CODE: A10201	R23	H.T.No:

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations July/ Aug 2024

Subject Name: Basic Electrical & Electronics Engineering

Branch: CSE

SET-1

Time: 3 Hours **Max. Marks: 70**

Note: Write Part a Answer from pages: 3-18 and part B from 19-34.

PART-A (Electrical Engineering Part) Answer all questions, each question carries one marks					
1	a	Define ohms law.	1M	CO1	L1
	b	Define the terms form factor and peak factor of alternating quantity.	1M	CO2	L1
	c	List types of Electrical Machines.	1M	CO2	L1
	d	What do you mean by grounding or earthing?	1M	CO3	L1
	e	Define unit used for consumption of electrical energy.	1M	CO3	L1
Answer all three units, 03 X 10 = 30 Marks					
UNIT-I					
2	a	State and explain superposition theorem.	5M	CO1	L2
	b	Explain the V-I relationship in R, L and C elements.	5M	CO1	L2
OR					
3	a	Explain the following: i) Real power ii) Reactive power iii) Apparent power.	5M	CO5	L2
	b	Derive the RMS value for a sine waveform.	5M	CO2	L3
UNIT-II					
4		Explain the working principle of a single phase transformer.	10M	CO2	L2
OR					
5		Explain the construction and working of moving iron (MI) instrument With neat diagram?	10M	CO3	L2
UNIT-III					
6		Draw a neat schematic diagram of a Hydro–electric plant and explain the function of various components.	10M	CO5	L4
OR					
7	a	Explain the working principle of miniature circuit breaker (MCB) with neat diagram.	5M	CO5	L2
	b	Define two part tariff and explain how you calculate electricity bill for domestic consumers.	5M	CO4	L2

PART-B (Electronics Engineering Part) Answer all questions, each question carries one marks					
8	a	Write any two characteristics of P-N junction Diode.	1M	CO1	L1
	b	Write the terminals of BJT.	1M	CO1	L1
	c	Draw the block diagram of dc power supply.	1M	CO1	L1
	d	Define Amplifier.	1M	CO2	L1
	e	Write brief note on Gray code.	1M	CO3	L1
Answer all three units, 03 X 10 = 30 Marks					
UNIT-I					
9		Briefly describe the operation of Zener Diode and explain its Characteristics.	10M	CO1	L2
OR					
10		Draw and explain in detail about the input and output characteristics of n-p-n transistor in CE configuration.	10M	CO1	L2
UNIT-II					
11	a	Explain the working of a full wave bridge rectifier with circuit diagram and input output waveforms	5M	CO2	L2
	b	Draw the block diagram of a public address system and explain its working.	5M	CO2	L2
OR					
12	a	Explain the working of an electronic instrumentation system with a block diagram.	5M	CO2	L2
	b	Explain the working of a half wave rectifier with circuit diagram and input output waveforms	5M	CO2	L2
UNIT-III					
13	a	What is a counter. Explain the working of a counter with suitable block diagram and truth table.	5M	CO3	L2
	b	How to convert a Gray code to binary code. Explain with Example.	5M	CO3	L3
OR					
14	a	What are the various logic gates? Give the representation along with truth table.	5M	CO3	L2
	b	Realize a full adder with half adders and explain its working with truth table.	5M	CO3	L3

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CODE: A10504 | **R23** | H.T.No:

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations July 2024
Subject Name: DATA STRUCTURES

Branch: CSE

SET-2

Time: 3 Hours **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	List linear and nonlinear data structures.	2M	CO1	BTL1
	b	What is the difference between Insertion sort and Bubble sort?	2M	CO1	BTL1
	c	List the basic operations carried out in a linked list.	2M	CO2	BTL1
	d	Compare array and linked list.	2M	CO2	BTL2
	e	Mention the applications of stack.	2M	CO3	BTL2
	f	How Stacks and Queues are represented in data structure?	2M	CO3	BTL1
	g	Outline the applications of queue.	2M	CO4	BTL2
	h	Classify the operations that can be performed on DEQUEUE.	2M	CO4	BTL2
	i	How Binary search tree is different from a tree?	2M	CO5	BTL1
	j	Interpret the uses of hash table.	2M	CO5	BTL2
PART-B					
UNIT-I					
2	a	Apply the selection sort on the following elements 21,11,5,78,49, 54,72,89	5M	CO1	BTL3
	b	Explain in detail about Abstract data types (ADTs) and their implementation.	5M	CO1	BTL2
OR					
3	a	Apply binary search and find the average number of comparisons required to find an element 11,15,17,19,21,25,27,29,31.	5M	CO1	BTL3
	b	Explain time and space complexities in detail.	5M	CO1	BTL2
UNIT-II					
4	a	Explain the Insertion and Deletion operations in a doubly linked list.	5M	CO2	BTL5
	b	Write a program to search for a value in a Singly linked list.	5M	CO2	BTL6
OR					
5	a	Explain how to create circular linked list and insert nodes at end.	5M	CO2	BTL5
	b	Given a Singly linked list with each node containing either 0, 1 or 2. Write code to sort the list. Input: 1 -> 1 -> 2 -> 0 -> 2 -> 0 -> 1 -> 0 Output: 0 -> 0 -> 0 ->1 -> 1 -> 1 -> 2 -> 2	5M	CO2	BTL3

UNIT-III					
6	a	Write a program to implement stack using Arrays.	5M	CO3	BTL6
	b	Implement a queue using two stacks.	5M	CO3	BTL4
OR					
7	a	Write an algorithm for basic operations on Stack.	5M	CO3	BTL4
	b	Transform the following expression to postfix expression using stacks. (a+b)*((d-e)+f).	5M	CO3	BTL3
UNIT-IV					
8	a	Write a program to implement queue using Linked List.	5M	CO4	BT3
	b	Explain DEQUEUE and its operations.	5M	CO4	BTL2
OR					
9	a	Discuss the applications of queues in breadth-first search.	5M	CO4	BTL3
	b	Mention the properties and operations of Queue.	5M	CO4	BTL2
UNIT-V					
10	a	Construct a binary search tree for the following 80, 40, 75, 30, 20, 90, 50	5M	CO5	BTL3
	b	Explain Chaining with an example.	5M	CO6	BTL2
OR					
11	a	Define hashing and discuss the different hashing functions with an example.	5M	CO6	BTL1
	b	Discuss the Applications of hashing in unique identifier generation, and caching.	5M	CO6	BTL3

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CODE: A10009 | R23 | H.T.No:

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations July/ Aug 2024

Subject Name: Differential Equations & Vector Calculus

Time: 3 Hours Branch: CSE and ECE **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

		PART-A			
1	a	Find the integral factor of $x(x+1)\frac{dy}{dx} - y = e^{3x}(x+1)^2$.	2M	CO	BTL3
	b	Solve $xdx + ydy = \frac{xdx - ydy}{x^2 + y^2}$	2M	CO1	BTL3
	c	Find the Complementary Function $(D^3+2D^2+D)y = e^{2x}+x^2$	2M	CO1	BTL3
	d	Find the Particular Integral of $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = xe^{3x} + \sin 2x$	2M	CO1	BTL2
	e	Eliminate arbitrary constants a and b from $z = ax + by + a^2 + b^2$.	2M	CO2	BTL2
	f	Form Partial differential equation by eliminating arbitrary function f from $z = f(x^2 + y^2)$.	2M	CO2	BTL3
	g	Find the directional derivative of the function $2xy+ z^2$ at the point (1,-1,3) in the direction of $\bar{i} + 2\bar{j} + 3\bar{k}$	2M	CO3	BTL1
	h	If $\bar{f} = xy^2\,\bar{\imath} + 2x^2yz\bar{\jmath} - 3yz^2\,\bar{k}$ find div$\bar{f}$ and Curl f at the point (1,-1,1)	2M	CO3	BTL4
	i	If $\bar{F} = (5xy - 6x^2)\bar{\imath} + (2y - 4x)\bar{\jmath}$, evaluate $\int_C \bar{F}.d\bar{r}$ along the curve C in the xy – plane $y = x^3$ from the point (1,1) to (2,8).	2M	CO4	BTL5
	j	Define Stoke's theorem.	2M	CO4	BTL1
		PART-B			
		UNIT-I			
2	a	Solve $2xydy - (x^2 + y^2 + 1)dx = 0$	5M	CO1	BTL3
	b	A body is originally at 80^0C and cools down to 60^0C in 20 minutes. If the temperature of the air is 40^0C, find the temperature of the body after 40 minutes.	5M	CO1	BTL5
		OR			
3	a	Solve $\frac{dy}{dx} + x\sin 2y = x^3\cos^2 y$	5M	CO1	BTL3
	b	If the temperature of a body is changing from 100^0c to 70^0c in 15 minutes, find when the temperature will be 40^0c , if the temperature of air is 30^0c.	5M	CO1	BTL4
		UNIT-II			
4	a	Solve the differential equation $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = xe^x \sin x$.	5M	CO1	BTL3
	b	Suppose that the mass in a mass-spring-dashpot system $m\frac{d^2x}{dt^2} + c\frac{dy}{dx} + kx = 0$ with m = 15, c = 10, and is set in motion with and k = 125, with initial conditions x(0) = 10, x′(0) = 31. Find the position function x(t).	5M	CO1	BTL5

OR					
5	a	Solve the differential equation $\frac{d^2y}{dx^2}+4y=tan2x$ by using method of variation of parameters	5M	CO1	BTL3
	b	A condenser of capacity C discharged through an inductance and resistance R in series and the charge q at time t satisfies the equation $L\frac{d^2q}{dt^2}+R\frac{dq}{dt}+\frac{q}{c}=E$. Given that L= 0.25H, R=12.5 ohms, C= 10^{-2} farads, E= 3sin2t, and that when t=0 , charge in the capacitor and current in the circuit are zero. Find the charge q in terms of t.	5M	CO1	BTL4
UNIT-III					
6	a	Solve the partial differential equation $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$	5M	CO2	BTL3
	b	Find the general solution of $\frac{\partial^2 z}{\partial x^2}+2\frac{\partial^2 z}{\partial x\partial y}+\frac{\partial^2 z}{\partial y^2}=sin(2x+3y)$	5M	CO2	BTL4
OR					
7	a	Solve the partial differential equation $$(\mathrm{mz-ny})\frac{\partial z}{\partial x}+(nx-lz)\frac{\partial z}{\partial y}=ly-mx$$	5M	CO2	BTL3
	b	Find the general solution of $r-4s+4t=e^{2x+y}$	5M	CO2	BTL4
UNIT-IV					
8	a	Find the directional derivative of the function f = x^2-y^2+2z^2 at the point P=(1,2,3) in the direction of the line PQ, where Q=(5,0,4).	5M	CO3	BTL4
	b	Prove that (i)$\nabla(r^n)=nr^{n-2}\bar{r}$,(ii) $\nabla(f(r))=\frac{f'(r)}{r}\bar{r}$,where $\bar{r}=x\bar{i}+y\bar{j}+z\bar{k}$.	5M	CO3	BTL5
OR					
9	a	Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point (1,-2,1) in the direction of the vector $2\bar{i}-\bar{j}-2\bar{k}$	5M	CO3	BTL4
	b	Prove that $\nabla^2 f(r)=f''(r)+\frac{2}{r}f'(r)$.	5M	CO3	BTL5
UNIT-V					
10	a	Evaluate $\iint_S \bar{F}.\bar{n}dS$ where $\bar{F}=6z\bar{i}-4\bar{j}+y\bar{k}$ and S is the surface of the plane $2x+3y+6z=12$ in the first octant.	5M	CO4	BTL4
	b	Apply Green's theorem to evaluate $\int_C(3x^2-8y^2)dx+(4y-6xy)dy$ where C is the region bounded by $y=\sqrt{x}\ and\ y=x^2$.	5M	CO4	BTL3
OR					
11	a	Find the work done by the force $\bar{F}=z\bar{i}+x\bar{j}+y\bar{k}$ when it moves a particle along the arc $\bar{r}=cost\,\bar{i}+sint\,\bar{j}-t\,\bar{k}$ from t = 0 to t = π .	5M	CO4	BTL4
	b	Use gauss divergence theorem evaluate $\iint_S \bar{F}.\bar{n}dS$ where $\bar{F}=4x\bar{i}-2y^2\bar{j}+z^2\bar{k}$ and S is the surface bounded by the region $x^2+y^2=0, z=0\ and\ z=3$.	5M	CO4	BTL3

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CODE: A10301	R23	H.T.No:

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations July 2024

Subject Name: Engineering Graphics

Branch: CSE

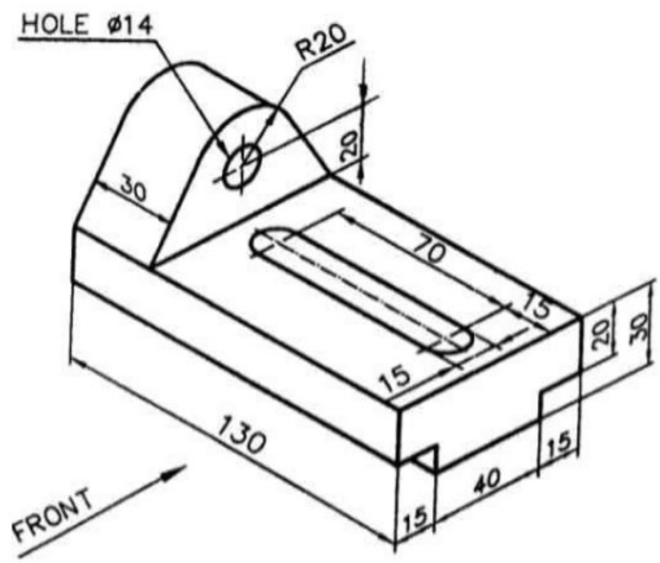
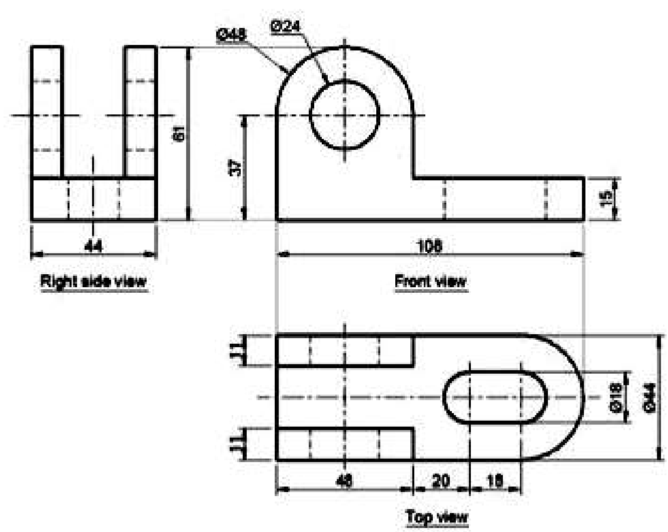
SET-1

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer one full question from each unit. Each full question carries 14 marks

UNIT-I					
1		The focus of a conic is 50 mm from the directrix. Draw the locus of a point F moving in such a way that its distance from the directrix is equal to its distance from the focus. Name the curve. Draw a tangent to the curve at a point 60 mm from the directrix.	14M	1	6
OR					
2		A coir is unwound from a drum of 50 mm diameter. Draw the locus of the free end of the coir for unwinding through an angle of 360°. Also draw normal and tangent at any point on the curve.	14M	1	6
UNIT-II					
3		One end P of a line PQ 70 mm long is 35 mm infront of V.P and 25 mm above H.P. The line inclined at 40^0 to the V.P. Draw the projections of PQ.	14M	2	6
OR					
4		The hexagonal plate of side 30 mm has one of its corners on H.P and the opposite corner on V.P. The plate makes 60^0 with H.P and 30^0 with V.P. Draw the projections of the plate.	14M	2	6
UNIT-III					
5		Draw the projections of a cylinder 75 mm diameter and 100 mm long lying on the H.P with its axis inclined at 30^0 to the V.P and parallel to the H.P.	14M	3	6
OR					
6		Draw the projections of a pentagonal pyramid of 30 mm base edges and axis 70 mm long rest on one of its base corner in H.P with the slant edge having a resting corner is vertical to V.P. and parallel to V.P.	14M	3	6
UNIT-IV					
7		A right circular cone of base diameter 55 mm height 70 mm and rests on its base on H.P. A section plane perpendicular to H.P and inclined at 40^0 to V.P cuts the cone at a distance of 10 mm from the axis and in front of it. Draw its top view, sectional front view and true shape of the section.	14M	4	6

OR					
8		A hexagonal prism of base 30mm side and axis 60mm long is resting on its base on HP with a base edge parallel to VP. It is cut by a plane perpendicular to VP, inclined 35° to HP. Draw the sectional top view and front view of the prism. Also draw the development of the complete surface.	14M	4	6
UNIT-V					
9		Draw to scale 1:1 the front view, top view and side view of the given machine block. (All dimensions are in mm) 	14M	5	6
OR					
10		Draw the isometric view for the given figure. (All dimensions are in mm) 	14M	5	6

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CODE: A10301	R23	H.T.No:

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations July 2024

Subject Name: Engineering Graphics

Branch: CSE

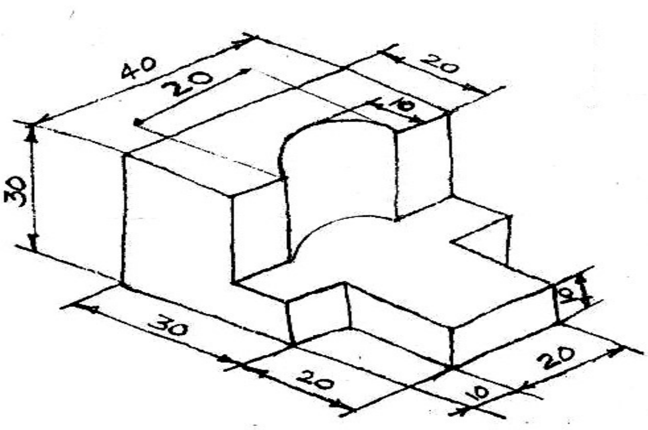
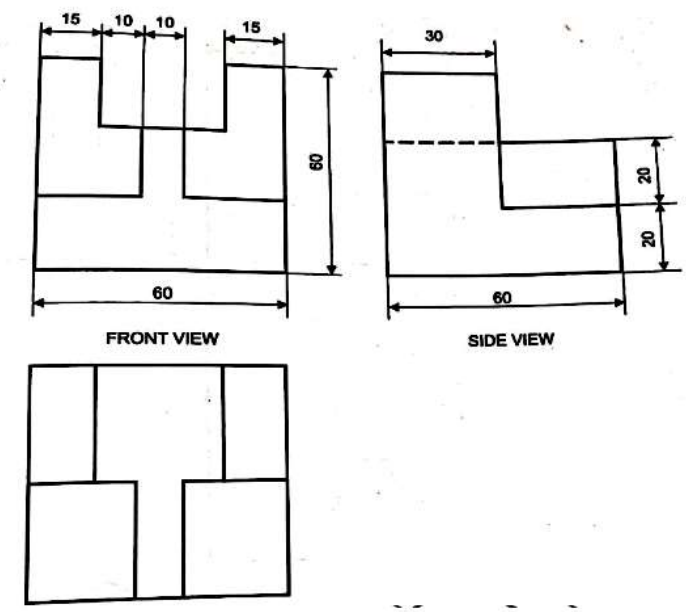
SET-2

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer one full question from each unit. Each full question carries 14 marks

		UNIT-I			
1		Draw the locus of a point P which moves in a plane in such a way that the ratio of its distances from a fixed point F and a fixed straight line AB is always 2/3. The distance between the fixed point F and fixed straight line is 50 mm. Also draw a tangent and normal on a point on the locus at a horizontal distance of 55 mm from the fixed straight line.	14M	1	6
		OR			
2		A circus animal rides small motor bike inside a globe of 200mm diameter. the motor bike has the wheel of 40mm diameter. Draw the locus of the point on the circumference of the motor-bike for one complete revolution.	14M	1	6
		UNIT-II			
3		A line PQ measuring 70 mm is inclined to H.P. at 30° and to V.P. at 45° with the end P 20 mm above H.P. and 15 mm in front of V.P. Draw its projections.	14M	2	6
		OR			
4		A rectangular plate of side 50 x 25 mm is resting on its shorter side on H.P. and inclined at 30° to V.P. Its surface is inclined at 60° to H.P. Draw its projections.	14M	2	6
		UNIT-III			
5		Draw the projections of a pentagonal prism of 30 mm base edges and axis 60 mm long when the axis is inclined at 75° to the H.P. and parallel to the V.P. with an edge of the base on the H.P.	14M	3	6
		OR			
6		A right regular hexagonal pyramid, edge of base 25 mm and height 50 mm, rests on one of its base edges on H.P. with its axis parallel to V.P. Draw the projections of the pyramid when its base makes an angle of 45° to the H.P.	14M	3	6
		UNIT-IV			
7		A square pyramid base 40 mm side and axis 65 mm long has its base on H.P. and all the edges of the base are equally inclined to V.P. It is cut by a section plane perpendicular to V.P. and inclined at 45° to H.P. and-	14M	4	6

		bisecting the axis. Draw its sectional top view, and the true shape of the section.			
		OR			
8		Draw the development of the lateral surface of the lower portion of a cylinder of diameter 50 mm and axis 70 mm. The solid is cut by a section plane inclined at 40° to H.P. and perpendicular to V.P. and passing through the midpoint of the axis.	14M	4	6
		UNIT-V			
9		Draw to scale 1:1 the front view, top view and side view of the given machine block. (All dimensions are in mm) 	14M	5	6
		OR			
10		Draw the isometric view for the given figure. (All dimensions are in mm) 	14M	5	6

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CODE: A10301	R23	H.T.No:

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations JULY 2024

Subject Name: Engineering Graphics

Branch: CSE

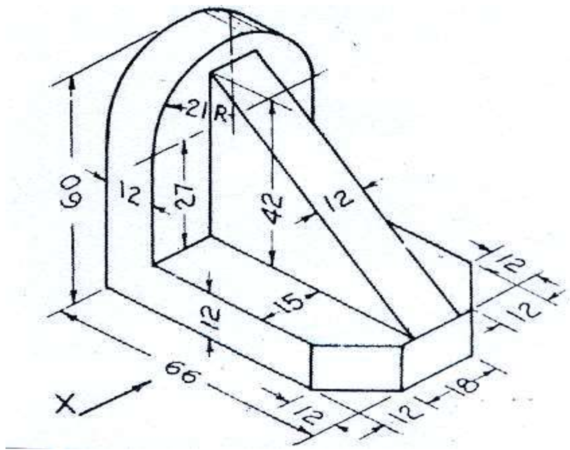
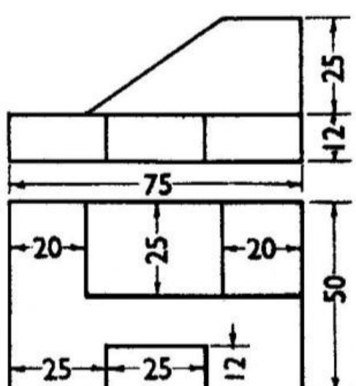
SET-4

Time: 3 Hours **Max. Marks: 70**

Instructions:

1. Answer one full question from each unit. Each full question carries 14 marks

UNIT-I					
1	a	Construct a parabola with base 60 and length of the axis 40. Draw a tangent to the curve at point 20 from the base. Also locate the focus and directrix to the parabola.	7M	CO1	L6
	b	A ball thrown up in the air reaches maximum height of 45 meters and travels a horizontal distance of 75 metres. Trace the path of the ball, assuming it to be parabolic.	7M	CO1	L6
OR					
2		Show by means of drawing that when the diameter of the directing circle is twice that of the generating circle, the hypocycloid is a straight line. Take the diameter of the generating circle is equal to 50 mm	14M	CO1	L6
UNIT-II					
3	a	A 120 mm long straight line PQR, is inclined at 30^0 to the H.P. and 45^0 to the V.P. The point Q divides the line in the ratio of 1:3 and is situated 40 mm above the H.P. and 60 mm in front of the V.P. Draw its projections	10M	CO2	L3
	b	Draw the projections of a 60 mm long line PQ which is situated both on the HP and on VP .Also determine the traces of the line	4M	CO2	L3
OR					
4		End P of a line PQ 70mm long is 15mm above HP and 20mm infront of VP. Q is 40mm above HP. The top view of the line is inclined at 45^0 to VP. Draw the projections of the line and find its true inclinations with VP and HP.	14M	CO2	L3
UNIT-III					
5		A square prism having base with a 45 mm side and 65 mm long axis has its axis parallel to and 55 mm in front of the V.P. An edge of its base is parallel to the H.P. and inclined at 30^0 to the V.P. Draw its projections.	14M	CO3	L6
OR					
6		A pentagonal pyramid, having base with a 25 mm side and 60 mm long axis, rests on an edge of the base on the H.P. with axis perpendicular to the V.P. Draw its projections when the base is 15 mm in front of the V.P.	14M	CO3	L6

		UNIT-IV			
7		A cone of 50 mm diameter and axis 70 mm long. Its base is on HP.It is cut by a sectional plane perpendicular to VP and inclined to HP at 45 degree from apex 32mm .Draw the projections of FV,S.TV, True shape.	14M	CO4	L6
		OR			
8		A pentagonal pyramid, side of base 30 mm and height 52 mm, stands with its base on HP and an edge of the base is parallel to VP. It is cut by a plane perpendicular to VP, inclined at 40 degree to HP and passing through a point on the axis, 32 mm above the base. Draw the development of the lateral surface of the truncated pyramid	14M	CO4	L6
		UNIT-V			
9		Draw the front view, side view from the right, and top view of the block as shown in figure. (All dimensions are in mm). 	14M	CO5	L6
		OR			
10		Draw the isometric view for the given figure. (All dimensions are in mm). 	14M	CO5	L6

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CODE: A10003	R23	H.T.No:										

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations JULY 2024
Subject Name: Engineering Physics

Branch: CSE

Time: 3 Hours **Max. Marks: 70**

Instructions:
1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

		PART-A			
1	a	Define Interference.	2M	CO1	BTL1
	b	List out any four conditions for sustained interference.	2M	CO1	BTL1
	c	Define Space lattice and Basis.	2M	CO2	BTL1
	d	Write any two differences between crystalline and amorphous materials.	2M	CO2	BTL1
	e	What is dielectric polarizability?	2M	CO3	BTL1
	f	Draw a B-H curve for a Ferro magnetic material.	2M	CO3	BTL1
	g	What are the properties of de-Broglie wave?	2M	CO4	BTL1
	h	Define fermi energy level.	2M	CO4	BTL1
	i	Any two differences between n-type and p-type semiconductors.	2M	CO5	BTL1
	j	List the applications of semiconductor.	2M	CO5	BTL1
		PART-B			
		UNIT-I			
2	a	Define Newton rings? Explain formation of Newton rings with suitable diagram.	7M	CO1	BTL2
	b	In a Newton's rings experiment, the diameter of 5^{th} ring is 0.30 cm and the diameter of 15^{th} ring is 0.62 cm. Find the diameter of 25^{th} ring.	3M	CO1	BTL3
		OR			
3	a	Discuss the construction and working of Nicol's prism.	6M	CO1	BTL2
	b	Explain the function of quarter wave plate and half wave plate.	4M	CO1	BTL2
		UNIT-II			
4		Describe seven crystal systems and their Bravais lattices with neat diagrams.	10M	CO2	BTL2
		OR			
5	a	Describe Laue method for determination of crystal structure.	6M	CO2	BTL3
	b	Calculate the ratio of d_{100}: d_{110}: d_{111} for Simple cubic structure.	4M	CO2	BTL4
		UNIT-III			
6	a	Define 1. Polarization, 2. Dielectric constant.	4M	CO3	BTL1
	b	Derive the electronic polarizability in a dielectric material.	6M	CO3	BTL4

OR					
7	a	Define orbital magnetic dipole moment. Calculate the orbital magnetic dipole moment for revolving electron around the nucleus in an atom.	7M	CO3	BTL4
	b	A magnetic material has a magnetization of 3300 A/m and flux density of 0.0044 Wb/m^2. Calculate magnetizing force and the relative permeability of the material	3M	CO3	BTL4
UNIT-IV					
8	a	Explain de Broglie hypothesis. Derive an expression for de Broglie wavelength.	7M	CO4	BTL2
	b	Write the properties of matter waves.	3M	CO4	BTL1
OR					
9		Explain the Fermi- Dirac distribution function of electrons. Explain the effect of temperature on the distribution.	10M	CO4	BTL2
UNIT-V					
10		Derive the expression for intrinsic carrier concentration and fermi level for intrinsic semiconductor.	10M	CO5	BTL6
OR					
11	a	Differentiate n-type and p-type semiconductors.	5M	CO5	BTL2
	b	Distinguish between direct and indirect band gap semiconductors.	5M	CO5	BTL2

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