Hall Ticket Number :										

R-23

Code: 23A0312T-D

B.Tech. I Semester Regular Examinations January 2024

Engineering Graphics

(Artificial Intelligence & Data Science)

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.	Construct a conic when the distance of its focus from its directrix is equal to 50 mm and its eccentricity is 2/3. Name the curve, mark its major axis and minor axis. Draw a tangent at any point, P on the curve.	14M	1	1
	OR			
2.	Construct a cycloid having a rolling circle diameter as 50mm. Draw a normal and a tangent to a curve at a point 35mm above the base line	14M	1	1
	UNIT-II			
3.	A top view of a 75 mm long line AB measures 65 mm, while the length of its front view is 50 mm. It's one end A is in the HP and 12 mm in front of the VP. Draw the projections of AB and determine its inclination with HP and the VP.	14M	2	2
	OR			
4.	The distance between the end projectors of a line AB is 40 mm. The end point A is 15 mm above HP and 20 mm in front of V.P. The line is inclined at 30^0 to the HP. Draw its projections if the true length of the line is 80 mm. Find its inclination with the VP. Take the end point B in the 1st quadrant.	14M	2	2
	UNIT-III			
5.	Draw the projections of a regular hexagon of 30mm side, having one of its sides in the HP and inclined at 60^0 to the VP and its surface making an angle of 45^0 with the HP	14M	3	2
	OR			
6.	Draw the projections of hexagonal pyramid of base 25 mm and height 60 mm when one of its triangular faces lies on HP, and its base edge is at right angle to the VP and the axis of the pyramid is parallel to VP.	14M	3	2

UNIT-IV

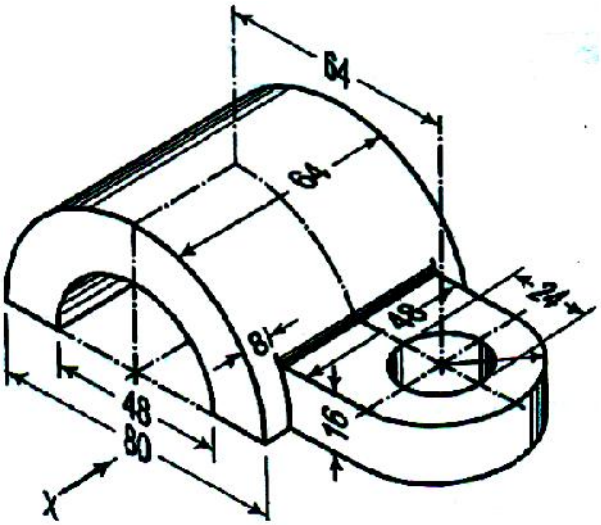
7. A pentagonal prism of side 3 cm height 7 cms is resting on its base in H.P. such that one of the base edges is parallel to V.P. It is cut by a section plane perpendicular to V.P and inclined at 60^0 to H.P. and passes through a point 15 mm below the top center. Draw the sectional top view and true shape of section. 14M 4 3

OR

8. A cone, base 50 mm diameter and axis 60 mm long, rests with its base on HP. Draw the development of lateral surface of the cone. 14M 4 3

UNIT-V

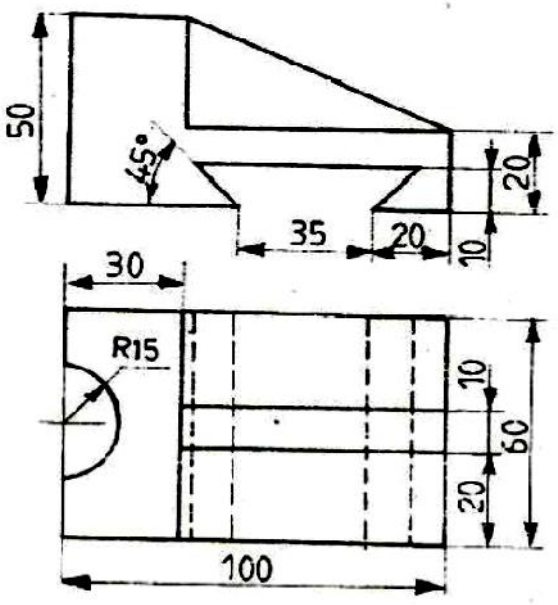
9. Draw the front view, top view and side view for the component shown in figure. All dimensions are in mm.



14M 5 4

OR

10. Draw the isometric view for the figure shown below front and top views. All dimensions are in mm.



14M 5 4

*** End ***

Hall Ticket Number :										

R-23

Q.P.Code: 23A0511T

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)

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

Hall Ticket Number :										

R-23

QPCode: 23AHS11T

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

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 $J\left(\frac{x, y}{r, -}\right)$. CO4 L2

i) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dxdy}{1+x^2+y^2}$. CO5 L2

j) Evaluate $\int_0^{\square} \int_0^{\square} x\left(x^2 + y^2\right) dx\, dy$ 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

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

can posses a non trivial solution only if ${}^{a} = 1, {}^{a} = -3$.

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 $\frac{®}{4} + \frac{3}{25} < \tan^{-1}\frac{4}{3} < \frac{®}{4} + \frac{1}{6}$. 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 $x = r\cos^{-}, y = r\sin^{-}$, find $\frac{\partial(u,v)}{\partial(r,^{-})}$. 10M CO4 L3

OR

9. If u=log($x^3 + y^3 + z^3 - 3xyz$) then show that$(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z})_2 u = \frac{-9}{(x+y+z)^2}$

UNIT–V

10. Change the order of integration in $I = \int_0^1 \int_{x^2}^{2-x} xydxdy$ and hence evaluate the same. 10M CO5 L3

OR

11. Evaluate, by changing to spherical polar coordinates

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dxdydz}{\sqrt{1-x^2-y^2-z^2}}$$

10M CO5 L4

*** End ***

Hall Ticket Number :										

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)

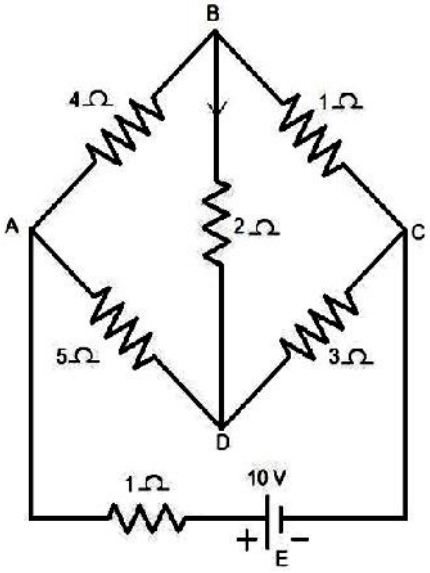
			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 1 = 5M)		
	a) State the limitations of Ohms law.		1	L2
	b) Define power factor in a AC circuit.		1	L1
	c) What is the purpose of magnetic core in a transformer?		2	L2
	d) List out some of non-conventional energy sources.		3	L2
	e) Explain 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			
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)=250sin(wt-20°)V is applied to the system. The current flowing through the system is given by i(t)=20sin(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

Code: 23A0211T (Part-2)

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)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 1 = 5M)		
	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			
2.		Discuss the V-I characteristics of PN Junction diode and explain its various biasing techniques.	10M	1	2
		OR			
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			
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			
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			
6.		Describe the working of JK flip flop with help of its truth table	10M	3	2
		OR			
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 ***

Hall Ticket Number :										

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)

		CO	BL
1.	Answer ***all*** the following short answer questions (10 X 2 = 20M)		
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			
2. a)	Explain the interference in thin films by reflection.	7M	CO1	L2
b)	Newton rings are observed in reflected light of wavelength 5900Aº. The diameter of 10^{th} dark ring is 0.5cm. Assess the radius of curvature of lens used.	3M	CO1	L5
	OR			
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 ***