Hall Ticket Number :										

R-23

Code: 23A0322T-B

B.Tech. II Semester Regular Examinations July 2024

Engineering Graphics

(Common to CSE & CSE(DS))

Max. Marks: 70 Time: 3 Hours

****

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

		Marks	CO	BL
	UNIT-I			
1.	Draw an epicycloid of a circle of diameter 50 mm, which rolls outside a circle of diameter 180 mm for one revolution. Also, draw a tangent and a normal to the epicycloid at a point 135 mm from the center of the directing circle.	14M	1	3
	OR			
2.	Construct a scale of 1:40 to read meters, decimeters and centimeters and long enough to measure up to 6 m. Mark a distance of 4.76 m on it.	14M	1	3
	UNIT-II			
3.	Draw the projections of the following points on a common reference line keeping the distance between their projectors 25 mm apart. (a) Point A is 40 mm above the H.P. and 25 mm in front of the V.P. (b) Point B is 40 mm above the H.P. and in the V.P. (c) Point C is 25 mm in front of the V.P. and in the H.P. (d) Point D is 25 mm above the H.P. and 30 mm behind the V.P. (e) Point E is in 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 the V.P.	14M	2	3
	OR			
4.	A 70 mm long line PQ is inclined at 30º to the H.P. The end P is 15 mm in front of the V.P. and 25 mm above the H.P. The front view of the line measures 45 mm. Draw the projections of the line PQ and determine its true angle of inclination with the V.P.	14M	2	3
	UNIT-III			
5.	The diagonals of a rhombus measure 100 mm and 40 mm. The longer diagonal is inclined at 30° to H.P. with an end in H.P. and the smaller diagonal is parallel to both the principal planes. Draw its projections.	14M	3	3
	OR			
6.	A hexagonal prism of base edge 30 mm and axis 70 mm has its axis parallel to and 50 mm above the H.P. Its base is parallel to the V.P. and an edge of the base is inclined at 45° to the H.P. Draw its projections.	14M	3	3

UNIT-IV

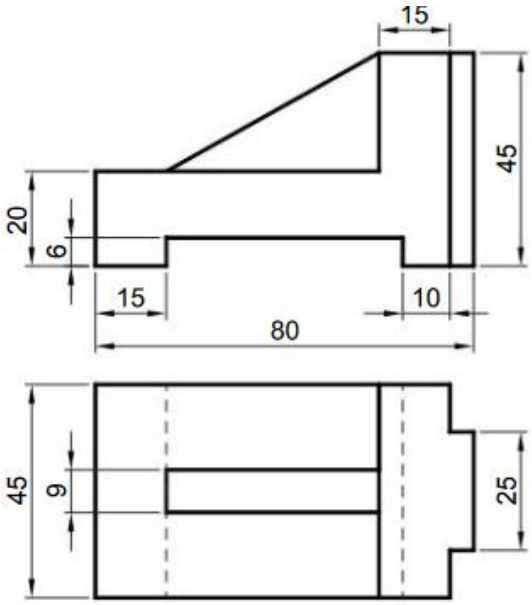
7. A square pyramid of base side 40 mm and axis 60 mm is resting on its base on the H.P. with a side of base parallel to the V.P. Draw its sectional views and true shape of the section, if it is cut by a section plane perpendicular to the V.P., bisecting the axis and is parallel to the H.P. 14M 4 3

OR

8. A cylinder of base diameter 50 mm and axis 70 mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to the V.P., inclined at 45° to the H.P., passing through the top of a generator and cuts all the other generators. Draw the development of its lateral surface. 14M 4 3

UNIT-V

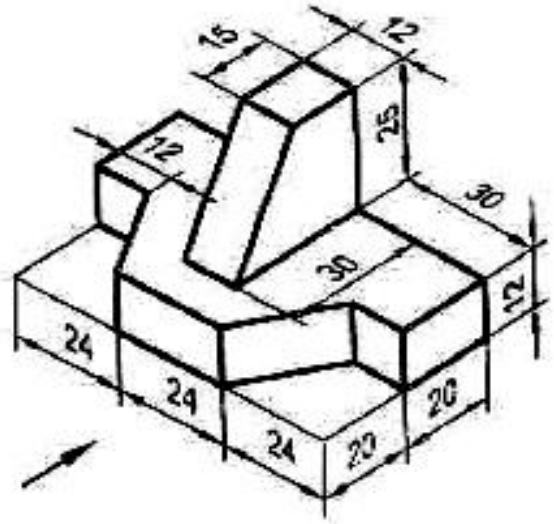
9. The front and the top views of an object are shown in Fig. Draw its isometric view.



14M 5 3

OR

10. Draw the following views for the object shown in figure. All dimensions are in mm. (a) Front view (b) Top view (c) Left side view.



14M 5 3

*** End ***

Hall Ticket Number :										

R-23

Code: 23AHS25T

B.Tech. II Semester Regular Examinations July 2024

Engineering Physics

(Common to CE, ME, CSE, CSE(DS) 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)

			CO	BL
1.	Answer ***all*** the following short answer questions (10 X 2 = 20M)			
	a)	Define interference and diffraction.	CO1	L1
	b)	What is resolving power of grating?	CO1	L2
	c)	Define the terms lattice and basis.	CO2	L1
	d)	What are miller indices?	CO2	L2
	e)	Write the relation between relative permittivity and susceptibility.	CO3	L4
	f)	Define the terms Magnetic permeability and susceptibility.	CO3	L1
	g)	What are matter waves?	CO4	L1
	h)	State Heisenberg uncertainity principle.	CO4	L1
	i)	What is Hall effect?	CO5	L2
	j)	What is n type semiconductor.	CO5	L2

PART-B

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

			Marks	CO	BL
		UNIT–I			
2.	a)	Explain interference in thin film due to reflected light and derive the bright and dark fringe conditions.	6M	CO1	L2
	b)	Describe colors in thin film and write examples.	4M	CO1	L2
		OR			
3.	a)	Explain construction and working of Nicol's prism to produce polarized light.	6M	CO1	L4
	b)	Describe polarization of light by reflection.	4M	CO1	L2
		UNIT–II			
4.	a)	Calculate coordination number and packing fractions for SC, BCC and FCC.	6M	CO2	L2
	b)	Derive the equation for interplanar spacing.	4M	CO2	L2

OR

5.	a)	Explain the crystal structure determination by powder method.	6M	CO2	L4
	b)	Derive Bragg's law of X-ray diffraction.	4M	CO2	L2

UNIT–III

6.		Define types of polarizations in dielectrics and derive the expression for electronic polarizability.	10M	CO3	L1

OR

7.	a)	Distinguish among dia, para and ferro magnetic materials.	6M	CO3	L4
	b)	Explain briefly about Hysterisis concept in ferromagnetism.	4M	CO3	L2

UNIT–IV

8.	a)	Derive the equation for eigen values of a particle in one dimensional potential box.	6M	CO4	L4
	b)	Calculate the energies of first and second quantum states of a particle confined to a potential box of length $2A^0$.	4M	CO4	L3

OR

9.	a)	Derive the expression for electrical conductivity according to quantum free electron theory.	6M	CO4	L5
	b)	Write the differences between classical and quantum free electron theory.	4M	CO4	L4

UNIT–V

10.	a)	Derive the concentration of electrons in the conduction band of intrinsic semiconductors.	6M	CO5	L5
	b)	Write the expression for electrical conductivity in intrinsic semiconductors.	4M	CO5	L5

OR

11.	a)	Derive drift and diffusion currents?	6M	CO5	L2
	b)	Deduce Einstein' equation.	4M	CO5	L2

*** End ***

Hall Ticket Number :										

R-23

Code: 23A0221T

B.Tech. II Semester Regular Examinations July 2024

Basic Electrical & Electronics Engineering

(Common to CE, ME, CSE, CSE(DS) and AI&ML)

Max. Marks: 70 Time: 3 Hours

****

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

PART-1

PART-A

(Compulsory question)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 1 = 5M)		
	a) State the Kirchhoff's current law?		1	1
	b) Define the term RMS value?		1	1
	c) What is the basic principle of three phase induction motor?		2	1
	d) Which type of instruments is used for measuring DC voltages and DC currents?		2	1
	e) What is the working principle of fuse?		3	1

PART-B

Answer *any three* questions by choosing one question from each unit (3x10=30 Marks)

			Marks	CO	BL
		UNIT–I			
2.		State and explain the Superposition theorem with an example?	10M	1	2
		OR			
3.		Explain the following terms with respect to alternating quantities with the help of neat diagram i) Phase and Phase difference ii) Frequency and period iii) Resistance and impedance	10M	1	2
		UNIT–II			
4.		Explain the operating principle of DC generator and single phase transformer with neat diagram?	10M	2	2
		OR			
5.		Describe the construction and working of Moving coil instruments?	10M	2	2
		UNIT–III			
6.		Briefly explain the operation of nuclear power station with a neat sketch?	10M	3	2
		OR			
7.	a)	Explain the safety precautions to avoid electric shock?	5M	3	2
	b)	Discuss the calculation of electricity bill for domestic consumers?	5M	3	2

Code: 23A0221T

B.Tech. II Semester Regular Examinations July 2024

Basic Electrical & Electronics Engineering

(Common to CE, ME, CSE, CSE(DS) and AI&ML)

PART-2

PART-A
(Compulsory question)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 1 = 5M)		
a)	Draw the forward characteristics of p-n junction diode.		CO1	2
b)	Define the Zener effect in Zener diodes.		CO1	1
c)	Describe the difference between intrinsic and extrinsic semiconductors.		CO2	1
d)	Sketch the circuit diagram of Full wave rectifier circuits.		CO2	1
e)	Convert $(1001)_2$ into a decimal number.		CO2	3

PART-B
Answer *any three* questions by choosing one question from each unit (3x10=30 Marks)

			Marks	CO	BL
		UNIT–I			
2.		Sketch the input and output characteristics of common emitter transistor configuration and explain briefly.	10M	CO3	
		OR			
3.		Explain the VI characteristics of PN junction diode.	10M	CO3	
		UNIT–II			
4.		Describe the working principle of a Zener diode. How is it used for voltage regulation? Provide a circuit diagram and explain its operation under different load conditions.	10M	CO4	
		OR			
5.		With a neat circuit diagram and waveforms explain the working of full wave bridge rectifier with C filter	10M	CO4	
		UNIT–III			
6.	a)	Design a full adder with two half adders	5M	CO5	
	b)	Describe the working of JK flip flop with help of its truth table	5M	CO5	
		OR			
7.	a)	Verify the truth tables of various logic gates	5M	CO5	
	b)	Write a short notes on i) Resistors ii) Counters	5M	CO5	

*** End ***

Hall Ticket Number :										

R-23

Code: 23A0521T

B.Tech. II Semester Regular Examinations July 2024

Data Structures

(Common to CSE, AI&DS, CSE(AI), CSE(DS) 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)

		CO	BL
1.	Answer ***all*** the following short answer questions (10 X 2 = 20M)		
a)	What is non-linear data structure?	1	L1
b)	Give examples of Abstract data types?	1	L1
c)	How is the end of a singly linked list represented?	2	L2
d)	Describe the structure of a node in a Double linked list.	2	L1
e)	How a Circular queue is different from Queue?	3	L2
f)	Write a short note of applying stack on reversing list.	3	L3
g)	Write a recursive function for pre-order traversal in a BST.	4	L2
h)	Define a graph. How does it differ from other data structures like trees?	4	L2
i)	What is a hash function?	5	L1
j)	What is a collision in the context of hashing?	5	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)	Explain the key characteristics that distinguish an ADT from a data structure.	5M	1	L2
b)	Write Time Complexity and Space Complexity of different linear data structures?	5M	1	L1
	OR			
3.	Explain the Stack Abstract Data Type (ADT) and discuss its primary functions. Provide detailed implementations of these functions using an array-based approach.	10M	1	L3
	UNIT-II			
4. a)	Write the procedure to insert a node at the beginning, middle, and end of a doubly linked list.	6M	2	L2
b)	"Node structure differ in a doubly linked list compared to a singly linked list", Justify your answer?	4M	2	L5

OR

5.	a)	Describe the process to search for a value in a singly linked list. What is the time complexity of this operation?	5M	2	L1
	b)	Explain the Applications of LinkedList?	5M	2	L2

UNIT-III

6.	a)	What is Queue? Explain properties and different applications of it.	5M	3	L2
	b)	Describe and write a program to implement queue using LinkedList and its operations?	5M	3	L2

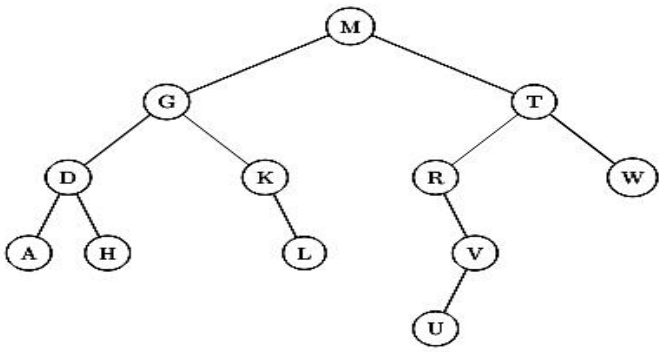
OR

7.	a)	Apply the stack in expression evaluation with an example.	4M	3	L3
	b)	What is De-queue? Illustrate the operations and applications of it.	6M	3	L2

UNIT-IV

8.	a)	Define a tree data structure. How is it different from other data structures like arrays or linked lists?	6M	4	L2
	b)	Explain how to search for a node in a binary tree.	4M	4	L2

OR

9.	a)	Describe the process of insert and delete operations on Binary Search tree.	4M	4	L2
	b)	Use the following binary search tree and find pre-order, in-order and post-order traversal of this tree. 	6M	4	L3

UNIT-V

10.		Describe how hashing can be applied to generate unique identifiers and provide examples of its applications.	10M	5	L3

OR

11.	a)	Given a set of keys {23, 12, 34, 54, 72, 15, 65}, insert them into a hash table of size 10 using chaining. Show the resulting hash table.	5M	5	L3
	b)	Explain the process of searching for a key in a hash table.	5M	5	L2

*** End ***

Hall Ticket Number :										

R-23

Code: 23AHS21T

B.Tech. II Semester Regular Examinations July 2024

Differential Equations and Vector 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)

		CO	BL
1.	Answer ***all*** the following short answer questions **(** 10 X 2 = 20M)		
a)	Solve $(2x+y+1)dx+(x+2y+1)dy=0$.	CO1	L3
b)	State Newton's Law of Cooling.	CO1	L1
c)	Solve $(D^2+4D+4)y=0$.	CO2	L3
d)	Find PI of $(D^2+5D+6)y=e^{3x}$.	CO2	L3
e)	Form the partial differential equation by eliminating arbitrary constants a,b from $z=ax+by+a^2+b^2$.	CO3	L3
f)	Solve $p\sqrt{x}+q\sqrt{y}=\sqrt{z}$.	CO3	L3
g)	Find *grad f,* where $f=x^2yz+xy^2z+xyz^2$.	CO4	L1
h)	Show that $\vec{f}$ is solenoidal, where $\vec{f}=3y^2z\,\hat{i}+3x^2z\,\hat{j}+3x^2y\,\hat{k}$	CO4	L1
i)	Evaluate the line integral $\int_C (x^2+xy)dx+(x^2+y^2)dy$, where C is the square formed by the lines $x=\pm1$ and $y=\pm1$.	CO5	L3
j)	State Green's theorem	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)	Solve $\frac{dy}{dx}+y\tan x=y^3\sec x$.	5M	CO1	L3
b)	Solve $(4xy+3y^2-x^2)dx+x(x+2y)dy=0$.	5M	CO1	L3
	OR			
3. a)	Solve $(4xy+3y^2)\frac{dy}{dx}=1$	5M	CO1	L3
b)	If the temperature of the air is 30^oC and the substance cools from 100^oC to 70^oC in 15 minutes. Find when the temperature will be 40^oC.	5M	CO1	L3

UNIT-II

4. Solve $(D-2)^2y = e^{2x}(\sin 2x + x)$ 10M CO2 L3

OR

5. Solve the simultaneous equations $\frac{dx}{dt} + 2y + \sin t = 0$, $\frac{dy}{dt} - 2x - \cos t = 0$, given that $x = 0$ and $y = 1$ when $t = 0$. 10M CO2 L3

UNIT-III

6. a) Form the partial differential equation by eliminating arbitrary constants *a*, *b* and *c* from $(x-a)^2 + (y-b)^2 + z^2 = c^2$ 5M CO3 L3

   b) Form the partial differential equation by eliminating arbitrary functions *f* and *g* from $z = f(y+2x) + g(y-3x)$. 5M CO3 L3

OR

7. Solve $(x^2 - yz)p + (y^2 - zx) = z^2 - xy$. 10M CO3 L3

UNIT-IV

8. a) If $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$ find curl$(\vec{F})$. 5M CO4 L3

   b) Find the directional derivative of div$(\vec{F})$. $\phi = x^2yz + 4xz^2$ at (1,-2,-1) in the direction of the vector $2i-j-2k$. 5M CO4 L3

OR

9. a) Find the angle between the surfaces $x^2 + y^2 - z^2 = 6$ and $z = x^2 + y^2 - 13$ at (2,1,2). 5M CO4 L3

   b) Find the values of *a,b,c* if $\vec{F}=(x+y+az)\hat{i} + (bx+2y-z)\hat{j} + (x+cy+2z)\hat{k}$ is irrotational 5M CO4 L3

UNIT-V

10. Find the work down by a force $\vec{F} = 3x\hat{i} + (2xz - y)\hat{j} + z\hat{k}$ along the straight line from $(0, 0, 0)$ to $(2, 1, 3)$. 10M CO5 L3

OR

11. Verify Green's theorem for $\int_C (xy + y^2)dx + x^2dy$, where C is bounded by $y = x$ and $y = x^2$. 10M CO5 L3

*** End ***