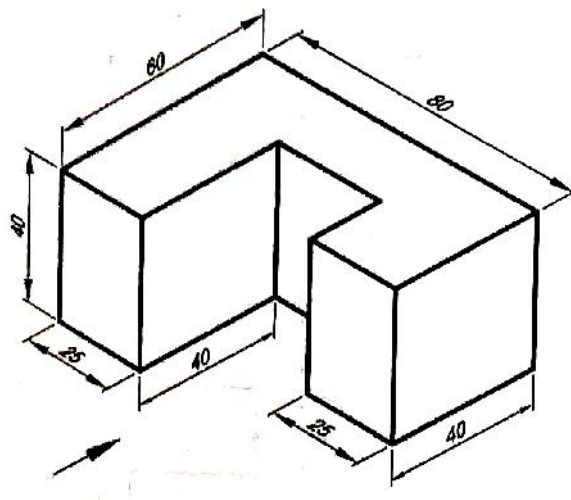
14M 5 3

OR

10. Draw the isometric view of the following orthographic views.

14M 5 3

*** End ***

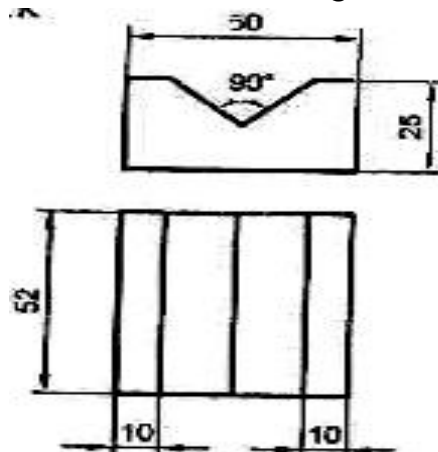**Q.P.Code: 23A0511T**

R-23

B.Tech. I Semester Regular Examinations January 2024
Introduction to 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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions   (10 X 2 = 20M)

		CO	BL
a)	Define flowchart and explain different symbols used for constructing flowchart.	1	1
b)	Evaluate the expression a+b*c/d where a=20, b=10, c=15 and d=5. Also print the value through C program.	1	1
c)	List the control structures in C.	2	1
d)	List the decision-making statements in C.	2	1
e)	Explain recursion with example.	3	1
f)	List the types of functions in C.	3	1
g)	Display the first n natural number with user-defined function	4	1
h)	Compare structure and union in terms of memory allocation with an example	4	1
i)	List basic operations of a file.	5	1
j)	Explain a file opening mode with an example.	5	1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 10 = 50 Marks)

			Marks	CO	BL
		UNIT–I			
2.	a)	Differentiate among compiler, assembler, and interpreter.	5M	1	2
	b)	Discuss tokens in C with examples.	5M	1	2
		OR			
3.	a)	Explain all the data types with their ranges and examples.	5M	1	2
	b)	Summarize Type Conversion and type casting in C.	5M	1	2
		UNIT–II			
4.	a)	Discuss briefly about multi-way selection statements with an example.	5M	2	2
	b)	Write a C program to find the sum of odd numbers using jumping statements.	5M	2	2
		OR			

5. a) Discuss about different format strings in c | 5M | 2 | 2

b) Write a C program to compute the real roots of a quadratic equation $a*x^2 + b*x+c = 0$. The program should request for the values of the constants a, b and c and print the values of root1 and root2.

Use the following rules:

i. No solution, if both a and b are zero There is only one root, if a=0

ii. There are no real roots, if $b^2-4*a*c$ is negative

iii. Otherwise, there are two real roots.

Write a C program to test all the above conditions | 5M | 2 | 4

UNIT–III

6. a) List the string handling function with an example | 5M | 3 | 2

b) Write a C program to copy the string str2 into str1 without using strcpy() function | 5M | 3 | 2

OR

7. a) Explain call by value and call by reference with examples. | 5M | 3 | 2

b) Write a C program to check whether a string is palindrome or not without using string function. | 5M | 3 | 2

UNIT–IV

8. a) Explain usage of structure in terms of definition, declaration and accessing members with syntax and example | 5M | 4 | 2

b) Differentiate structures and unions. | 5M | 4 | 2

OR

9. a) What are pointers? Describe pointer arithmetic with examples | 5M | 4 | 2

b) Explain call by reference mechanism with an example program | 5M | 4 | 2

UNIT–V

10. a) C program to read name and marks of n number of students and store them in a file. | 5M | 5 | 2

b) Write C program that uses both recursive and non-recursive functions to find the sum of n natural numbers. | 5M | 5 | 2

OR

11. a) Write C program that uses both recursive and non-recursive functions to find the factorial of a given number. | 5M | 5 | 2

b) Explain various storage classes in C with an example | 5M | 5 | 2

*** End ***

B.Tech. I Semester Regular Examinations January 2024
Linear 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 marks.**
      3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions   (10 X 2 = 20M)   CO   BL

		CO	BL
a)	Define the rank of a matrix. What is the rank of an identity matrix of order n?	CO1	L1
b)	State Cauchy's Binet formula.	CO1	L1
c)	Show that the Eigen values of a matrix A and its transpose A^1 are same.	CO2	L1
d)	State Cayley-Hamilton theorem.	CO2	L1
e)	Stare Rolle's theorem.	CO3	L1
f)	State Maclaurin's theorem with Lagrange's form of remainder.	CO3	L1
g)	If $f(x, y)= ax^2+2hxy+by^2$, then find its first and second order partial derivatives.	CO4	L2
h)	If $x = r\cos_{_,,}$, $y = r\sin_{_,,}$ then find $J\left(\dfrac{x, y}{r, {_,,}}\right).$	CO4	L2
i)	Evaluate $\displaystyle\int_0^1 \int_0^{\sqrt{1+x^2}} \dfrac{dxdy}{1+x^2+y^2}.$	CO5	L2
j)	Evaluate $\displaystyle\int_0^{\pi} \int_0^{a\frac{2}{2}} x(x^2 + y^2)dx\,dy$	CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 10 = 50 Marks)

                                                            Marks   CO   BL

UNIT–I

2. a) Find the rank of the matrix $B = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$ 5M CO1 L2

   b) Solve by Gauss elimination method the following equations

$$x - 2y + 3t = 2, 2x + y + z + t = -4, 4x - 3y + z + 7t = 8.$$ 5M CO1 L3

OR

3. Show that the system of equations

$$2x_1 - 2x_2 + x_3 = \}x_1, \ 2x_1 - 3x_2 + 2x_3 = \}x_2, -x_1 + 2x_2 = \}x_3$$

can posses a non trivial solution only if $\} = 1, \} = -3$.
Obtain the solution in each case.   10M CO1 L3

UNIT–II

4. Verify Cayley-Hamilton theorem for the following matrix and hence find the inverse $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$

    10M CO2 L3

OR

5. Reduce the following quadratic form $2x_1x_2 + 2x_1x_3 - 2x_2x_3$ into canonical form or sum of squares through orthogonal reduction and hence find the nature.

    10M CO2 L3

UNIT–III

6. State first mean value theorem, and using it prove that $(0 < a < b < 1)$,

$$\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}.$$

Hence show that $\dfrac{f}{4} + \dfrac{3}{25} < \tan^{-1}\dfrac{4}{3} < \dfrac{f}{4} + \dfrac{1}{6}.$

    10M CO3 L3

OR

7. Expand $\log_e^x$ in powers of (x-1) and hence evaluate $\log_e^{1.1}$ correct to 4 decimal places.

    10M CO3 L3

UNIT–IV

8. If $u = x^2 - y^2, v = 2xy$ and $x = r\cos_{\prime\prime}, y = r\sin_{\prime\prime}$, find $\dfrac{\partial(u,v)}{\partial(r,_{\prime\prime})}$.

    10M CO4 L3

OR

9. If u=log(x³ + y³ + z³ − 3xyz) then show that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right)_2 u = -\frac{-9}{(x+y+z)2}$

UNIT–V

10. Change the order of integration in $I = \displaystyle\int_0^1 \int_{x^2}^{2-x} xy\,dx\,dy$ and hence evaluate the same.

    10M CO5 L3

OR

11. Evaluate, by changing to spherical polar coordinates

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

    10M CO5 L4

*** End ***

R-23

Code: 23A0211T

B.Tech. I Semester Regular Examinations January 2024

Basic Electrical & Electronics Engineering

(Common to EEE, ECE, AI&DS and CSE(AI))

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-1** and **Part-2)**

2. Use separate Answer booklets for **Part-1 and Part-2**

3. Part-1 & Part-2 of question paper consists of Part-A & Part-B

4. In Part-A, each question carries **One marks.**

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

PART-1 (Basic Electrical Engineering)

PART-A

(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 1 = 5M)			
a) State the limitations of Ohms law.		1	L2
b) Define power factor in a AC circuit.		1	L1
c) What is the purpose of magnetic core in a transformer?		2	L2
d) List out some of non-conventional energy sources.		3	L2
e) Explain the function of fuse element.		3	L2

PART-B

Answer *five* questions by choosing one question from each unit (3 x 10 = 30 Marks)

Marks   CO   BL

UNIT–I

	Marks	CO	BL
2. a) State and Explain Kirchhoff Laws with examples.	5M	1	L1
b) The voltage and current through circuit elements are			

$v = 100 \sin (314 t + 45°)$ volts

$i = 10 \sin (314 t + 315°)$ amperes

(i) Identify the circuit elements. (ii) Find the value of the elements. (iii) Obtain an expression for power.   5M   1   L3

OR

3. a) An instantaneous voltage of $v(t)=250\sin(wt-20°)V$ is applied to the system. The current flowing through the system is given by $i(t)=20\sin(wt+40°)A$. Find the following parameters

i. Active Power   ii. Reactive Power   iii. Apparent Power and

iv. Power factor of the system   5M   1   L3

b) In the circuit shown, determine the current through the 2ohm resistor and the total current delivered by the battery. Use Kirchhoff's laws
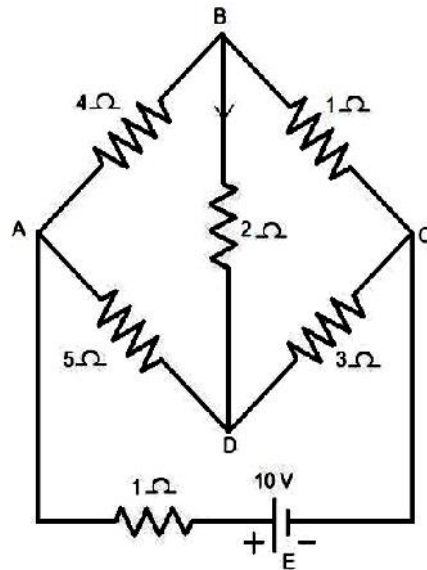
5M 1 L3

UNIT–II

4. a) With neat sketch, Explain the construction and working of DC motor.
5M 2 L2

b) Describe the constructional details of an attraction type MI instrument with the help of a neat diagram.
5M 2 L2

OR

5. a) Define Transformer. Explain the construction and working of single phase transformer.
5M 2 L2

b) Explain the configuration of resistors in a typical Wheatstone bridge setup and mention the type of deflection instrument used.
5M 2 L2

UNIT–III

6. a) Draw the layout of nuclear power plant and explain the function of each component.
5M 3 L2

b) Outline the key safety protocols that should be followed when working with electrical equipment or circuits.
5M 3 L2

OR

7. a) Draw the layout of hydro power plant and explain the function of each component.
5M 3 L2

b) Explain the working principle of Miniature circuit breaker.
5M 3 L2

I B.Tech. I Semester Regular Examinations January 2024
Basic Electrical & Electronics Engineering
(Common to EEE, ECE, AI&DS and CSE(AI))

PART-2(Basic Electronics Engineering)
PART-A
(Compulsory question)

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

		CO	BL
a)	Draw the V-I Characteristics of PN junction diode.	1	1
b)	Draw the circuit diagram of a PNP junction transistor in CE configuration.	1	1
c)	Draw the h-parameter model of basic transistor.	2	2
d)	Draw the structure of D-Flip Flop and write its truth table	3	2
e)	Convert the binary code $(1011011)_2$ into decimal equivalent.	3	3

PART-B
Answer *five* questions by choosing one question from each unit (3 x 10 = 30 Marks)

Marks   CO   BL

UNIT–I

		Marks	CO	BL
2.	Discuss the V-I characteristics of PN Junction diode and explain its various biasing techniques.	10M	1	2

OR

			Marks	CO	BL
3.	a)	Explain the operation of CE Configuration of BJT and its input and output characteristics briefly	8M	1	1
	b)	Classify the various configurations of a transistor	2M	1	2

UNIT–II

			Marks	CO	BL
4.	a)	Sketch the block diagram of Public Addressing System and explain its operation	5M	2	2
	b)	Explain working of RC coupled common emitter amplifier and draw its frequency response.	5M	2	2

OR

			Marks	CO	BL
5.	a)	How is Zener diode used as voltage regulator? Explain the working principle of zener voltage regulator	5M	2	1
	b)	With a neat circuit diagram and necessary wave forms explain the operation of half wave rectifier.	5M	2	2

UNIT–III

			Marks	CO	BL
6.		Describe the working of JK flip flop with help of its truth table	10M	3	2

OR

			Marks	CO	BL
7.	a)	Why a NAND and NOR gates are known as universal gates? Verify their truth tables.	5M	3	1
	b)	Draw and Explain the operation of Half and Full Adder	5M	3	3

*** End ***

R-23

Code: 23AHS15T

B.Tech. I Semester Regular Examinations January 2024

Engineering Physics

(Common to EEE, ECE, CSE(AI) and AI&DS)

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 marks.**

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

PART-A
(Compulsory question)

1. Answer **all** the following short answer questions (10 X 2 = 20M)   CO   BL

		CO	BL
a)	Define interference of light.	CO1	L1
b)	Differentiate between Fresnel and Fraunhofer diffraction.	CO1	L2
c)	Define Space lattice and Basis.	CO2	L1
d)	Write the coordination number and packing fraction of Simple cubic structure.	CO2	L1
e)	Express the relation between electric vectors E, D and P.	CO3	L2
f)	Define magnetic susceptibility and permeability.	CO3	L1
g)	Define Heisenberg's uncertainty principle.	CO4	L1
h)	List any two demerits of classical free electron theory.	CO4	L1
i)	Illustrate the energy band diagrams of conductors, insulators and semiconductors.	CO5	L4
j)	List two applications of Hall effect.	CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 10 = 50 Marks)

Marks   CO   BL

UNIT-I

			Marks	CO	BL
2.	a)	Explain the interference in thin films by reflection.	7M	CO1	L2
	b)	Newton rings are observed in reflected light of wavelength 5900A°. The diameter of 10th dark ring is 0.5cm. Assess the radius of curvature of lens used.	3M	CO1	L5

OR

			Marks	CO	BL
3.	a)	Evaluate the resultant intensity equation in case of Fraunhofer diffraction due to single slit.	5M	CO1	L5
	b)	Describe the working of Nicol's prism with a neat diagram.	5M	CO1	L2

UNIT-II

4. Define packing fraction and evaluate packing fraction of SC and BCC structures. — 10M CO2 L5

OR

5. Explain the crystal structure determination by Laue's method with a neat diagram. — 10M CO2 L2

UNIT-III

6. a) Deduce the expression for electronic polarizability. — 7M CO3 L5

    b) The dielectric constant of He gas at NTP is 1.0000684. Calculate the electronic polarizability of He atoms if the gas contains 2.7×10^{25} atoms /m^3. — 3M CO3 L3

OR

7. a) Qualitatively explain Weiss theory of ferromagnetism and draw the hysteresis loop. — 7M CO3 L4

    b) The magnetic field intensity in a piece of ferric oxide is 10^6 amp/m. If the susceptibility of the material is 1.5×10^{-3}, calculate the magnetization of the material. — 3M CO3 L3

UNIT-IV

8. Give the significance of wave function and determine Schrodinger time independent wave equation. — 10M CO4 L2, L3

OR

9. Determine the expression for electrical conductivity based on quantum free electron theory. — 10M CO4 L3

UNIT-V

10. Derive an expression for density of electrons in intrinsic semiconductor. — 10M CO5 L6

OR

11. a) Discuss drift and diffusion currents. — 4M CO5 L2

    b) Derive Hall co-efficient in hall effect — 6M CO5 L3

*** End ***