

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**LINEAR ALGEBRA AND COMPLEX ANALYSIS**

(Electronics & Communication Engineering)

Time: 3Hrs

Max Marks: 100

PART-A (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1. a.	Find x if $\begin{bmatrix} 1 & 2+i \\ x-i & 4 \end{bmatrix}$ is Hermitian.	1	1	3
b.	Find k such that $x+y=3$, $2x+ky=6$ represents a dependent system.	1	1	3
c.	Define linearly dependent set.	1	2	1
d.	Define basis of vector space.	1	2	1
e.	Find the eigenvalues of $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$.	1	3	3
f.	Find the quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 1 & 2 \\ 2 & -4 \end{bmatrix}$	1	3	3
g.	Define harmonic function.	1	4	1
h.	Check whether the function $f(z) = \bar{z}$ is analytic or not.	1	4	2
i.	Write the formula for the residue of $f(z)$ at a double pole $z = a$.	1	5	1
j.	Write the statement of Cauchy's Residue theorem.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

- Q.2. a. Define the rank of the matrix and find its rank of the matrix by reducing it to canonical form $A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ 9 M 1 3
- b. Find the rank of the matrix, by reducing it to the normal form $\begin{bmatrix} 2 & -4 & 3 & -1 & 0 \\ 1 & -2 & -1 & -4 & 2 \\ 0 & 1 & -1 & 3 & 1 \\ 4 & -7 & 4 & -4 & 5 \end{bmatrix}$ 9 M 1 3

OR

- Q.3. a. Find the values of a and b for which the equations $x+y+z=3$, $x+2y+2z=6$, $x+9y+az=b$ have (i) No solution (ii) A unique solution, (iii) Infinite number of solutions. 9M 1 4
- b. Solve completely the system of equations $x+y-2z+3w=0$, $x-2y+z-w=0$, $4x+y-5z+8w=0$, $5x-7y+2z-w=0$. 9M 1 3

UNIT-II

- Q.4. Let $V = \mathbb{R}^2$, with vector addition and scalar multiplication is defined by $(x_1, y_1) \oplus (x_2, y_2) = (x_1 + x_2 - 2, y_1 + y_2 + 3)$, $a \odot (x_1, y_1) = (ax_1 - 2a + 2, ay_1 + 3a - 3)$. Prove that V is vector space. 18 M 2 4

OR

- Q.5.** Check whether the following sets are linearly independent or not? 18 M 2 3
- (i) $S = \left\{ \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}, \begin{bmatrix} -1 & 1 \\ 1 & 1 \end{bmatrix}, \begin{bmatrix} 6 & -1 \\ 3 & 2 \end{bmatrix}, \begin{bmatrix} -11 & 3 \\ -2 & 2 \end{bmatrix} \right\}$ is a subset of M_{22}
- $S = \{(1, 2, -1, 1), (2, 1, 0, 1), (2, -2, 1, 0), (11, 1, 1, 4)\}$ is subset of $\mathbb{R}^4$

UNIT-III

- Q.6.** a. Diagonalize the matrix $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ 9 M 3 3
- b. State Cayley Hamilton theorem and verify it for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$. Hence find A^{-1} 9 M 3 3

OR

- Q.7.** Reduce the quadratic form to canonical form by an orthogonal reduction and state the rank, Index, signature, nature of the quadratic form $2x^2 + 2y^2 + 2z^2 - 2xy - 2yz - 2zx$ 18 M 3 4

UNIT-IV

- Q.8.** a. Prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4 |f'(z)|^2$ where $w = f(z)$ is analytic. 9 M 4 3
- b. Prove that the function $f(z)$ defined by $f(z) = \begin{cases} \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, & z \neq 0 \\ 0, & z = 0 \end{cases}$ 9 M 4 4
- is continuous and the Cauchy-Riemann equations are satisfied at the origin, yet $f'(0)$ does not exist.

OR

- Q.9.** a. Find k such that $f(x, y) = x^3 + 3kxy^2$ may be harmonic and find its conjugate 9 M 4 3
- b. Find the regular function whose imaginary part is $u = e^{-x} [x \cos y + y \sin y]$ 9 M 4 3

UNIT-V

- Q.10.** a. Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$, if c is the square with vertices at $1 \pm i$ and $-1 \pm i$ 12 M 5 3
- b. Evaluate $\int_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$ where c is the circle $|z|=3$ using Cauchy's integral formula. 6 M 5 3

OR

- Q.11.** a. Obtain all the Laurent series of the function $\frac{7z-2}{(z+1)(z)(z-2)}$ about $z_0 = -1$ 12 M 5 4
- b. Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)} dz$ where c is circle $|z|=3$ by using Residue theorem. 6 M 5 3

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026

LINEAR ALGEBRA

(Common to CSE, CAI, CDS, CCS, CAM)

Time: 3Hrs

Max Marks: 100

PART-A (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1. a.	Define Boolean matrix with suitable examples	1	1	1
b.	Find the inverse of the matrix $A = \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$ by inverse method.	1	1	2
c.	Define Eigenvalues and eigenvectors of a matrix	1	2	1
d.	Discuss the index of the quadratic form $x_1^2 + x_2^2 + 2x_1x_2$	1	2	2
e.	Let $V = R^2$, with addition defined by $[x, y] \oplus [w, z] = [x + w + 1, y + z - 2]$ and scalar multiplication defined by $a[x, y] = [ax + a - 1, ay - 2a + 2]$. Find the additive inverse in $V = R^2$.	1	3	2
f.	In the standard basis $\{e_1, e_2\}$ of R^2 , determine whether or not the set $\{e_1 - e_2, e_2 - e_1\}$ is Linearly independent.	1	3	2
g.	Find the matrix of Linear transformation with respect to the standard bases for R^2 given by $L: R^2 \rightarrow R^2$ defined by $L(x, y) = (-3x - 2y, -2x + 3y)$	1	4	2
h.	Define kernel of a linear transformation	1	4	1
i.	Determine k such that the vectors $\{(2, 0, 1), (-3, -2, k)\}$ are orthogonal.	1	5	2
j.	State Cauchy-Schwarz Inequality in inner product space.	1	5	1

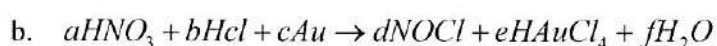
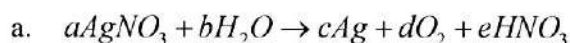
PART-B (Answer any one question from each of Units I to V)

UNIT-I

- Q.2. a.
$$\begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 1 \\ 3 & 4 & 5 & 1 & 2 \\ 4 & 5 & 1 & 2 & 3 \\ 5 & 1 & 2 & 3 & 4 \end{bmatrix}$$
 Find the rank of the matrix by reducing it into reduced row echelon form. 9 M 1 3
- b. Solve the system of simultaneous linear equations
 $2x_1 + 3x_2 + 4x_3 + x_4 = 17$; $8x_1 + 5x_2 + 2x_3 + 4x_4 = 47$; $5x_1 + 9x_2 + 13x_3 + 3x_4 = 44$;
 $4x_1 + 3x_2 + 2x_3 + 2x_4 = 25$ 9 M 1 3

OR

- Q.3. Use the Gauss-Jordan method to find the minimal integer values for the variables that will balance each of the following chemical equations 18 M 1 3



UNIT-II

- Q.4.** Diagonalize the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ and hence find A^4 by using the modal matrix. 18 M 2 3

OR

- Q.5.** Reduce the quadratic form $x^2 + 5y^2 + z^2 + 2xy + 2yz + 6xz$ to Canonical form by an orthogonal transformation and hence discuss the nature of the quadratic form. 18 M 2 3

UNIT-III

- Q.6.** Let V be the set R^+ of positive real numbers defined by $v_1 \oplus v_2 = v_1 \cdot v_2$ and $a \cdot v = v^a$ for every $a \in R, v, v_1, v_2 \in V$. Show that $V = R^+$ is a vector Space. 18 M 3 3

OR

- Q.7. a** Show that the subset $\{x^4, x^4 - x^3, x^4 - x^3 + x^2, x^4 - x^3 + x^2 - x, x^3 - 1\}$ of p_4 form the basis for p_4 . 9 M 3 3

- b** Let W be the solution set to the matrix equation $AX = O$, where $A = \begin{bmatrix} 1 & 2 & 1 & 0 & -1 \\ 2 & -1 & 0 & 1 & 3 \\ 1 & -3 & -1 & 1 & 4 \\ 2 & 9 & 4 & -1 & -7 \end{bmatrix}$. Find a basis for W . Show that $\dim(W) + \text{rank}(A) = 5$. 9 M 3 3

UNIT-IV

- Q.8.** Consider the ordered bases B, C and D for R^3 given by $B = \{(8,1,0)(2,11,5)(-1,2,1)\}$; $C = \{(2,11,5)(-1,2,1)(8,1,0)\}$ and $D = \{(-1,2,1)(2,11,5)(8,1,0)\}$. Calculate (i) The transition matrix P from B to C (ii) The transition matrix Q from C to D (iii) The transition matrix T from B to D . Then verify by showing that $T = QP$ 18 M 4 3

OR

- Q.9. a** Let $L : R^3 \rightarrow R^4$ given by $L \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 4 & -2 & 8 \\ 7 & 1 & 5 \\ -2 & -1 & 0 \\ 3 & -2 & 7 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$. Find a basis for $\ker(L)$ 9 M 4 3

- b** Find a basis for $\ker(L)$ and a basis for $\text{Range}(L)$, and verify that the $\dim(\ker(L)) + \dim(\text{Range}(L)) = \dim(M_{22})$ for the linear transformation $L : M_{22} \rightarrow M_{22}$ given by $L(A) = A - A^T$. 9 M 4 3

UNIT-V

- Q.10. a** Use the Gram-Schmidt Process to find an orthogonal and orthonormal vectors for the subspace $\{(2,1,0,-1)(1,1,1,-1)(1,-2,1,1)\}$ in R^4 . 9 M 5 3

- b** Find the QR factorization for the matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ 9 M 5 3

OR

- Q.11.** Find a singular value decomposition for the matrix $A = \begin{bmatrix} 1 & -1 \\ 1 & 1 \\ -1 & -1 \end{bmatrix}$ 18 M 5 3

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(Deemed to be University under Section 3 of UGC Act, 1956)**B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026****LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS**

(Common to CE, EEE, ME)

Time: 3Hrs

Max Marks: 100

PART-A (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1. a.	Define rank of a matrix	1	1	1
b.	When a homogeneous linear system of equations have trivial solution	1	1	1
c.	Find the order and degree of the differential equation $\frac{d^2y}{dx^2} + y^2 = \left(\frac{dy}{dx}\right)^{3/2}$	1	2	2
d.	Find the integrating factor of differential equation $\frac{dy}{dx} - xy = \sin x$.	1	2	2
e.	Find the solution of $y'' + 4y' + 4y = 0$.	1	3	2
f.	Find P.I for the differential equation $(D-2)^2 y = e^{2x}$	1	3	2
g.	Find the Laplace transform of 10 .	1	4	1
h.	State convolution theorem in Laplace transforms	1	4	1
i.	Form the PDE by eliminating arbitrary constants from $z = a(x^2 + y^2) + b$.	1	5	1
j.	Define heat equation in one-dimensional space.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

- Q.2. a. Reduce the following matrix $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ into Echelon form and hence find the rank. 9 M 1 3
- b. Solve completely the system of equations $3x + 4y - z - 6w = 0$; $2x + 3y + 2z - 3w = 0$; $2x + y - 14z - 9w = 0$; $x + 3y + 13z + 3w = 0$ by applying Gauss elimination method. 9 M 1 3

OR

- Q.3. a. Find eigenvalues and eigenvectors of the matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ 9 M 1 3
- b. Verify Cayley-Hamilton theorem, find A^{-1} and A^4 of $A = \begin{bmatrix} 3 & 2 & 4 \\ 4 & 3 & 2 \\ 2 & 4 & 3 \end{bmatrix}$ 9 M 1 3

UNIT-II

- Q.4. a. Find the orthogonal trajectories of the families of the following curves.
(i) $x^2 + y^2 + 2gx + c = 0$. (ii) $y = cx^2$ 9 M 2 3
- b. Solve $(3x^2 - y^2)dy - 2xydx = 0$ by finding an integrating factor 9 M 2 3

OR

- Q.5.** Solve the linear differential equations i. $y' + y \cot x = 2x \operatorname{cosec} x$ 18 M 2 3
 ii. $\frac{dy}{dx} + \frac{1}{x}y = 3x$

UNIT-III

- Q.6.** Find the general solution of the differential Equations 18 M 3 3
 (i) $y'' + 4y' + 4y = 10x^3 e^{-2x}$ (ii) $(D-2)^2 y = e^{2x} \sin x$

OR

- Q.7.** Solve the following differential equations by applying the method of 18 M 3 3
 variation of parameters (i). $y'' + y = \sec x \operatorname{cosec} x$ (ii). $y'' + y = \sec x$

UNIT-IV

- Q.8.** Using convolution theorem, evaluate i. $L^{-1}\left(\frac{1}{p^2(p^2+1)}\right)$ 18 M 4 3
 ii. $L^{-1}\left(\frac{p}{(p^2+a^2)^2}\right)$

OR

- Q.9.** a Solve the integral equation $y(x) = 1 - \int_0^x (x-t)y(t)dt$ 9 M 4 3
 b Solve the differential equation $y'' + 2y' + 5y = 3e^{-x} \sin x$, given the initial condition $y(0) = 0$ and $y'(0) = 3$ by applying the method of Laplace transforms 9 M 4 3

UNIT-V

- Q.10.** Derive a partial differential equation by eliminating arbitrary 18 M 5 3
 constants/functions i. $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$ ii. $z = f(x+at) + g(x-at)$ iii.
 $f(x^2 + y^2, z - xy) = 0$

OR

- Q.11.** A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially 18 M 5 3
 in a position given by $y = y_0 \sin^3\left(\frac{\pi x}{l}\right)$. If it is released from rest to this position then find the displacement $y(x, t)$.

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**DATA STRUCTURES AND ALGORITHMS**

(Common to CSE, CAI, CDS, CCS, CAM)

Time: 3Hrs**Max Marks: 100****PART-A** (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1.	a. Define Abstract Data Type (ADT) with one example.	1	1	1
	b. Distinguish between time complexity and space complexity.	1	1	2
	c. State the difference between a singly and doubly linked list in one sentence.	1	2	1
	d. Explain how a circular linked list differs from a linear linked list.	1	2	2
	e. List the primitive operations of a stack and name the principle it follows.	1	3	1
	f. Classify different type of queues.	1	3	2
	g. Recall the algorithm steps of binary search and state its time complexity.	1	4	1
	h. State the time complexity of Bubble Sort.	1	4	2
	i. Identify the order of nodes visited during inorder traversal of a BST.	1	5	1
	j. Outline the differences between BFS and DFS in terms of data structure used.	1	5	2

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2.	(a) Illustrate the best, worst, and average case time complexities using examples of linear search, binary search, and bubble sort.	9 M	1	2
	(b) Summarize Abstract Data Types (ADT) with a real-world example. Design an ADT for a Stack with all operations.	9 M	1	3
OR				
Q.3.	(a) Explain the Big-O, Omega, and Theta asymptotic notations with mathematical definitions and graphical representations. Use $f(n) = 3n^2 + 5n + 2$ to show all three bounds.	9 M	1	2
	(b) Analyse the time complexity of simple loop and nested loop with appropriate examples.	9 M	1	4

UNIT-II

Q.4.	(a) Implement insertion at head, tail, and a given position in a singly linked list for the sequence: 10, 20, 30, 40, 50. Trace pointer changes for each operation with memory diagrams.	9 M	2	3
	(b) Describe the structure and operations of a Circular Singly Linked List with suitable diagrams. Explain how traversal is performed and discuss situations where it is preferred over a Singly Linked List.	9 M	2	2
OR				
Q.5.	(a) Implement a Program in C for the following operations on Doubly Linked List (DLL). i. Create a DLL. ii. Display the status of DLL iii. Perform Insertion and Deletion at End of DLL iv. Perform Insertion and Deletion at Front of DLL	9 M	2	3

- (b) Implement a Program in C for the following operations on Singly Linked List 9 M 2 3
- Create a SLL.
 - Display the status of SLL
 - Perform Insertion/Deletion at End of SLL
 - Perform Insertion/Deletion at Front of SLL

UNIT-III

- Q.6.** (a) Solve the infix-to-postfix conversion for: $(A + B) * (C - D) / E$ using the stack evaluation algorithm. Show each step. 9 M 3 2
- (b) Explain Stack ADT with its operations and illustrate with suitable examples. 9 M 3 2

OR

- Q.7.** (a) Outline the structure and working of queue and illustrate with appropriate examples. 9 M 3 3
- (b) Examine how a circular queue resolves the drawbacks of a linear queue. Trace enqueue and dequeue operations for the sequence: insert 10, 20, 30, 40; delete twice; insert 50, 60 in a queue of size 6, showing front and rear pointers. 9 M 3 5

UNIT-IV

- Q.8.** (a) Given the sorted array {10, 20, 30, 40, 50, 60, 70, 80, 90}, apply Binary Search to find the element 70. Illustrate the values of low, high, and mid at each iteration. Write the algorithm and discuss its complexity 9 M 4 2
- (b) Explain the Heap Sort algorithm with a suitable example. Sort the elements {45, 23, 67, 12, 89, 34, 56} using Heap Sort and show the heap after each pass 9M 4 2

OR

- Q.9.** (a) Illustrate an algorithm for Quicksort and write its time complexity with example list are 5,3,1,9,8,2,4,7. 9M 4 2
- (b) Sort the array [38, 27, 43, 3, 9, 82, 10] using Merge Sort. Show all the divide and merge steps 9M 4 2

UNIT-V

- Q.10.** (a) Construct a BST by inserting: 50, 30, 70, 20, 40, 60, 80. Perform inorder, preorder, and postorder traversals. Then delete nodes 20 and 70 and show the updated tree after each deletion. 9M 5 5
- (b) Justify why AVL trees are preferred over unbalanced BSTs. Insert 10, 20, 30, 40, 50 into an AVL tree. Identify each imbalance, apply the correct rotation (LL/RR/LR/RL), and show balance factors at all nodes. 9M 5 5

OR

- Q.11.** (a) Summarise the BFS and DFS traversal algorithms using pseudocode. State the role of the queue in BFS and the stack in DFS, and give one practical application for each traversal technique. 9M 5 3
- (b) Break down DFS to detect a cycle in the directed graph with vertices {A, B, C, D, E} and edges {A→B, B→C, C→D, D→B, D→E}. Classify each edge as tree, back, forward, or cross edge, and state which edge type confirms the cycle. 9M 5 4

End

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**MODERN PHYSICS FOR QUANTUM TECHNOLOGIES**

(Common to CAI, CDS, CAM)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1.	a. What is the experiment name based on the division of wavefront method?	1	1	1
	b. Define polarization.	1	1	1
	c. What is De Broglie's hypothesis?	1	2	1
	d. Write down the operator forms of momentum and energy.	1	2	1
	e. Define Q-bit and its importance in quantum computing.	1	3	1
	f. Mention any two Elementary quantum gates.	1	3	1
	g. Define Fermi energy.	1	4	1
	h. Mention any two applications of Hall effect.	1	4	1
	i. Sketch the magnetic hysteresis loop of a ferromagnet.	1	5	1
	j. What is Meissner effect?	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2.	Derive the expression to determine the wavelength of the light source using Newton's rings experiment with suitable diagrams.	18 M	1	3
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OR

Q.3.	a. Explain different methods to produce the polarized light with necessary schematics.	10 M	1	3
	b. Discuss the construction and working of Nicol prism with suitable diagrams.	8 M	1	3

UNIT-II

Q.4.	a. Explain Heisenberg's uncertainty principle.	4 M	2	3
	b. Derive Schrödinger time dependent and time independent wave equation.	14 M	2	3

OR

Q.5.	Derive Schrödinger equation for a particle in a one-dimensional infinite potential well (particle in a box) and deduce the expressions for eigen energy and wavefunction. Write the energy expressions for ground state, second excited state and third excited states.	18 M	2	4
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UNIT-III

Q.6.	Describe the Q-bits and its importance in quantum computation. Discuss how classical computers differ from quantum computers.	18 M	3	3
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OR

Q.7.	Define quantum entanglement. Using EPR pairs, explain how entanglement is applied in quantum information.	18 M	3	3
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UNIT-IV

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|-------------|----|--|------|---|---|
| Q.8. | a. | Define band structure. Based on energy band structure, classify the materials with suitable diagrams and one example each. | 10 M | 4 | 3 |
| | b. | Using quantum free electron theory, derive an expression for electrical conductivity in semiconductors. | 8 M | 4 | 3 |

OR

- | | | | | | |
|-------------|--|---|------|---|---|
| Q.9. | | Discuss various dimensions of quantum materials with suitable examples. Describe Quantum dots and Quantum Dots as Qubits. | 18 M | 4 | 2 |
|-------------|--|---|------|---|---|

UNIT-V

- | | | | | | |
|--------------|--|--|------|---|---|
| Q.10. | | Describe magnetic hysteresis. Sketch magnetic hysteresis loop for a ferromagnetic material and define retentivity, coercivity, remanence, and energy loss. | 18 M | 5 | 3 |
|--------------|--|--|------|---|---|

OR

- | | | | | | |
|--------------|--|---|------|---|---|
| Q.11. | | Define superconductivity based on resistance and Meissner effect. Differentiate Type I and Type II superconductors with suitable diagrams and examples. | 18 M | 5 | 2 |
|--------------|--|---|------|---|---|

*****End*****

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B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**SEMICONDUCTOR PHYSICS**

(Electronics and Communication Engineering)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. What is the reason for getting the circular Newton's rings?	1	1	1
	ii. Define an optic axis?	1	1	1
	iii. State Heisenberg's uncertainty principle.	1	2	1
	iv. What is the velocity at the extreme position of simple harmonic oscillator?	1	2	1
	v. How the materials can be classified based on band theory?	1	3	1
	vi. What is the difference between intrinsic and extrinsic semiconductor?	1	3	1
	vii. What is diffusion current?	1	4	1
	viii. Draw the symbol for p-n junction diode.	1	4	1
	ix. Define metastable state.	1	5	1
	x. Define numerical aperture of an optical fiber.	1	5	1
Q.2(A)	Explain the construction and working principle of Young's double slit experiment. Evaluate an expression for the fringe width (β).	18	1	4
	OR			
Q.2(B)	Derive an expression for the intensities of double slit Fraunhofer diffraction?	18	1	2
Q.3(A)	i) Derive the time dependent and independent Schrödinger wave equation for a free particle?	18	2	2
	OR			
Q.3(B)	Assuming the time independent Schrodinger's wave equation, discuss the solution for a particle in one-dimensional potential well or box of infinite height.	18	2	2
Q.4(A)	Describe the motion of an electron in a periodic potential field using the Kronig-Penny model for the energies of an electron using E-k diagram.	18	3	3
	OR			
Q.4(B)	i) Distinguish between direct and indirect bandgap semiconductors.	8	3	2
	ii) What is the difference between elemental semiconductors (Ge and Si) and compound semiconductors (SiC and GaN).	10	3	3
Q.5(A)	Describe the theory, construction and I-V characteristics of the p-n junction diode.	18	4	4

OR

Q.5(B)	Explain the working principle and operation of proximity, linear and position sensors along with the symbolic representations.	18	4	2
Q.6(A)	Describe the principle, construction and working of a ruby laser with the help of suitable diagrams,	18	5	3

OR

Q.6(B)	Draw the block diagram of an optical fiber communication system and describe the function of each block.	18	5	3
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MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**ENGINEERING PHYSICS**

(Common to CE, EEE & ME)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. What is meant by damped harmonic oscillation?	1	1	1
	ii. Define the Transverse waves.	1	1	1
	iii. Quote the difference between interference and diffraction.	1	2	1
	iv. Define Polarization of light.	1	2	1
	v. Write the expression for de Broglie's wavelength.	1	3	1
	vi. Write any two drawbacks of classical free electron theory.	1	3	1
	vii. What is P-type semiconductor?	1	4	1
	viii. What is stimulated emission of radiation?	1	4	1
	ix. Write the relation between electric vectors.	1	5	1
	x. Define permeability of magnetic material.	1	5	1
Q.2(A)	Write the conditions for simple Harmonic oscillation. Formulate the equation of motion for SHM and find its solution for displacement. Using general solution, derive the expressions for velocity and acceleration.	18	1	3
OR				
Q.2(B)	i. What is the condition under which the stationary waves could form? On the condition of stationary waves, deduce the mathematical condition for the first and second harmonics.	12	1	3
	ii. Derive the velocity of a transverse wave along a stretched string.	6	1	3
Q.3(A)	i. Explain Young's double slit experiment and derive the conditions for constructive and destructive interference.	9	2	3
	ii. Illustrate the construction and working principle of Nicol Prism.	9	2	3
OR				
Q.3(B)	Illustrate the Fraunhofer diffraction due to single slit. Drive the expression for resultant intensity and obtain the conditions for maxima and minima intensities.	18	2	3
Q.4(A)	i. Explain the Heisenberg uncertainty Principle.	8	3	2
	ii. Deduce the Schrodinger's 1-D time independent wave equation.	10	3	3

OR

Q.4(B)	i	Derive the expression for electrical conductivity based on quantum free electron theory.	10	3	3
	ii	Illustrate the origin of energy band formation in solids.	8	3	2
Q.5(A)	i	Show that the total current density in semiconductor is a combination of drift and diffusion components.	10	4	3
	ii	Distinguish direct and indirect bandgap semiconductors.	8	4	2
OR					
Q.5(B)	i	Derive the relation between Einstein's coefficients.	6	4	3
	ii	Interpret the Principle, construction and working of semiconductor laser with neat diagram.	12	4	2
Q.6(A)	i	Define Electronic polarization and derive the expression for electronic polarizability in terms of atomic radius.	8	5	3
	ii	Deduce the Clausius-Mossotti equation.	10	5	3
OR					
Q.6(B)	i	Explain the origin of magnetic moment in an atom. By this, derive the orbital magnetic moment of an atom	6	5	3
	ii	Draw the hysteresis curve(B-H) curve and explain it by using domain walls motion and rotation.	12	5	4

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be a University under Section 3 of the UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**CHEMISTRY FOR ELECTRONICS**

(Electronics & Communication Engineering)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub-questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1. a.	What is the physical significance of a wave function in quantum mechanics?	1	1	2
b.	How is bond order determined using Molecular Orbital Theory?	1	1	1
c.	Mention one electronic application of graphene.	1	2	1
d.	What is the characteristic property of a superconductor?	1	2	1
e.	What is the purpose of an electrochemical cell?	1	3	1
f.	Why are supercapacitors preferred for rapid energy storage and delivery?	1	3	2
g.	Why is silicon widely used in photovoltaic cells?	1	4	2
h.	What distinguishes an intrinsic semiconductor from an extrinsic semiconductor?	1	4	2
i.	How does green chemistry contribute to sustainable electronics?	1	5	2
j.	Identify two economically valuable metals commonly recovered from e-waste.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

- Q.2. a Discuss the postulates of quantum mechanics and highlight the significance of wave functions in quantum systems. (9M) 18 M 1 2
- b Describe the particle-in-a-box model and explain the origin of quantized energy levels. (9M)

OR

- Q.3. a Explain the formation of molecular orbitals and discuss bonding in homonuclear (N_2 & O_2) diatomic molecules. (9M) 18 M 1 2
- b Analyze the molecular orbital energy level diagram of N_2 and comment on its stability. (9M)

UNIT-II

- Q.4. a Discuss the classification of nanomaterials and explain the precipitation method used for their synthesis. (9M) 18 M 2 2
- b Examine the properties and applications of carbon nanotubes and quantum dots in electronics. (9M)

OR

- Q.5. a Describe the mechanism of electrical conduction in conducting polymers with suitable examples. (9M) 18 M 2 2
- b Illustrate the principles of superconductors and OLEDs and discuss their technological applications. (9M)

UNIT-III

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- | | | | | | |
|-------------|---|--|------|---|---|
| Q.6. | a | How does the Nernst equation help in understanding the behaviour of electrochemical cells? Discuss. (9M) | 18 M | 3 | 3 |
| | b | Distinguish between potentiometric and conductometric titrations and discuss their analytical significance. (9M) | | | |

OR

- | | | | | | |
|-------------|---|---|------|---|---|
| Q.7. | a | Examine the construction and working of lithium-ion batteries and hydrogen-oxygen fuel cells. (9M) | 18 M | 3 | 3 |
| | b | Relate the operating principles of supercapacitors to their applications in modern energy-storage systems. (9M) | | | |

UNIT-IV

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- | | | | | | |
|-------------|---|--|------|---|---|
| Q.8. | a | Discuss the formation of energy bands in solids and their significance in semiconductor behaviour. (9M) | 18 M | 4 | 2 |
| | b | Explain the characteristics of n-type and p-type semiconductors and their role in p-n junction formation. (9M) | | | |

OR

- | | | | | | |
|-------------|---|--|------|---|---|
| Q.9. | a | Describe the principle of photovoltaic energy conversion and discuss recent photovoltaic materials. (9M) | 18 M | 4 | 2 |
| | b | Discuss the mechanism and applications of self-healing polymers and smart coatings. (9M) | | | |

UNIT-V

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- | | | | | | |
|--------------|---|---|------|---|---|
| Q.10. | a | Illustrate how the principles of green chemistry can be applied to promote sustainability in the electronics industry. (9M) | 18 M | 5 | 2 |
| | b | Relate the presence of hazardous substances in e-waste to their impact on human health and environmental quality. (9M) | | | |

OR

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|--------------|---|--|------|---|---|
| Q.11. | a | Compare various e-waste disposal methods and justify the importance of recycling. (9M) | 18 M | 5 | 2 |
| | b | Illustrate the recovery of valuable metals from e-waste and discuss its environmental benefits. (9M) | | | |

End

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Question Paper Code: 25BACHETC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**ENGINEERING CHEMISTRY**

(Common to CE, EEE, ME)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1. a.	What is meant by temporary hardness of water?	1	1	2
b.	What is the role of ion exchange resins in water treatment?	1	1	2
c.	What are secondary batteries? Give an example.	1	2	2
d.	Write the simplified Nernst equation.	1	2	1
e.	List the monomers used for the synthesis of Nylon 6,6.	1	3	1
f.	Which compound is considered for calculating octane number.	1	3	2
g.	What is the significance of Flash point test?	1	4	2
h.	What is hardening process of cement?	1	4	2
i.	List the merits of Sol-gel process for nano synthesis.	1	5	1
j.	Explain Meissner effect.	1	5	2

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2.	Write a note on the following:	18 M	1	2
a.	Ion-exchange process			
b.	Reverse osmosis.			

OR

Q.3.	Explain the method of estimation of hardness of water by EDTA titration.	18 M	1	2
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UNIT-II

Q.4.	Write a note on fuel cells. Explain the principle and working of H ₂ -O ₂ fuel cell.	18 M	2	2
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OR

Q.5.	What is meant by corrosion. Explain the factors affecting corrosion.	18 M	2	2
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UNIT-III

Q.6.	Write the synthesis, properties and applications of BUNA-S & BUNA-N	18 M	3	2
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OR

Q.7.	Write a note on biodegradable polymers?	18 M	3	2
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UNIT-IV

Q.8.	Discuss the various physicochemical properties of lubricating oils and explain the importance of lubricant selection for engineering applications.	18 M	4	2
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OR

Q.9.	Describe the manufacturing process of Portland cement and explain the setting and hardening processes with chemical reactions.	18 M	4	2
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UNIT-V

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|--------------|---|------|---|---|
| Q.10. | Explain the BCS theory with a neat diagram to illustrate the mechanism of superconductivity. | 18 M | 5 | 2 |
| OR | | | | |
| Q.11. | Discuss the following methods for synthesis of Nanomaterials
(i) Sol-gel process (ii) Precipitation method. | 18 M | 5 | 2 |

End

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year I/II Semester (R25) Regular & Supplementary End Semester Examinations - June 2026**SMART CHEMISTRY**

(Common to CSE, CAI, CDS, CAM & CSC)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1.	a. Explain Heisenberg uncertainty principle.	1	1	2
	b. How many nodes are present in the LUMO of the butadiene molecule?	1	1	1
	c. Define plane of symmetry element.	1	2	1
	d. Why absorbance (A) is a dimensionless quantity?	1	2	1
	e. Why does a pure Semiconductor behave as an insulator at 0 K?	1	3	2
	f. Mention any two applications of fullerene?	1	3	1
	g. What is molecular logic gate?	1	4	1
	h. Name one advantage of molecular electronics over silicon-based electronics.	1	4	1
	i. What is alfa-fold?	1	5	1
	j. Define a codon in Genetics.	1	5	2

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

- Q.2. a. Derive the equation for the wave function and energy of a particle in the one-dimensional box. 12 M 1 2
- b. An electron is confined in a one-dimensional box of length $1 \text{ \AA}$. Calculate ground state energy in electron volts. 6 M 1 2

OR

- Q.3. a. Draw the MOT diagram of O_2 molecule, and explain the bond order and magnetic behaviour. 10 M 1 2
- b. Draw a neat MOT diagram of the N_2 molecule and explain its magnetic property. 8 M 1 2

UNIT-II

- Q.4. a. Draw the group multiplication table of C_{2v} point group. 10 M 2 2
- b. Write the matrix representation (3 x 3) of the C_{2v} point group. 8 M 2 2

OR

- Q.5. a. Prove that, H_2O is an example for C_{2v} point group. 8 M 2 2
- b. Explain the principle, instrumentation and applications of UV-Visible spectroscopy. 10 M 2 2

UNIT-III

- Q.6. What are superconductors and their properties? Explain the BCS theory and mention four important applications of superconductors. 18 M 3 2

OR

- Q.7. a. Explain n-type and p-type semiconductors with neat diagram. 10M 3 2
- b. Explain the doping mechanism in polyaniline conducting polymer. 8M 3 2

UNIT-IV

Q.8.	a.	Explain the concept of OR molecular logic gate and provide their design principle, and mechanism using any suitable example.	10 M	4	2
	b.	Explain the key applications of molecular logic gates.	8 M	4	2
OR					
Q.9.	a.	Demonstrate elaborately AND & OR logic gates with acid-base reactions.	12 M	4	2
	b.	Compare molecular logic systems with traditional electronics.	6 M	4	2

UNIT-V

Q.10.	a.	Apply the knowledge of nucleic acid structure to differentiate between DNA and RNA in terms of composition, structure, and biological function.	6 M	5	3
	b.	Describe the mechanism of signal transmission in neurons and explain the role of synapses and neuromuscular junctions.	12 M	5	2
OR					
Q.11.	a.	What are carbohydrates? Discuss the structure and functions of carbohydrates.	8 M	5	2
	b.	Discuss the structure and functions of proteins.	10M	5	2

End

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MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I/II Semester (R25) Regular & Supplementary End Semester Examinations - June 2026**PROFESSIONAL COMMUNICATION**

(Common to All)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1.	a. Which tense do you use to describe any habitual action?	1	1	2
	b. Identify the parts of speech of the words "examined" and "carefully" in the given sentence: "They examined the evidence very carefully."	1	1	1
	c. While narrating an event, which connector would you use to show the final event? Use it in a sentence.	1	2	2
	d. You are sharing details of a visit to a tourist place 2 years ago. What tense will you use to narrate it? Write one example sentence.	1	2	2
	e. You need assistance for an assignment from a colleague who is familiar with the work. Frame a polite request.	1	3	2
	f. Identify whether the sentence is in direct or indirect speech: Teacher: "Have you done your homework?"	1	3	1
	g. You have been given a passage with questions for which you need to find answers quickly. What technique will you use?	1	4	2
	h. Why is scanning an important technique?	1	4	1
	i. Mention any two things to keep in mind when drafting an email.	1	5	1
	j. Write any two important principles of written communication.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2.	a. Prepare a conversation where you introduce your friend to a career counsellor who is ready to help your friend plan his career options. (10-12 exchanges)	9	1	2
	b. Describe your college in about 150-200 words.	9	1	3

OR

Q.3.	a. Develop a conversation between two school mates who are meeting at a school reunion. (9-10 exchanges)	9	1	3
	b. Discuss your plans after you graduate from college. (150-200 words)	9	1	3

UNIT-II

Q.4.	a. Narrate an event from your life that changed your outlook towards your relatives. Use appropriate tense forms and connectors in about 200 words.	9	2	4
	b. Tell the reader your opinions with regard to having your own start-up. (200 Words)	9	2	3

OR

Q.5.	a. How do you see AI related changes impacting the globe 15 years from now? 200-250 words	9	2	4
	b. Describe a very exciting tour or trip to some place in 300 words.	9	2	3

UNIT-III

Q.6.	a	Frame meaningful WH-questions to get the following answers.	9	3	2
		i. Ravi met Ramesh on 18 June.			
		ii. She recited a few poems to her children.			
		iii. The General motivated his soldiers.			
		iv. My home is located in Sainikpuri.			
		v. My brother bought the flat in 2008.			
		vi. We arrived in Paris on 16 June.			
		vii. They are complaining because the train arrived very late.			
		viii. We are meeting at 4 p.m. in my flat.			
		ix. I completed the assignment.			
	b	Write a dialogue between you and your friend who wants to travel to Germany for higher studies when her financial condition is very bad and she cannot afford to pay living expenses based on the limited stipend she has been promised. (10 to 12 exchanges)	9	3	3

OR

Q.7.	a	Write a dialogue between a very strict teacher and a student who hasn't come prepared for the exam and requests the teacher to be generous in awarding him marks. (10 to 12 exchanges)	9	3	3
	b	Convert the following sentences in direct speech to indirect speech.	9	3	2
	i.	"I am very disappointed," she said.			
	ii.	"Where is the bank ?" he asked.			
	iii.	"I cannot give you any explanation," Ranjit retorted.			
	iv.	Rakesh said: "The sun rises in the east."			
	v.	"Where can I find a supermarket?", Vishnu asked a bystander.			
	vi.	"They are very badly hurt", the policeman said.			
	vii.	Rani : "Please close the windows. It is very cold."			
	viii.	"I saw them go out" Manish said.			
	ix.	"May I have a sheet of paper? Rajesh asked his manager.			

UNIT-IV

Q.8.	How does Tagore discuss human values in the story 'The Victory'? Illustrate with examples.	18	4	2
OR				
Q.9.	Discuss what transpires between the kidnappers and the boy in 'The Ransom of the Red Chief'.	18	4	4

UNIT-V

Q.10.	Assume you are Mr. Avinash, the campus placement coordinator of your University. Write a letter to the recruiting officer of Infygist Ltd. Bengaluru requesting details about their visit to your college for recruiting final year students of B.Tech.	18	5	3
OR				
Q.11.	a Assuming you are Mr. Rajesh, compose a formal email to the admissions committee of Merlin Tomlinson university, USA requesting them details about the master's programme, tuition fee, living expenses, GRE score, admission procedures, etc. (100 to 150 words)	9	5	3
	b Prepare a report on an awareness programme conducted to promote "soft skills for employability" in your University. (150 to 200 words)	9	5	3

End

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Question Paper Code: 25BAHUMTC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year I/II Semester (R25) Regular & Supplementary End Semester Examinations - June 2026**HUMAN VALUES AND PROFESSIONAL ETHICS**

(Common to All)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1	a. The basic aspiration of every human being is _____ and _____.	1	1	1
	b. Define Natural acceptance.	1	1	1
	c. Which is central to human existence?	1	2	1
	d. The responses of material units are _____ and _____.	1	2	1
	e. Human values lead to _____ in relationships.	1	3	1
	f. The Human Goal at the level of society is _____.	1	3	1
	g. Name the four orders in Nature.	1	4	1
	h. What is meant by coexistence.	1	4	1
	i. Is Natural Acceptance dependent on preconditioning?	1	5	2
	j. Quote the ethical human conduct.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2	Write the guidelines of value education in detail.	18 M	1	2
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OR

Q.3	Reflect on how your understanding of happiness has changed after studying UHV. Do you recognize continuity of happiness and prosperity as your basic aspiration? Compare your earlier and present views, and support your discussion with examples from your own experiences.	18 M	1	2
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UNIT-II

Q.4	The proposal 'Human being is the coexistence of the Self (I) and the Body' can be verified through self-exploration. Examine this proposal in the context of your own life and validate your understanding with suitable real-life examples.	18 M	2	3
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OR

Q.5	The body is an instrument for the Self (I) and requires proper nurture, protection, and right utilization. Are you able to see your responsibility towards your body? Reflect on the programs you have made to ensure its well-being and illustrate your response with examples from your own life."	18 M	2	2
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UNIT-III

- Q.6** Intention and competence are understood as distinct aspects of human behavior. Reflect on a real-life situation where you were able to differentiate between the two. How did this understanding influence your feelings and relationships? Discuss the natural outcomes of having clarity about intention and competence 18 M 3 3

OR

- Q.7** Why is seeing the other person as similar to oneself considered the minimum content of respect? Explain the basis of this similarity and elaborate the complete content of respect as understood in Universal Human Values. 18 M 3 2

UNIT-IV

- Q.8** Nature consists of four orders. Identify and explain each order with suitable examples. Present their activities, innateness, and inheritance in a tabular form, and discuss how these orders contribute to harmony in nature. 18 M 4 2

OR

- Q.9** Existence is all that exists.' Explain the two types of realities that exist in existence. How can these realities be distinguished from one another? Illustrate your answer with suitable examples. 18 M 4 2

UNIT-V

- Q.10** Explain the implications of value based living at all the four levels in detail 18 M 5 2

OR

- Q.11** Consider yourself as a future professional. Explain how you would apply professional competence and ethical competence while handling a workplace challenge. Illustrate with a suitable example. 18 M 5 3

*****End*****

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MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

(Common to CE, EEE, ME, ECE)

Time: 3Hrs

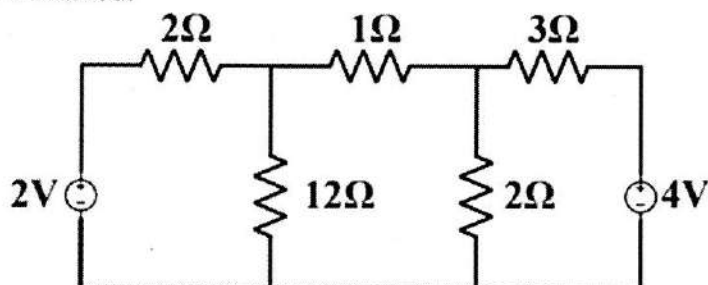
Max Marks: 100

PART-A (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1.	a. Write the formula for series & parallel connection of resistors.	1	1	1
	b. Define power factor.	1	1	1
	c. State the working principle of a Moving Coil Instrument.	1	2	1
	d. Define LVDT. Why LVDT is called linear differential transformer?	1	2	1
	e. What is the basic principle of DC generator?	1	3	1
	f. What is meant by step up transformer?	1	3	1
	g. What is cut in voltage in PN junction diode?	1	4	1
	h. List out the applications of BJT.	1	4	1
	i. State Demorgan's theorem.	1	5	1
	j. What is flip flop? Where it is used?	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

- Q.2. Determine the current flowing through the $12\ \Omega$ resistor, by Using Kirchoff's method. 18 M 1 3

**OR**

- Q.3. a A Pure inductance of 318 mH is connected in series with a pure resistance of $75\ \Omega$. The circuit is supplied from 50Hz source and the voltage across $75\ \Omega$ resistor is found to be 150V. Calculate the supply voltage and the phase angle. 9 M 1 3
- b Three $100\ \Omega$ resistors are connected in star and then delta across 415V, 3-phase supply. Find line current, phase current in each case and also power taken from the source. 9 M 1 3

UNIT-II

- Q.4. Describe the principle, construction, and operation of a Moving Iron Instrument with neat diagram. 18 M 2 1

OR

- Q.5. Explain the construction, working, and applications of Strain Gauge and LVDT? 18 M 2 1

UNIT-III

- | | | | | |
|-----------|---|------|---|---|
| Q.6. | Explain the construction and working principle of Single-Phase Transformer with neat diagram. | 18 M | 3 | 1 |
| OR | | | | |
| Q.7. | What is the importance of the fuses & State its different types with neat Diagram? | 18 M | 3 | 1 |

UNIT-IV

- | | | | | |
|-----------|--|------|---|---|
| Q.8. | Explain in detail the operation of a PN junction diode in forward and reverse bias conditions and draw the relevant V-I characteristics. | 18 M | 4 | 1 |
| OR | | | | |
| Q.9. | Draw & explain in detail the block diagram of voltage regulator? | 18 M | 4 | 1 |

UNIT-V

- | | | | | |
|-----------|--|------|---|---|
| Q.10. | Design a Half adder & Full adder circuit using Logic gates and verify its truth table? | 18 M | 5 | 3 |
| OR | | | | |
| Q.11. | Draw the circuit diagram of a D and T flip-flop also explain its operation with the help of the truth table? | 18 M | 5 | 3 |

End

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Question Paper Code: 25BAEEETC03

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year I/II Semester (R25) Regular & Supplementary End Semester Examinations - June 2026**DIGITAL DESIGN**

(Common to CSE, CAI, CDS, CAM and CCS)

Time: 3Hrs**Max Marks: 100****PART-A** (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1.	a. Convert $(1001011)_2$ to decimal.	1	1	3
	b. Represent $(-15)_{10}$ in 1's complement form.	1	1	5
	c. What do you mean by minterm or product term?	1	2	2
	d. Validate the boolean function $A(A' + B) = AB$	1	2	4
	e. What do you mean by Data Selector logic circuit.	1	3	2
	f. Convert $(652)_{10}$ into Gray Number.	1	3	3
	g. What do you mean by Sequential logic circuit?	1	4	2
	h. Write characteristics table of SR Flip Flop?	1	4	2
	i. Define ROM.	1	5	2
	j. Define MROM.	1	5	2

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2.	a. Add 1110011 and 1101111	18 M	1	3
	b. Subtract 101110_2 from 110001_2			
	c. Multiply 1100 and 1000			
	d. Write 2's complement of a binary number is 11010			
	e. Write 2's complement of a binary number is 1110101			
	f. Write 2's complement of a binary number is 10111010			

OR

Q.3.	Explain briefly all the logic gates with their symbol, and truth table?	18 M	1	2
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UNIT-II

Q.4.	a. Simplify the function $F = x + xyz + yzx' + wx + w'x + x'y$ using boolean laws.	9 M	2	3
	b. Minimize the function $F = A'B(D' + C'D) + B(A + A'CD)$ using boolean laws.	9 M		

OR

Q.5.	a. Simplify the boolean function $F(A, B, C, D) = \Pi m(3, 4, 6, 7, 11, 12, 13, 14, 15)$ using K-Map.	9 M	2	3
	b. Simplify the boolean function $F(A, B, C, D) = \Sigma m(0, 6, 8, 13, 14) + d(2, 4, 10)$ using K-Map.	9 M		

UNIT-III

Q.6.	Explain the 1×2 DEMUX and 1×4 DEMUX with truth table or function table and logic circuit diagram.	18 M	3	2
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OR

Q.7.	Explain the design of 4-bit Binary-to-Gray Code Converter with K-Map, truth table or function table and logic circuit diagram.	18 M	3	3
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UNIT-IV

- | | | | | |
|-------------|--|------|---|---|
| Q.8. | Describe the truth table and excitation table for SR, JK, D, and T flip-flops, including necessary logic circuit diagrams. | 18 M | 4 | 2 |
| OR | | | | |
| Q.9. | Briefly explain a two-bit ripple up-down (up/down) counter implemented using both negative and positive edge-triggered flip-flops. | 18 M | 4 | 2 |

UNIT-V

- | | | | | |
|--------------|--|------|---|---|
| Q.10. | Explain in detail the different types of memory. | 18 M | 5 | 2 |
| OR | | | | |
| Q.11. | Define Programmable Array Logic (PAL). Explain how a combinational circuit can be designed using a PAL, with a suitable example. | 18 M | 5 | 2 |

*****End*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I/II Semester (R25) Regular & Supplementary End Semester Examinations - June 2026**INTRODUCTION TO ENVIRONMENT AND SUSTAINABILITY**

(Common to All)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1. a.	Give two examples of biomes?	1	1	1
b.	Give two examples of gaseous biogeochemical cycles.	1	1	1
c.	Which toxic gases lead to acid rain?	1	2	1
d.	What is Eutrophication?	1	2	1
e.	Name the Act related to conservation of biodiversity in India.	1	3	1
f.	What is Carbon credit Trading under Kyoto protocol?	1	3	1
g.	Mention any two Sustainable Development Goals (SDGs).	1	4	1
h.	Which SDG focuses on conservation of marine resources?	1	4	1
i.	What is primary goal of a sustainable engineer?	1	5	1
j.	Mention the two life cycle models that have linear economy	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2. a	Illustrate the stages of transformation of water across all the spheres of environment.	9		2
b	Define biodiversity and discuss the human activities threatening the biodiversity leading to Habitat loss.	9	1	2
OR				
Q.3. a	What are biodiversity hotspots and explain the human activities threatening the biodiversity?	10		2
b	Differentiate between renewable and non-renewable resources.	8	1	2

UNIT-II

Q.4. a	Explain the principles and steps involved in Integrated Solid Waste Management (ISWM).	10		2
b	Discuss the various methods to process the different type of waste for safe disposal.	8	2	2
OR				
Q.5. a	Illustrate the step-by-step process of E-waste management.	9		2
b	Illustrate the mechanism of Greenhouse effect and summarize the human activities leading to increased concentration of GHGs.	9	2	3

UNIT-III

Q.6. a	State the objectives and provisions under water (Prevention and Control of Pollution) Act, 1974.	9		2
b	Explain the functions of CPCB and SPCB under water (Prevention and Control of Pollution) Act, 1974.	9	3	2
OR				
Q.7. a	Summarize the key aspects of Paris agreement as discussed in COP21?	8		2
b	Outline the process of EIA in a highway project.	10	3	2

UNIT-IV

Q.8.	a	Explain the significance of SDGs and identify the SDGs focusing on Environmental sustainability?	9		2
	b	Discuss the role of engineering and technology in Sustainability.	9	4	2
OR					
Q.9.	a	Discuss the challenges to sustainable development.	9		2
	b	Explain the framework of Agenda 21 and its implementation to achieve sustainability.	9	4	2

UNIT-V

Q.10.	a	Discuss about the principles of circular model in LCA.	6		2
	b	Explain the stages of LCA to be performed while manufacturing a laptop?	12	5	2
OR					
Q.11.	a	Differentiate between linear economy model and circular economy model.	6		2
	b	Demonstrate the working of circular economy model along with its principles and discuss its benefits to environment.	12	5	3

End

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**PRINCIPLES OF ARTIFICIAL INTELLIGENCE**

(CSE- Artificial Intelligence)

Time: 3Hrs

Max Marks: 100

PART-A (Answer all sub questions in Question I)

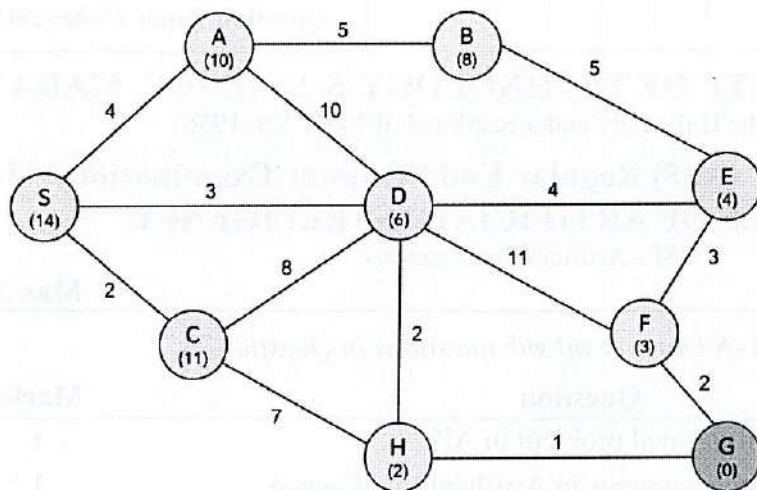
Q.No.	Question	Marks	CO	BL
Q.1.	a. What is meant by a well-defined problem in AI?	1	1	1
	b. List different types of environments in Artificial Intelligence.	1	1	2
	c. Apply Depth First Search (DFS) to the given graph and determine the traversal order.	1	2	2
<pre> graph TD A([A(Initial)]) --> B([B]) A --> C([C]) B --> D([D]) B --> E([E]) C --> G([G(Goal)]) C --> F([F]) </pre>				
	d. Define informed search strategies and provide examples.	1	2	1
	e. State the difference between propositional logic and first-order logic.	1	3	1
	f. What is Unification in AI?	1	3	1
	g. List and explain the different knowledge representation schemes.	1	4	2
	h. What is inheritance in semantic networks?	1	4	1
	i. What is an Expert System?	1	5	1
	j. What is MYCIN?	1	5	1

PART-B (Answer any one question from each of Units I to V)**Unit-I**

Q.2.	Compare different types of Environments (deterministic vs. stochastic, static vs. dynamic, episodic vs. sequential) with real-world AI applications.	18 M	1	4
OR				
Q.3.	Explain the foundations, history, and major applications of Artificial Intelligence. Discuss the four approaches to AI with suitable examples	18 M	1	3

Unit-II

Q.4.	Solve the 8-Puzzle Problem using Breadth First Search (BFS). Show the state space representation, node expansion steps, and the final solution path.	18 M	2	3
OR				
Q.5.	Apply the A* Search Algorithm to find the optimal path for the given problem considering node S as initial node. Calculate the heuristic values, evaluation function, and show all intermediate steps until the goal state is reached.	18 M	2	4



Unit-III

Q.6. Explain the architecture of a knowledge-based agent with a neat diagram. 18 M 3 2

OR

Q.7. Demonstrate the working of Forward Chaining and Backward Chaining in First-Order Logic using a suitable example and compare their inference process. 18 M 3 4

Unit-IV

Q.8. Explain representational adequacy, inferential adequacy, inferential efficiency, and acquisitional efficiency with suitable examples. 18 M 4 4

OR

Q.9. Analyze the major knowledge representation issues and trade-offs in AI systems. 18 M 4 3

Unit-V

Q.10. Illustrate the expert system development process. Explain certainty factors, forward chaining, and backward chaining in expert systems. 18 M 5 4

OR

Q.11. Construct the hierarchy of knowledge layers in a knowledge-based agent and explain the role of each layer with suitable examples. 18 M 5 3

***** End*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**FUNDAMENTALS OF INTELLIGENT SYSTEMS**

(CSE- Artificial Intelligence and Machine Learning)

Time: 3Hrs

Max Marks: 100

PART-A (Answer all sub questions in Question 1)

Q.No.	Question	Marks	CO	BL
Q.1. a.	List the types of AI.	1	1	1
b.	List of the primary components of Intelligent system.	1	1	1
c.	Define the Randomized Search.	1	2	1
d.	List the search strategies in Artificial Intelligence.	1	2	1
e.	Define the Minimax rule.	1	3	1
f.	Define Heuristic function.	1	3	1
g.	List the Components of SAT formulation.	1	4	1
h.	Define real-world planning in AI.	1	4	1
i.	Define utility-based agent	1	5	1
j.	Identify which AI technology is used in recommender systems.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

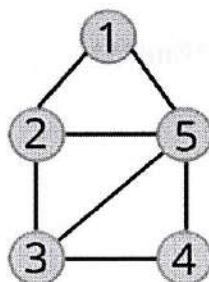
Q.2. a	Illustrate the evolution of computing from conventional systems to intelligent systems.	8 M	1	2
b	Analyze how Artificial Intelligence systems learn from data and improve their performance over time. Give an example.	10 M	1	4

OR

Q.3. a	Summarize the Challenges and limitations of intelligent systems.	6 M	1	2
b	Illustrate the Sensing–Thinking–Acting cycle with an example.	12 M	1	2

UNIT-II

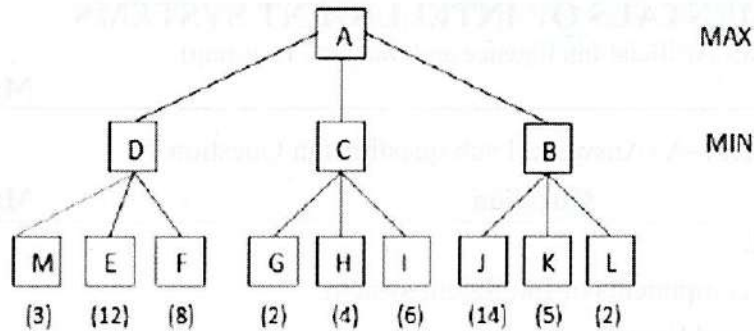
Q.4. a	Demonstrate the working principle of Genetic algorithm with an example.	10 M	2	2
b	Apply Depth First Search to the given search tree and determine whether the goal node is reached.	8 M	2	3

**OR**

Q.5. a	Compare DFS and BFS and justify which is better for deep search problems.	9 M	2	4
b	Apply the Hill Climbing algorithm to solve an optimization problem and explain each step involved in reaching the solution.	9 M	2	3

UNIT-III

- | | | | | |
|-------------|--|-----|---|---|
| Q.6. | a Compare Depth-Limited Search and Iterative Deepening Search. | 9 M | 3 | 4 |
| | b In the following two-ply game tree, the terminal nodes show the utility values computed by the utility function. Apply the Minimax algorithm to compute the utility values for other nodes in the given game tree. | 9 M | 3 | 3 |



OR

- | | | | | |
|-------------|---|-----|---|---|
| Q.7. | a Illustrate the architecture of Rules Based Expert Systems with a neat sketch. | 9 M | 3 | 2 |
| | b Demonstrate the working principle of AlphaBeta Pruning with an example. | 9 M | 3 | 2 |

UNIT-IV

- | | | | | |
|-------------|---|-----|---|---|
| Q.8. | a Analyse how STRIPS solves planning problems in the Blocks World domain. | 9 M | 4 | 4 |
| | b Illustrate Types of heuristic search in planning. | 9 M | 4 | 2 |
- OR**
- | | | | | |
|-------------|--|-----|---|---|
| Q.9. | a Apply Goal Stack Planning to achieve the goal: "Block A on Block B" in Blocks World. | 9 M | 4 | 3 |
| | b Analyse the role of durative actions in real-world planning systems with a suitable example. | 9 M | 4 | 4 |

UNIT-V

- | | | | | |
|--------------|--|-----|---|---|
| Q.10. | a Demonstrate how deliberative architecture supports reasoning and planning with an example. | 9 M | 5 | 2 |
| | b Illustrate about current trends, opportunities, and challenges in Artificial Intelligence. | 9 M | 5 | 2 |
- OR**
- | | | | | |
|--------------|---|-----|---|---|
| Q.11. | a Demonstrate the reactive architecture with its advantages and limitations. | 9 M | 5 | 2 |
| | b Explain hybrid agent architecture and discuss how it combines reactive and deliberative approaches. | 9 M | 5 | 2 |

*****End*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE**

(Common to ECE and CSE-DS)

Time: 3Hrs**Max Marks: 100****PART-A (Answer all sub questions in Question 1)**

Q.No.	Question	Marks	CO	BL
Q.1. a.	List any two applications of Artificial Intelligence in everyday life.	1	1	1
b.	List any two branches of AI.	1	1	1
c.	Give a real-world example of structured, semi-structured and unstructured data used in AI.	1	2	2
d.	Describe the characteristics of structured data in brief.	1	2	2
e.	What is Reinforcement Learning?	1	3	1
f.	Give an example for supervised learning.	1	3	2
g.	What is Natural Language Processing (NLP)?	1	4	1
h.	What is the significance of transparency in Responsible AI?	1	4	1
i.	Differentiate between General AI and Super AI.	1	5	2
j.	Mention any two AI applications in healthcare.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

Q.2.	Compare Narrow AI, General AI, and Super AI with suitable examples.	18 M	1	3
OR				
Q.3.	Examine the societal implications of widespread AI adoption and propose responsible AI practices.	18 M	1	4

UNIT-II

Q.4.	Describe the mean, median, mode and variance. Consider the dataset 5, 10, 15, 10, 20, 30, 40. Calculate the mean, median, mode and variance and interpret the results.	18 M	2	3
OR				
Q.5.	Demonstrate various methods used to improve data quality in an AI project.	18 M	2	3

UNIT-III

Q.6.	Explain the relationship between Artificial Intelligence, Machine Learning and Data science with suitable examples.	18 M	3	2
OR				
Q.7.	Demonstrate the use of Teachable Machine for building a simple image classification model.	18 M	3	3

UNIT-IV

Q.8.	Analyse the concept of Image recognition in AIML with suitable real-world examples.	18 M	4	2
OR				
Q.9.	Demonstrate the application of recommendation systems with examples such as NETFLIX and AMAZON recommendations.	18 M	4	3

UNIT-V

Q.10.	Demonstrate emerging AI applications in Smart cities and Smart homes.	18 M	5	3
OR				
Q.11.	Discuss the importance of AI-based accessibility tools for differently abled individuals.	18 M	5	2

*****End*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**ENGINEERING MECHANICS**

(Common to CE and ME)

Time: 3Hrs

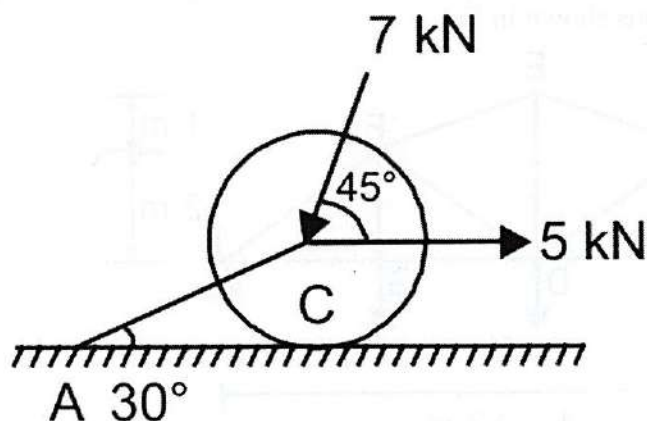
Max Marks: 100

PART-A (Answer all sub questions in Question 1)

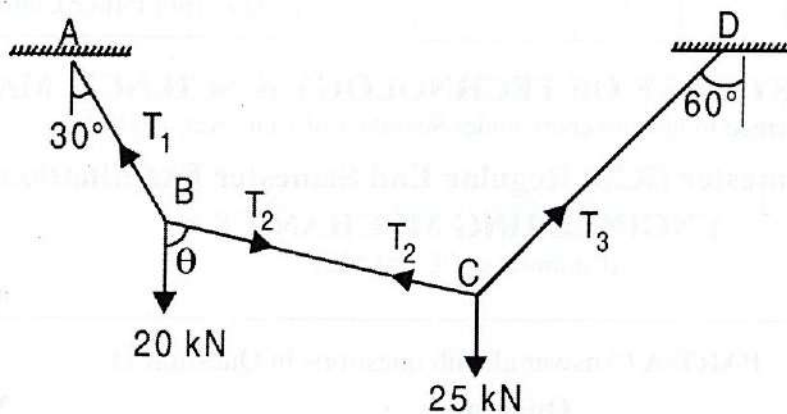
Q.No.	Question	Marks	CO	BL
Q.1. a.	Define free body diagram.	1	1	1
b.	State the principle of transmissibility of forces.	1	1	1
c.	What is meant by a deficient truss?	1	2	1
d.	State the assumptions made in truss analysis.	1	2	1
e.	Define centroid.	1	3	1
f.	State parallel axis theorem.	1	3	1
g.	Define coefficient of friction.	1	4	1
h.	What is angle of friction?	1	4	1
i.	Distinguish between rectilinear and curvilinear motion.	1	5	1
j.	State the law of conservation of momentum.	1	5	1

PART-B (Answer any one question from each of Units I to V)**UNIT-I**

- Q.2.** A roller of weight 10 kN rests on a smooth horizontal floor and is connected to the floor by the bar AC as shown in Fig. Determine the force in the bar AC and reaction from floor, if the roller is subjected to a horizontal force of 5 kN and an inclined force of 7 kN as shown in the figure.

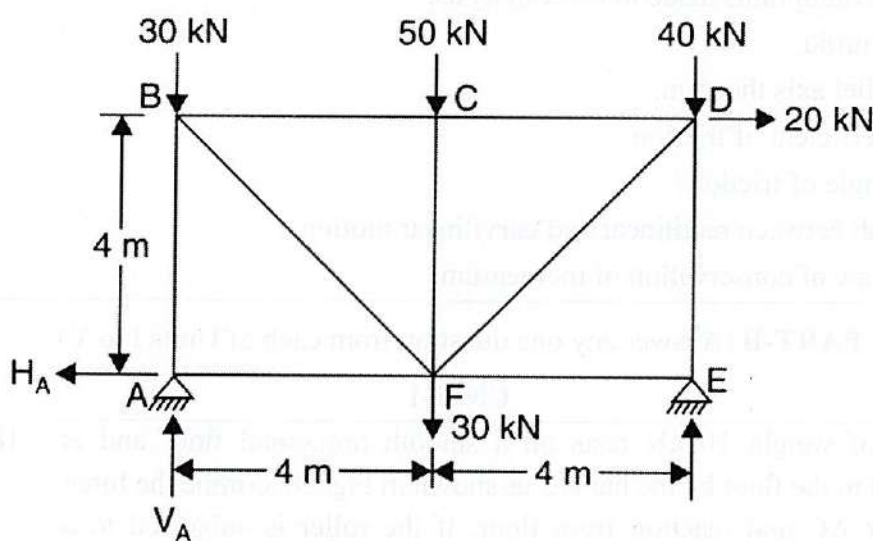
**OR**

- Q.3.** A wire is fixed at two points A and D as shown in Fig. Two weights 20 kN and 25 kN are supported at B and C, respectively. When equilibrium is reached it is found that inclination of AB is 30° and that of CD is 60° to the vertical. Determine the tension in the segments AB, BC and CD of the rope and also the inclination of BC to the vertical.



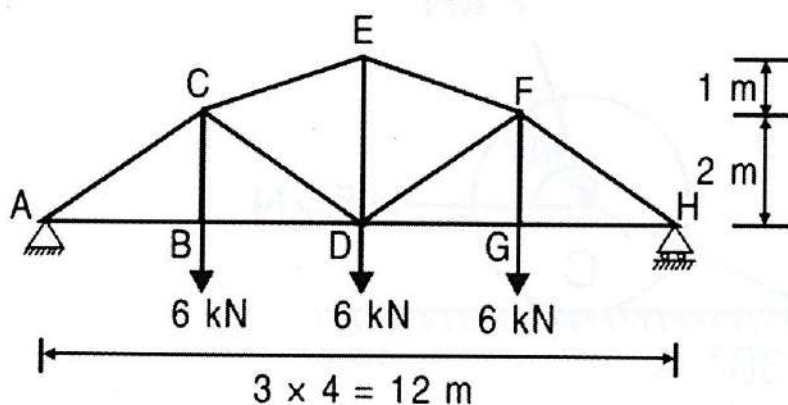
UNIT-II

- Q.4.** Determine the forces in the members of the truss using the method of joints shown in Fig. 18 M 2 4



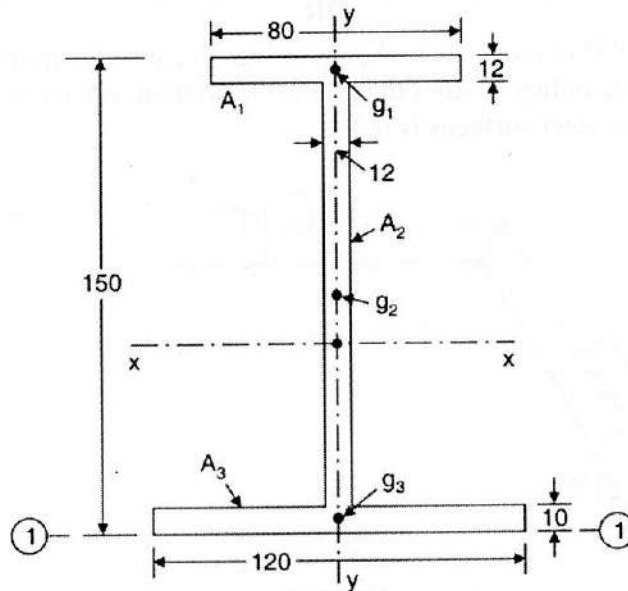
OR

- Q.5.** Find the forces in the members CE, CD and BD of the given truss using the method of sections shown in Fig. 18 M 2 4



UNIT-III

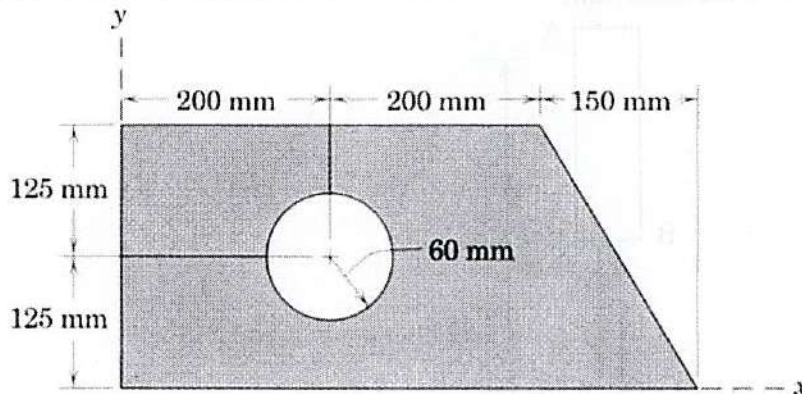
- Q.6.** Determine the polar moment of inertia of the I-section shown in the Fig. Also determine the radii of gyration with respect to the x-x axis and y-y axis. All the dimensions are in mm. 18 M 3 4



OR

Q.7. Determine the coordinates of the centroid of the shaded area

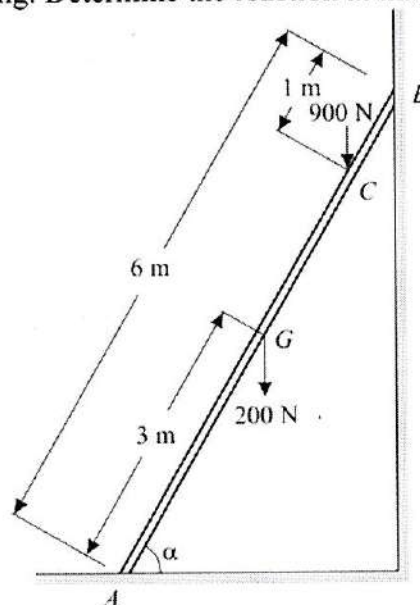
18 M 3 3



UNIT-IV

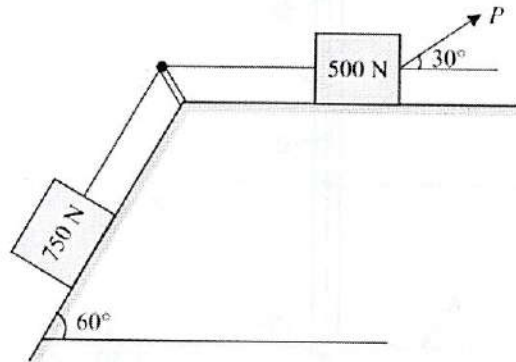
Q.8. The ladder shown in Figure is 6 m long and is supported by a horizontal floor and a vertical wall. The coefficient of friction between the floor and the ladder is 0.25 and between the wall and the ladder is 0.4. The weight of the ladder is 200 N and may be considered as a concentrated load at G. The ladder supports a vertical load of 900 N at C, which is at a distance of 1 m from B. Determine the least value of α at which the ladder may be placed without slipping. Determine the reaction at that stage.

18 M 4 4



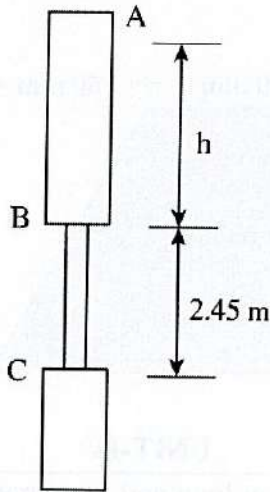
OR

- Q.9.** What is the value of P in the system shown in Fig. to cause the motion to impend? Assume the pulley is smooth and the coefficient of friction between the other contact surfaces is 0.2. 18 M 4 4



UNIT-V

- Q.10.** If a stone fall past a window of 2.45 m height in half second, find the height (h) from which the stone fall. 18 M 5 3



OR

- Q.11.** An elevator of mass 3000 kg is moving vertically upward with a constant acceleration. Starting from the rest it travels a distance of 40 m during an interval of 10 s. Find the cable tension during this time. $g=10 \text{ m/s}^2$ 18 M 5 3

End

SET-1

Hall Ticket No:

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Question Paper Code: 25BAMECEC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026**ENGINEERING GRAPHICS**

(Common to CE, EEE, ME, ECE)

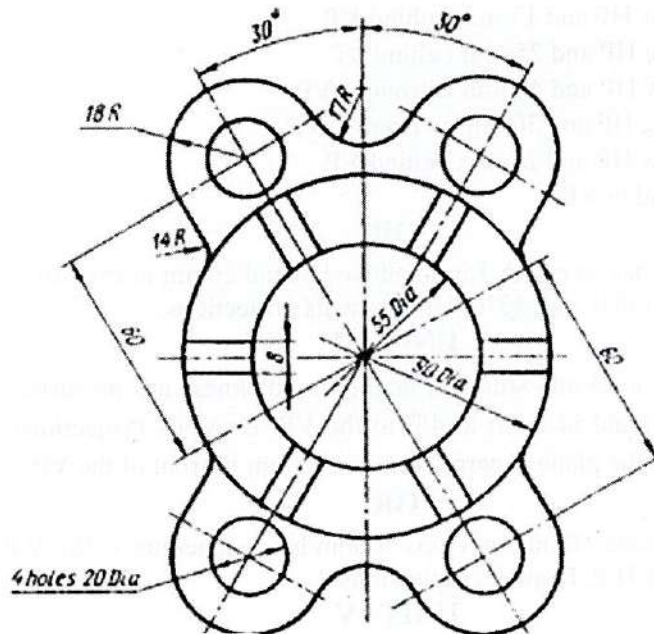
Time: 3Hrs**Max Marks: 100**

(Answer any one question from each of Units I to V)

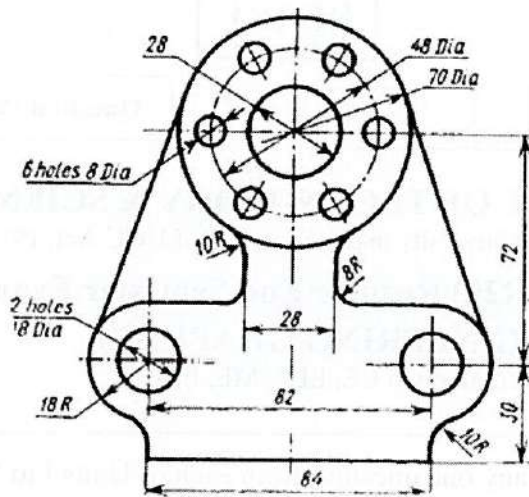
Q.No.	Question	Marks	CO	BL
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UNIT-I

- | | | | | |
|------|--|------|---|---|
| Q.1. | Draw the machine part, shown below and consider all the dimensions are in mm | 20 M | 1 | 3 |
|------|--|------|---|---|

**OR**

- | | | | | |
|------|--|------|---|---|
| Q.2. | Draw the following diagram shown below and consider all the dimensions are in mm | 20 M | 1 | 3 |
|------|--|------|---|---|



UNIT-II

- Q.3.** Draw the projection of the following points; 20 M 2 3
- A, in HP and 15 mm behind VP
 - B, 35 mm above HP and 10 mm Infront of VP
 - C, in the VP and 15 mm above HP
 - D, 25 mm below HP and 15 mm behind VP
 - E, 15 mm above HP and 25 mm behind VP
 - F, 30 mm below HP and 40 mm Infront of VP
 - G, 20 mm above HP and 30 mm in front of VP
 - H, 35 mm below HP and 25 mm behind VP
 - I, both in HP and in VP

OR

- Q.4.** A line AB, 70mm long, has its end A 15mm above HP and 20mm in front of VP. It is inclined at 30° to HP and 45° to VP. Draw its projections. 20 M 2 3

UNIT-III

- Q.5.** A hexagonal Plate with a 30 mm side and negligible thickness has its surface perpendicular to the HP and inclined at 45° to the VP. Draw its Projections? When one of its sides of the plane is parallel to and 20 mm in front of the VP. 20 M 3 3

OR

- Q.6.** A Cylinder of base diameter 50 mm and axis 70 mm has a generator in the V.P and inclined at 30° to the H.P. Draw its projections. 20 M 3 3

UNIT-IV

- Q.7.** A square pyramid, base 35 mm side and axis 55 mm long, has its base on the HP with two edges of the base perpendicular to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view, sectional side view and true shape of the section. 20 M 4 3

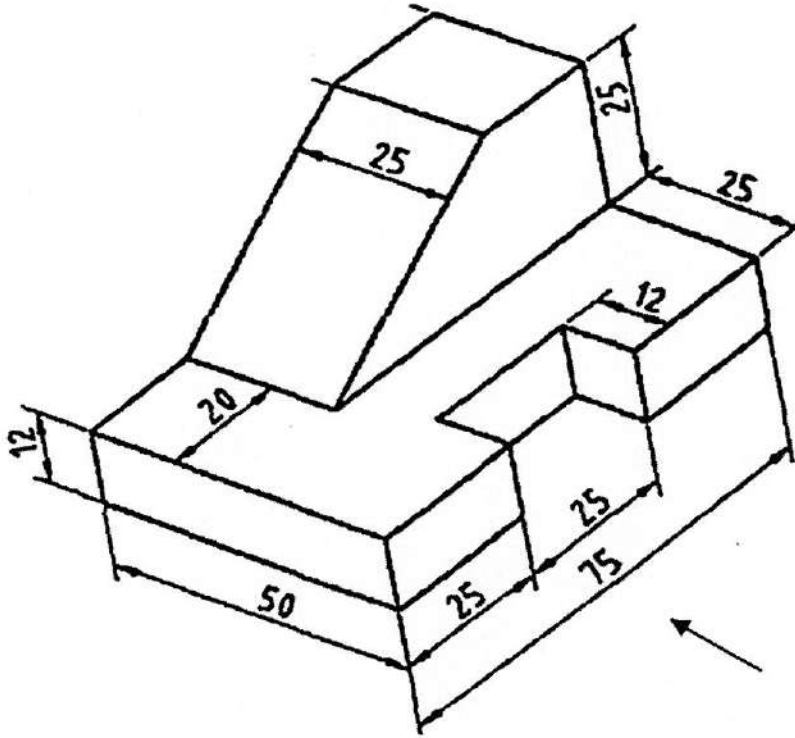
OR

- Q.8.** A hexagonal prism of side of base 40 mm and axis 80 mm long is resting on its base on H.P. such that a rectangular face is parallel to V.P. It is cut by a section plane perpendicular to V.P. and inclined at 30° to H.P. The section plane is passing through the axis at a height of 40mm from the base. Draw the development of the lateral surface of the cut prism, Use parallel line method. 20 M 4 3

UNIT-V

- Q.9.** Draw the orthographic projections (FV, TV and SV) for the following mechanical component. All Dimensions are in mm 20 M 5 3

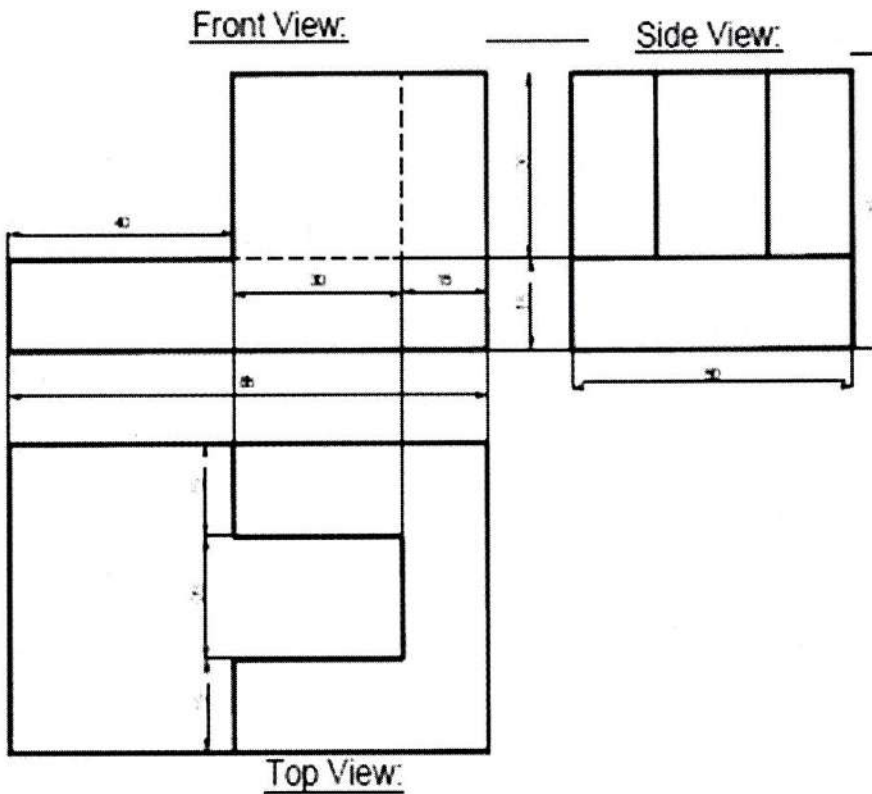
SET-1



OR

Q.10. Draw the isometric View from the given orthographic views of a solid

20 M 5 3



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Question Paper Code: 25BAMECEC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026

ENGINEERING GRAPHICS

(Common to CE, EEE, ME, ECE)

Time: 3Hrs

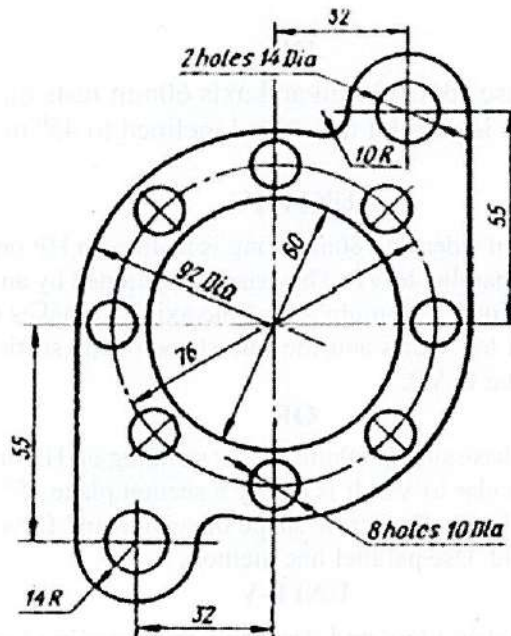
Max Marks: 100

(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
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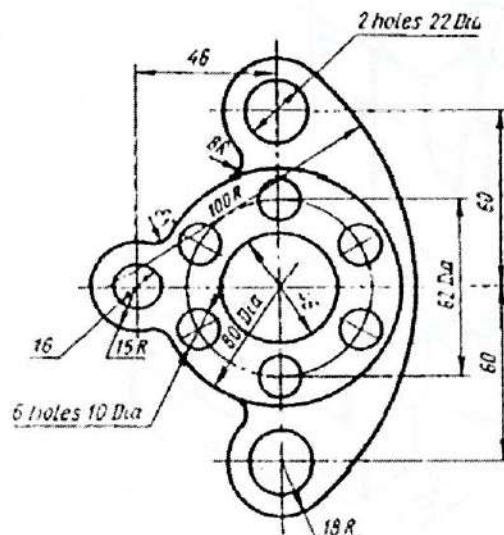
UNIT-I

Q.1.	Draw the following machine component profile, all the dimensions are in mm	20 M	1	3
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OR

Q.2.	Draw the following machine component shown below, all the dimensions are in mm	20 M	1	3
-------------	--	------	---	---



UNIT-II

- Q.3. Draw the orthographic projections of the following points?** 20 M 2 3
- (a) Point P is 40 mm above H.P and 50 mm in front of VP
 (b) Point Q is 35 mm above H.P and 45 mm behind VP
 (c) Point R is 45 mm below H.P and 50 mm behind VP
 (d) Point S is 45 mm below H.P and 50 mm in front of VP
 (e) Point T is in H.P and 40 mm behind VP
 (f) Point U is in V.P and 50 mm below HP
 (g) Point V is in V.P and 45 mm above H.P
 (h) Point W is in H.P and 50 mm in front of VP

OR

- Q.4. Front View of line AB 50° inclined to XY and measures 55mm, its top view 60° inclined XY. End A is 10mm above HP and 15mm in front of VP. Find TL, θ , ϕ .** 20 M 2 3

UNIT-III

- Q.5. A circular plane with a 60mm diameter is resting on a point its circumference on the VP. The center is 40mm above the HP, and the surface is inclined at 45° to the VP. And perpendicular to the HP. Draw its projections?** 20 M 3 3

OR

- Q.6. A pentagonal prism of base edge 30 mm and axis 60mm rests on edge of its base in the HP. Its axis is parallel to VP and inclined to 45° to the HP. Draw its Projections?** 20 M 3 3

UNIT-IV

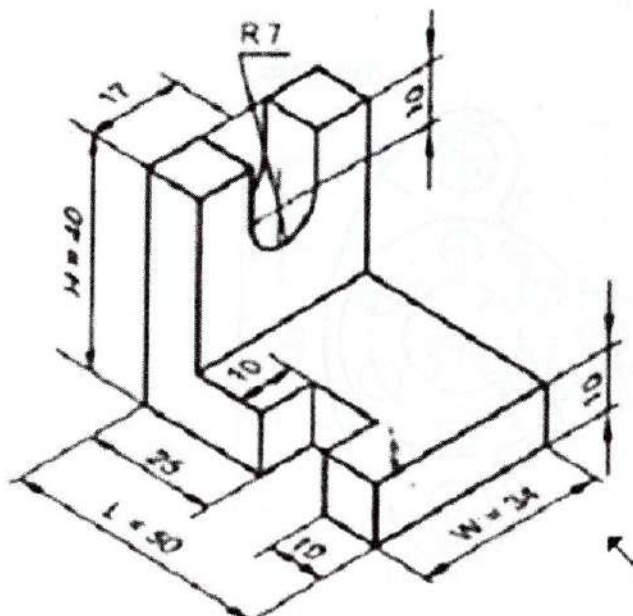
- Q.7. A Hexagonal prism of 30mm sides and 80mm long is resting on HP on its base with two of its lateral faces parallel to VP. The prism is sectioned by an inclined section plane that passes through the midpoint of the axis and makes 60° with the HP. Draw the sectional top views and the true shape of the section of the section plane is perpendicular to VP.** 20 M 4 3

OR

- Q.8. A Pentagonal Prism 25mm base side & 60mm axis is standing on HP on its base whose one side is perpendicular to VP. It is cut by a section plane 45° inclined to HP, through mid-point of axis. Draw true shape of section and Development of surface of remaining Solid. Use parallel line method.** 20 M 4 3

UNIT-V

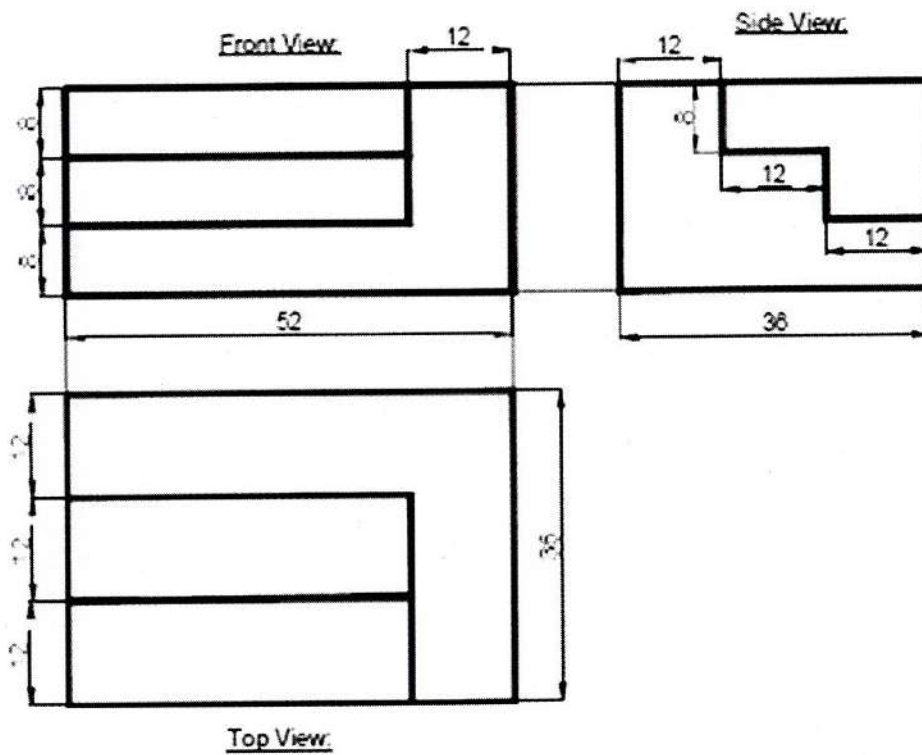
- Q.9. Study the following isometric view and draw the orthographic views (FV, TV and SV). All the dimensions are in mm** 20 M 5 3



SET-2

OR

Q.10. Draw the isometric View from the given orthographic views of a solid 20 M 5 3



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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026

ENGINEERING GRAPHICS

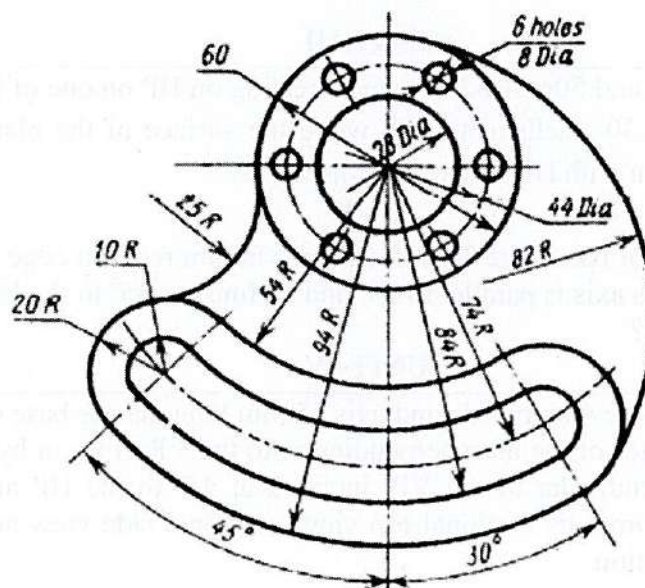
(Computer Science & Engineering)

Time: 3Hrs

Max Marks: 100

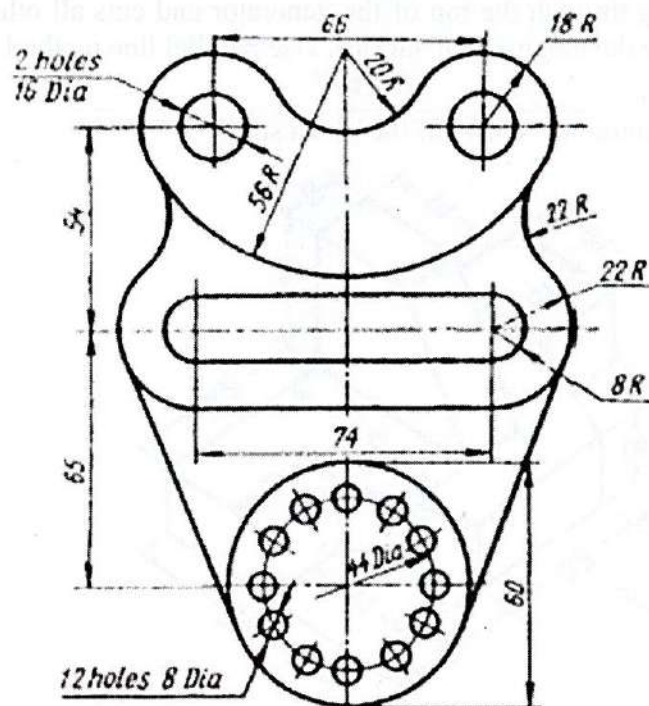
(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
UNIT-I				
Q.1	Draw the below diagram and consider all the dimensions are in millimetre	20	1	3



OR

Q.2	Draw the simple diagram and consider all the dimensions are millimetre	20	1	3
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UNIT-II

- | | | | | |
|------------|--|----|---|---|
| Q.3 | Draw the orthographic projections of the following points?
(a) Point P is 40 mm above H.P and 50 mm in front of VP
(b) Point Q is 35 mm above H.P and 45 mm behind VP
(c) Point R is 45 mm below H.P and 50 mm behind VP
(d) Point S is 55 mm below H.P and 60 mm in front of VP
(e) Point T is in H.P and 60 mm behind VP
(f) Point U is in V.P and 50 mm below HP
(g) Point V is in V.P and 65 mm above H.P
(h) Point W is in H.P and 50 mm in front of VP | 20 | 2 | 3 |
|------------|--|----|---|---|

OR

- | | | | | |
|-------------|--|----|---|---|
| Q.4. | A line AB 80mm long is inclined at an angle of 30° to H.P and 45° to V.P. The point A is 15mm above H.P. and 20mm in front of V.P. Draw the projections of the straight line and determine angles made by Front View and Top View. | 20 | 2 | 3 |
|-------------|--|----|---|---|

UNIT-III

- | | | | | |
|-------------|--|----|---|---|
| Q.5. | A Rectangle 30mm and 50mm sides plane is resting on HP on one of its small side which is 30° inclined to VP, while the surface of the plane makes 45° inclination with HP. Draw its projections? | 20 | 3 | 3 |
|-------------|--|----|---|---|

OR

- | | | | | |
|-------------|---|----|---|---|
| Q.6. | A pentagonal prism of base edge 30 mm and axis 60mm rests on edge of its base in the HP. Its axis is parallel to VP and inclined to 45° to the HP. Draw its Projections? | 20 | 3 | 3 |
|-------------|---|----|---|---|

UNIT-IV

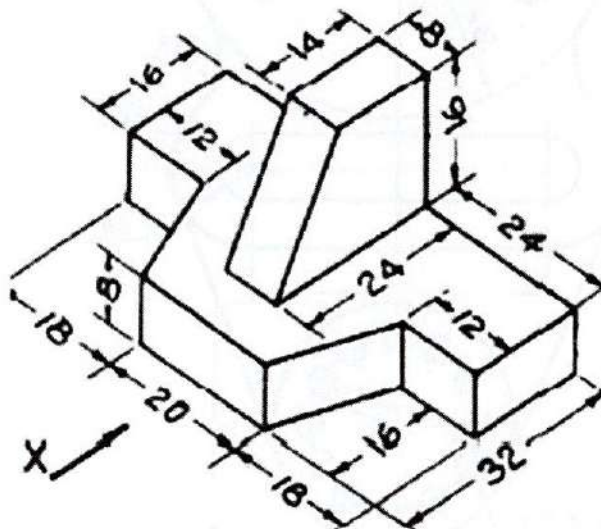
- | | | | | |
|-------------|---|----|---|---|
| Q.7. | A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP with two edges of the base perpendicular to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view, sectional side view and true shape of the section. | 20 | 4 | 3 |
|-------------|---|----|---|---|

OR

- | | | | | |
|-------------|---|----|---|---|
| Q.8. | A Cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to VP and inclined at 45° to HP passing through the top of the generator and cuts all other generators. Draw the development of surface. Use parallel line method. | 20 | 4 | 3 |
|-------------|---|----|---|---|

UNIT-V

- | | | | | |
|-------------|---|----|---|---|
| Q.9. | Draw the three Orthographic Views of the given solid. | 20 | 5 | 3 |
|-------------|---|----|---|---|

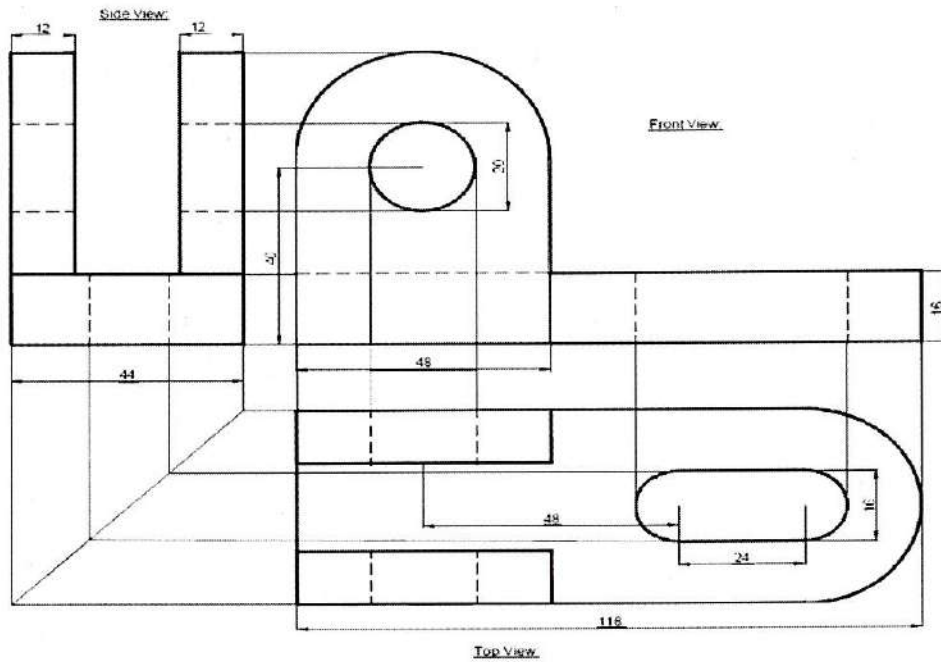


SET-3

OR

Q.10. Draw the isometric View from the given orthographic views of a solid

20 5 3



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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026

ENGINEERING GRAPHICS

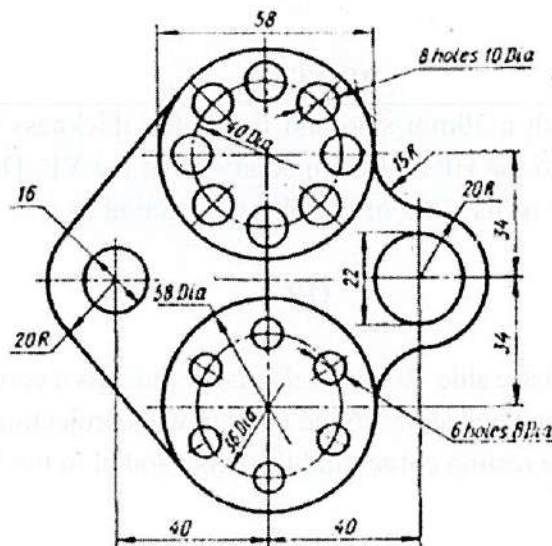
(Computer Science & Engineering)

Time: 3Hrs

Max Marks: 100

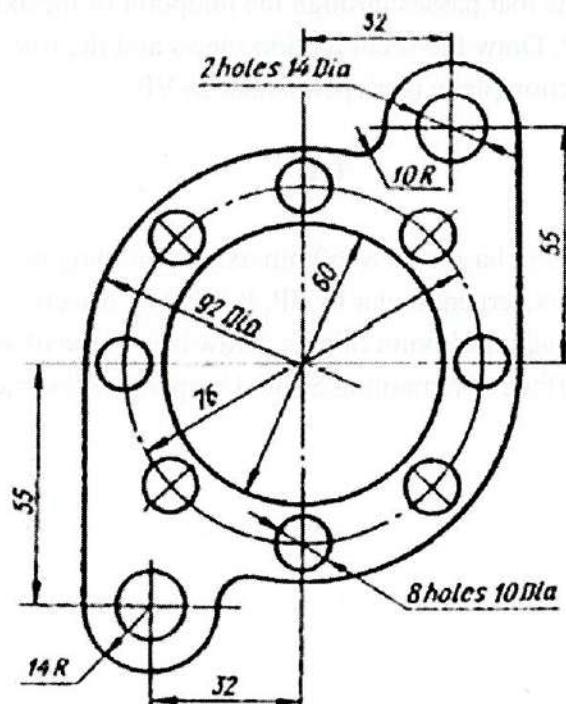
(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
UNIT-I				
Q.1.	Draw the below diagram and consider all the dimensions are in millimeter	20	1	3



OR

Q.2.	Draw the simple diagram and consider all the dimensions are millimetre	20	1	3
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UNIT-II

Q.3.	Draw the orthographic projections of the following points?	20	2	3
	(a) Point P is 30 mm above H.P and 40 mm in front of VP			
	(b) Point Q is 45 mm above H.P and 55 mm behind VP			
	(c) Point R is 35 mm below H.P and 60 mm behind VP			
	(d) Point S is 45 mm below H.P and 50 mm in front of VP			
	(e) Point T is in H.P and 50 mm behind VP			
	(f) Point U is in V.P and 40 mm below HP			
	(g) Point V is in V.P and 45 mm above H.P			
	(h) Point W is in H.P and 60 mm in front of VP			

OR

Q.4.	Front View of line AB 50° inclined to XY and measures 55mm, its top view 60° inclined XY. End A is 10mm above HP and 15mm in front of VP. Find TL, θ , ϕ .	20	2	3
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UNIT-III

Q.5.	A hexagonal Plate with a 30mm side and negligible thickness has its surface perpendicular to the HP and inclined at 45° to the VP. Draw its Projections? When one of its sides of the plane is parallel to and 15 mm in front of the VP.	20	3	3
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OR

Q.6.	A pentagonal prism of base side 30 mm and axis 70 mm has a corners on the HP and the axis is inclined at 45° to the HP. Draw its projection when the plane containing the resting corner and the axis parallel to the VP.	20	3	3
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UNIT-IV

Q.7.	A Hexagonal prism of 30mm sides and 80mm long is resting on HP on its base with two of its lateral faces parallel to VP. The prism is sectioned by an inclined section plane that passes through the midpoint of the axis and makes 60° with the HP. Draw the sectional top views and the true shape of the section of the section plane is perpendicular to VP.	20	4	3
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OR

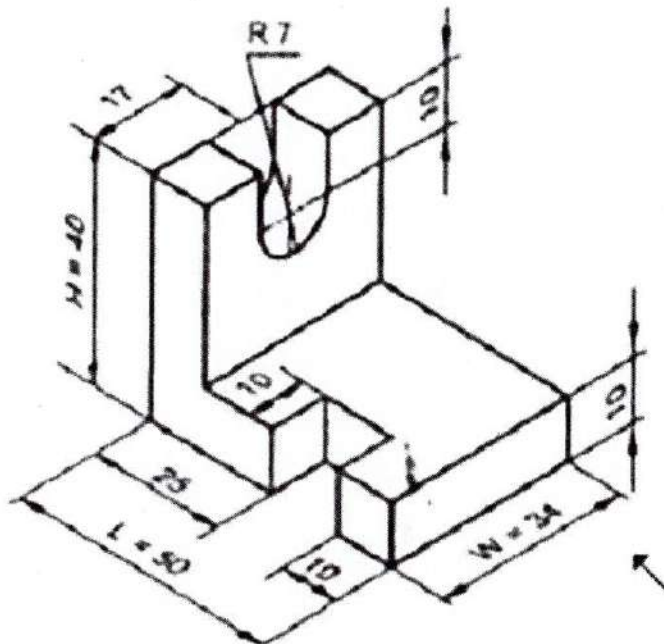
Q.8.	A Pentagonal Prism 30mm base side & 60mm axis is standing on HP on its base whose one side is perpendicular to VP. It is cut by a section plane 45° inclined to HP, through mid-point of axis. Draw true shape of section and Development of surface of remaining Solid. Use parallel line method.	20	4	3
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SET-4

UNIT-V

Q.9. Draw the three Orthographic Views of the given solid.

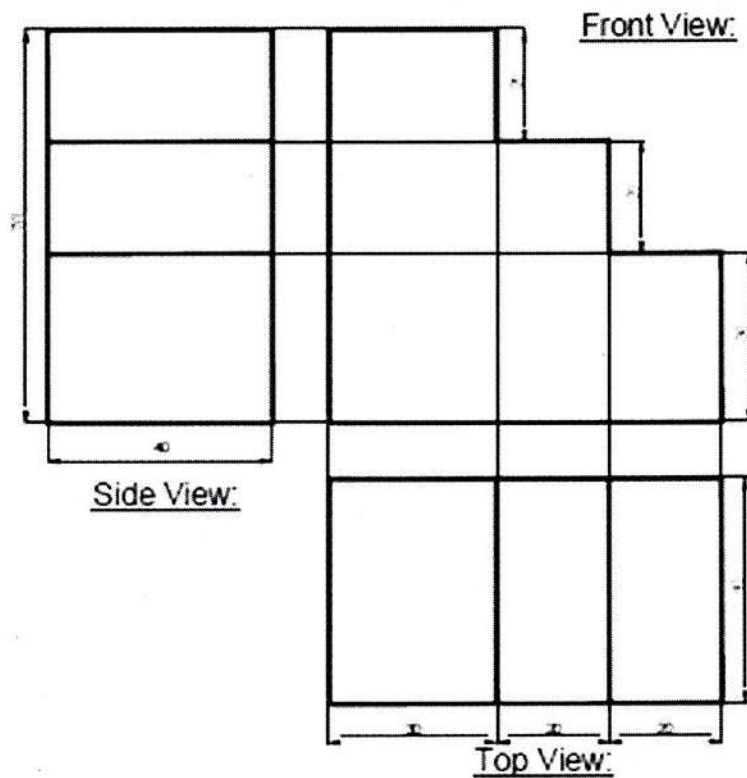
20	5	3
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OR

Q.10. Draw the isometric View from the given orthographic views of a solid

20 5 3



End

SET-5

[illegible]

Question Paper Code: 25BAMECEC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026

ENGINEERING GRAPHICS

(Common to CSE, CCS)

Time: 3Hrs**Max Marks: 100**

(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
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UNIT-I

- | | | | |
|-------------|--|------|-----|
| Q.1. | Redraw Figure 1 given below by implementing proper BIS Standards of scaling and dimensioning using AutoCAD software. (All dimensions are in mm) <i>(Note: The holes are 25 mm equidistant from the origin)</i> | 20 M | 1 3 |
|-------------|--|------|-----|

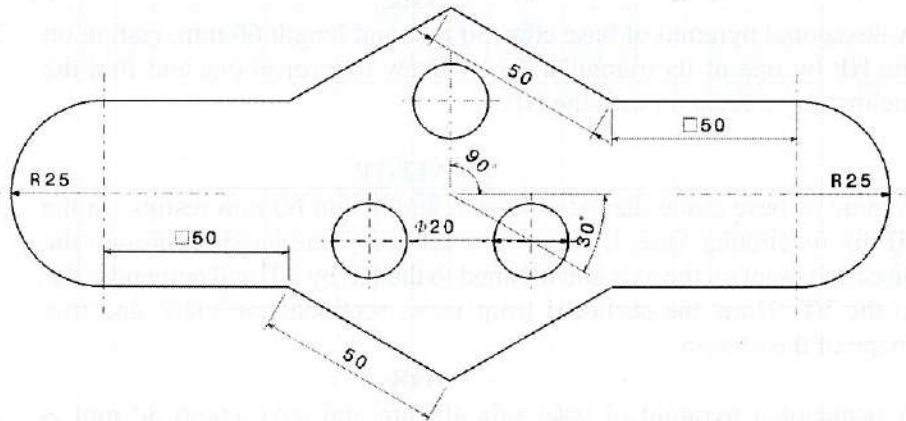


Figure 1

OR

- Q.2.** Redraw Figure 2 given below by implementing proper BIS Standards of scaling and dimensioning manually on an A3 sheet. (All dimensions are in mm) (*Follow the scaling-down approach and mention the scale used*)

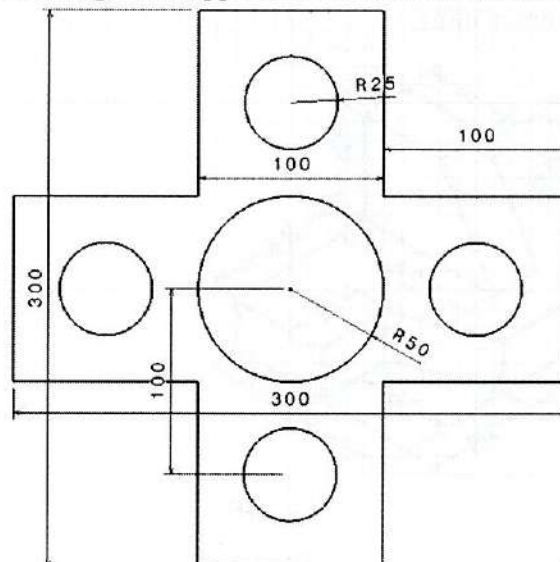


Figure 2

UNIT-II

- | | | | | |
|-------------|--|------|---|---|
| Q.3. | Draw the projections of a following points in a single XY line | 20 M | 2 | 3 |
| | a Point A is 40 mm above HP & 50 mm in front of VP | | | |
| | b Point B is 45 mm below HP & 30 mm behind VP | | | |
| | c Point C is in HP & 40 mm behind VP | | | |
| | d Point D is 35 mm below HP & is in VP | | | |

OR

- | | | | | |
|-------------|--|------|---|---|
| Q.4. | Line AB measures 20 cm in length, inclined to HP and VP by 30° and 35° , respectively. The point A of the line is 4 cm AHP and 5 cm IVP. Draw its scaled-down projections and find:
i. The apparent lengths,
ii. The apparent inclinations, and
iii. The distance between the end projectors. | 20 M | 2 | 3 |
|-------------|--|------|---|---|

UNIT-III

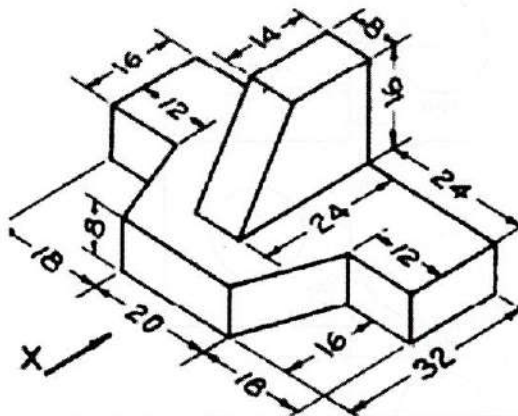
- | | | | | |
|-------------|--|------|---|---|
| Q.5. | A rectangular plate, 20 mm $\times$ 40 mm, is resting on the HP such that its top view appears as a square of side 20 mm. Draw its projections when the resting side is inclined at 30° to the VP. Find the surface inclination of the plate with the HP. | 20 M | 3 | 3 |
|-------------|--|------|---|---|
- OR
- | | | | | |
|-------------|---|------|---|---|
| Q.6. | A hexagonal pyramid of base edge 30 mm and length 60 mm, resting on the HP by one of its triangular faces. Draw its projections and find the inclination of the axis with the HP. | 20 M | 3 | 3 |
|-------------|---|------|---|---|

UNIT-IV

- | | | | | |
|-------------|--|------|---|---|
| Q.7. | A cone of base circle diameter 40 mm and height 60 mm resting on the HP by its circular face. It is cut by a section plane passing through the bisection point on the axis and inclined to the HP by 30° and perpendicular to the VP. Draw the sectional front view, sectional top view, and true shape of the section. | 20 M | 4 | 3 |
|-------------|--|------|---|---|
- OR
- | | | | | |
|-------------|---|------|---|---|
| Q.8. | A pentagonal pyramid of base side 40 mm and axis length 80 mm is resting on the HP such that one of its base edges is parallel to and away from the VP. It is sectioned by a plane inclined to the HP by 55° & passing through a mid-point on the axis. Draw its development at the sectioned surface. | 20 M | 4 | 3 |
|-------------|---|------|---|---|

UNIT-V

- | | | | | |
|-------------|---|------|---|---|
| Q.9. | Draw the plan, front and side elevations of the image shown in Figure 3: (All dimensions are in mm) | 20 M | 5 | 3 |
|-------------|---|------|---|---|



OR

SET-5

Q.10. Convert the following orthographic views shown in Figure 4 into the Isometric view. 20 M 5 3

(Assume each dashed square has a side of dimension 20 mm)

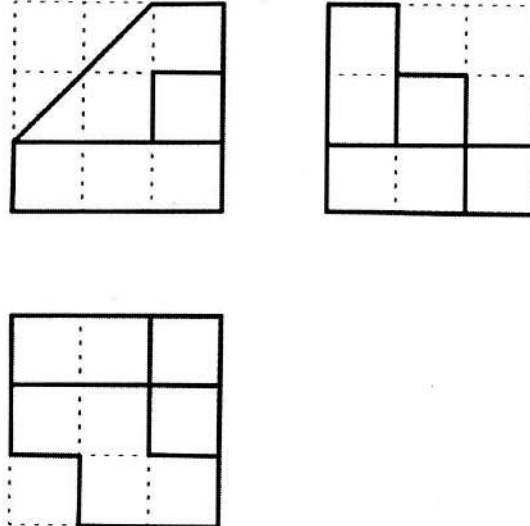


Figure 3

End

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B.Tech. I Year II Semester (R25) Regular End Semester Examinations - June 2026

ENGINEERING GRAPHICS

(Common to CSE, CCS)

Time: 3Hrs

Max Marks: 100

(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
UNIT-I				
Q.1.	Redraw Figure 1 given below by implementing proper BIS Standards of scaling and dimensioning using AutoCAD software. (All dimensions are in mm)	20 M	1	3

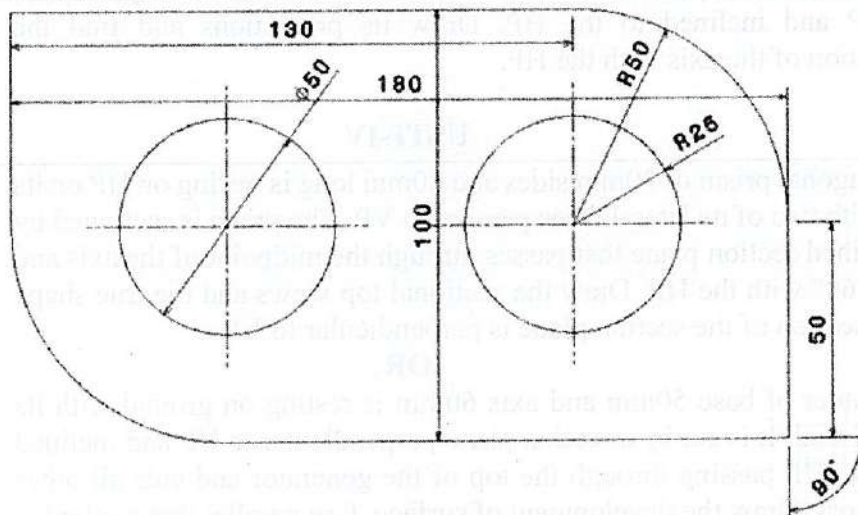


Figure 1

OR

Q.2.	Redraw Figure 2 given below by implementing proper BIS Standards of scaling and dimensioning manually. (All dimensions are in mm)	20 M	1	3
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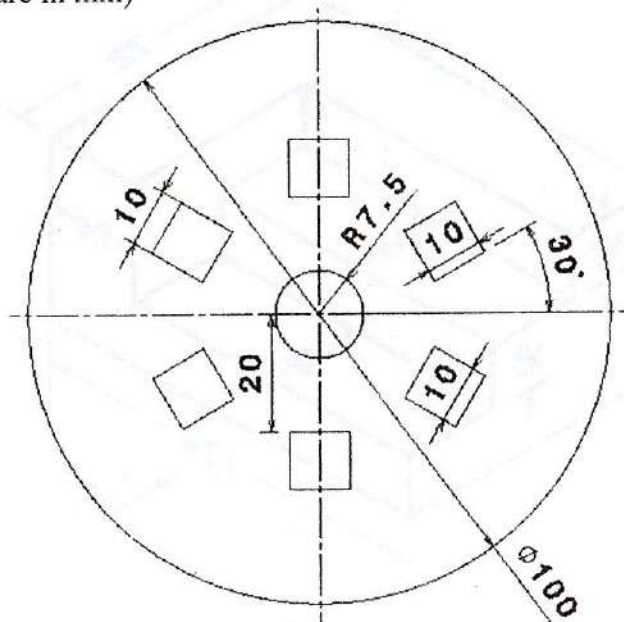


Figure 2

UNIT-II

- Q.3.** Draw the projections of a following points in a single XY line 20 M 2 3
- Point P is 40 mm below HP & 50 mm behind VP
 - Point Q is in HP and 30 mm in front of the VP
 - Point R is 30 mm above HP and 30 mm behind VP
 - Point S is 50 mm below HP and in VP
- OR**
- Q.4.** A line PQ measures 80 mm in length, having its point P 50 mm AHP, and 15 mm IVP, whereas the point Q is on the HP, and 50 mm IVP. Draw its projections and find the true and apparent inclinations. 20 M 2 3

UNIT-III

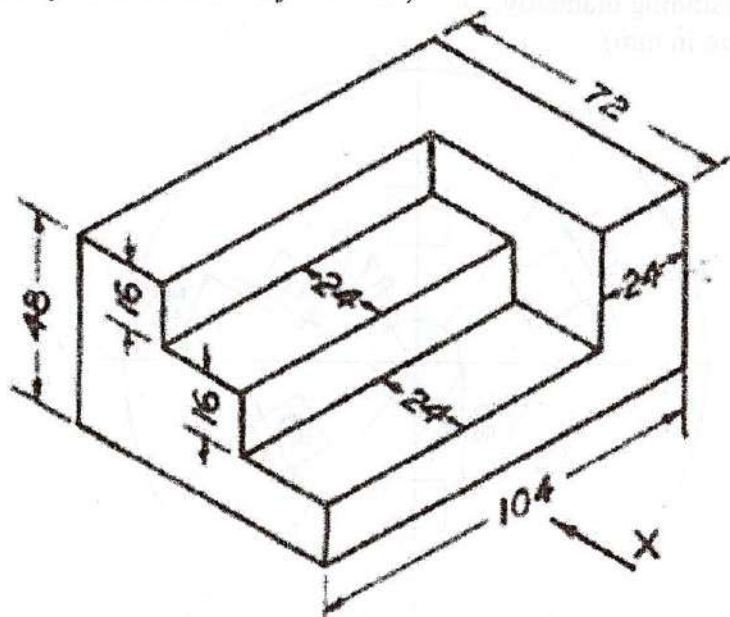
- Q.5.** A pentagonal sheet of side dimension 45 mm is resting on the HP by one of its corners such that one of its sides is parallel to the VP and nearer to it, in the first position. Then, the surface of the sheet is inclined to HP by 50° and VP by 40° . Draw its projections. 20 M 3 3
- OR**
- Q.6.** A cone of base circle diameter 50 mm and axis height 80 mm is freely suspended from a point on its base circle such that the axis is parallel to the VP and inclined to the HP. Draw its projections and find the inclination of the axis with the HP. 20 M 3 3

UNIT-IV

- Q.7.** A Hexagonal prism of 30mm sides and 80mm long is resting on HP on its base with two of its lateral faces parallel to VP. The prism is sectioned by an inclined section plane that passes through the midpoint of the axis and makes 60° with the HP. Draw the sectional top views and the true shape of the section of the section plane is perpendicular to VP. 20 M 4 3
- OR**
- Q.8.** A Cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to VP and inclined at 45° to HP passing through the top of the generator and cuts all other generators. Draw the development of surface. Use parallel line method. 20 M 4 3

UNIT-V

- Q.9.** Draw the Orthographic projection of the image shown in the below Figure 20 M 5 3
(Assume any direction as the front view)



OR

SET-6

- Q.10. Convert the following orthographic views shown in Figure 4 into the Isometric view. 20 M 5 3
(Assume suitable dimensions)

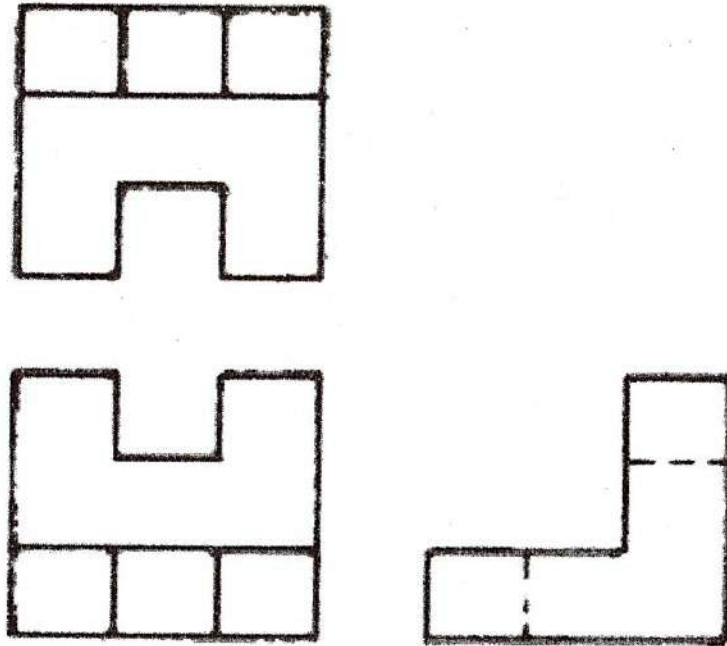


Figure 4

End

Hall Ticket No:

Question Paper Code: 25BAMECEC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

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B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026

ENGINEERING GRAPHICS

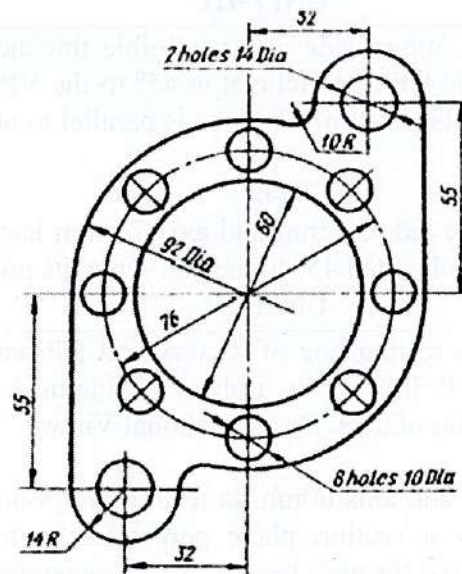
(Common to CAI, CDS, CAM)

Time: 3Hrs

Max Marks: 100

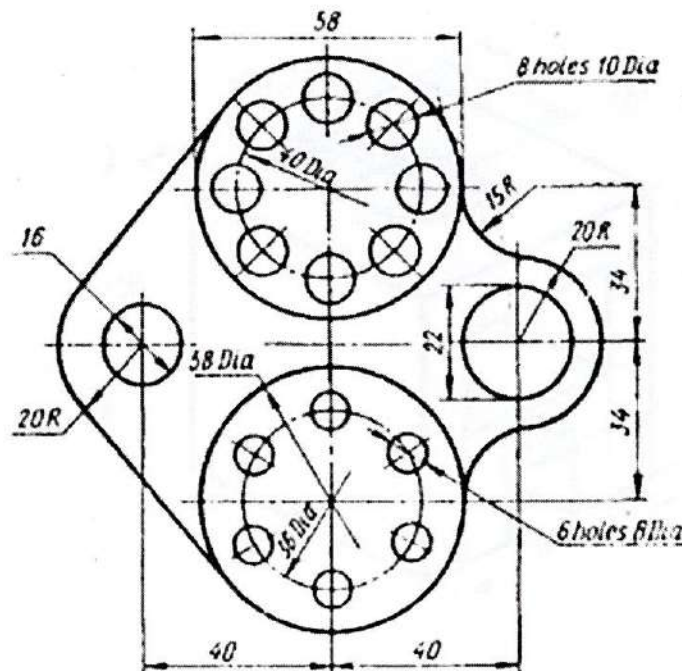
(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
UNIT-I				
Q.1.	Draw the simple diagram and consider all the dimensions are millimeter	20 M	1	3



OR

Q.2.	Draw the below diagram and consider all the dimensions are in millimeter	20 M	1	3
------	--	------	---	---



UNIT-II

- Q.3.** (i) Draw the projections of the following points on the same ground line and keep the distance between the projectors as 50mm. Name the quadrants in which they are? 20 M 2 3
- a) Point P – 50mm in front of the VP & 30mm above the HP
b) Point Q – 65mm below the HP and on the VP
c) Point R – 35mm below the HP and 50mm behind the VP
d) Point S – 40mm above the HP and 45mm in front of the VP
(ii). Two points F and G are on HP. The point F being 30mm in front of VP while G is 40mm behind VP. The line joining their top views makes an angle of 45° with XY. Find the horizontal distance between two points.

OR

- Q.4.** A line AB 80mm long is inclined at an angle of 30° to H.P and 45° to V.P. The point A is 15mm above H.P. and 20mm in front of V.P. Draw the projections of the straight line and determine apparent lengths and apparent inclinations. 20 M 2 3

UNIT-III

- Q.5.** A hexagonal Plate with a 30mm side and negligible thickness has its surface perpendicular to the HP and inclined at 45° to the VP. Draw its Projections? When one of its sides of the plane is parallel to and 15 mm in front of the VP. 20 M 3 3

OR

- Q.6.** A pentagonal prism of base side 30 mm and axis 70 mm has a corners on the HP and the axis is inclined at 45° to the HP. Draw its projections. 20 M 3 3

UNIT-IV

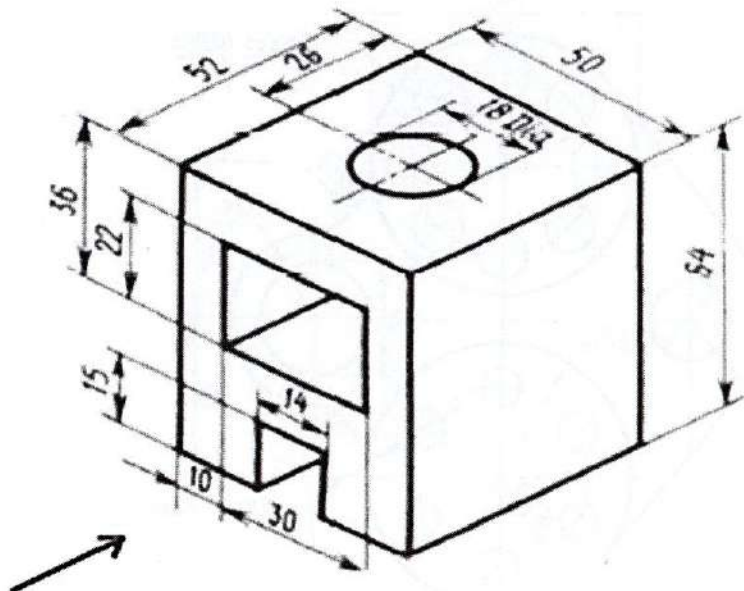
- Q.7.** A Cube of 50mm edges is resting one of its faces on HP with vertical faces equally inclined to VP. It is cut by a plane 45° inclined to HP and passing through the midpoint of axis. Draw Sectional Views. 20 M 4 3

OR

- Q.8.** A Cylinder of base 50mm and axis 60mm is resting on ground with its axis vertical. It is cut by a section plane perpendicular to VP and inclined at 45° to HP passing through the top of the generator and cuts all other generators. Draw the development of surface. Use parallel line method. 20 M 4 3

UNIT-V

- Q.9.** Draw the three Orthographic Views of the given solid. 20 M 5 3



SET-7

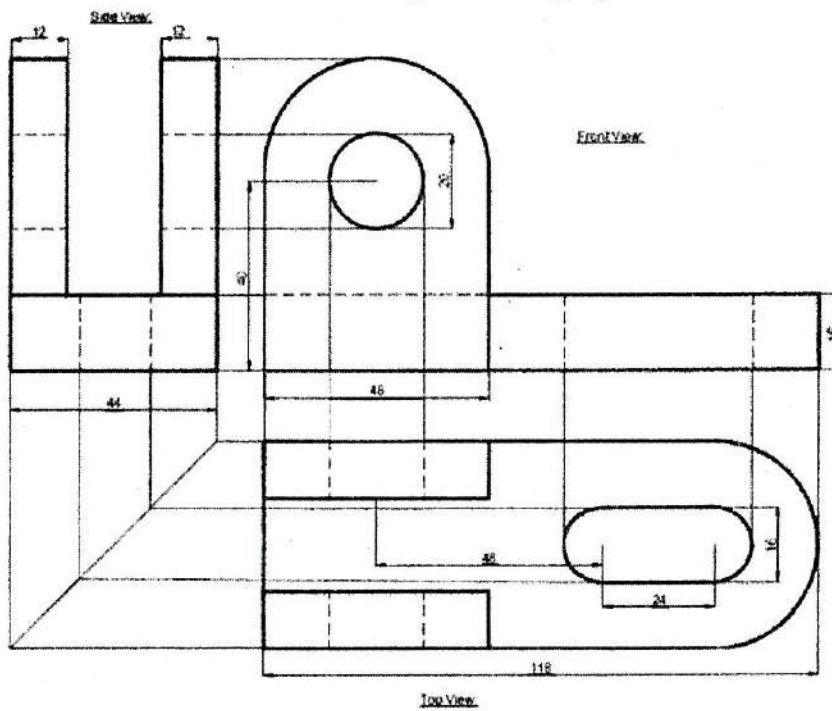
OR

Q.10. Draw the isometric View from the given orthographic views of a solid

20 M

5

3



End

Hall Ticket No:

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Question Paper Code: 25BAMECEC01

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

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ENGINEERING GRAPHICS

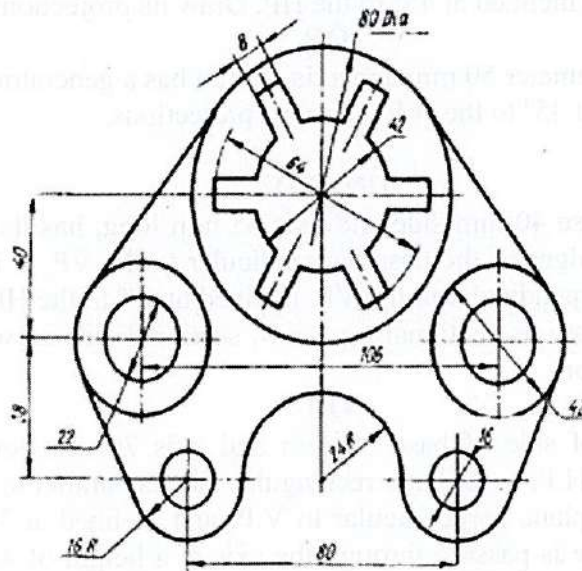
(Common to CAI, CDS, CAM)

Time: 3Hrs

Max Marks: 100

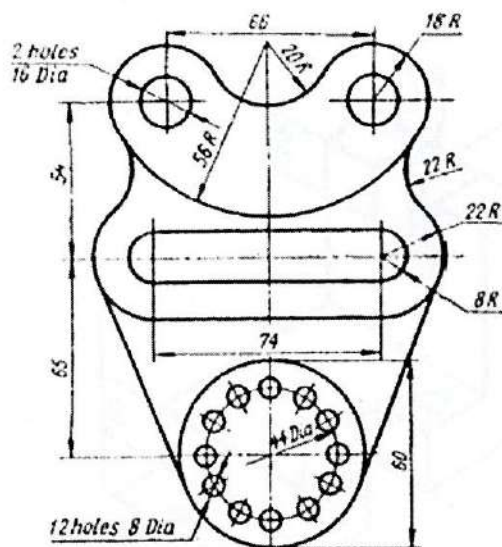
(Answer any one question from each of Units I to V)

Q.No.	Question	Marks	CO	BL
	UNIT-I			
Q.1.	Draw the simple diagram and consider all the dimensions are millimeter	20 M	1	3



OR

Q.2.	Draw the simple diagram and consider all the dimensions are millimeter	20 M	1	3
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UNIT-II

- Q.3.** (1) Draw the projections of the following points on the same reference line by keeping the distance between projectors as 40mm. 20 M 2 3
- E – 30mm below HP and 50mm behind VP
 - F – 40mm above HP and 60mm behind VP
 - G – 50mm above HP and 60mm in front of VP
 - H – 40mm below HP and 30mm in front of VP
- (2) A point A is 15mm above HP and 20mm in front of VP. Another point B is 25mm behind VP and 40mm below HP. Draw the projection of A and B. Keep the distance between the projectors equal to 90mm. Draw straight line joining (i) The Top View (ii) The Front View

OR

- Q.4.** Front View of line AB 50° inclined to XY and measures 55mm, its top view 60° inclined XY. End A is 10mm above HP and 15mm in front of VP. Find TL, θ , ϕ . 20 M 2 3

UNIT-III

- Q.5.** A pentagonal Plane with a 30mm side has an edge on the HP, the surface of the plane is inclined at 45° to the HP. Draw its projections? 20 M 3 3

OR

- Q.6.** A Cylinder of base diameter 50 mm and axis 70 mm has a generator in the V.P and inclined at 45° to the H.P. Draw its projections. 20 M 3 3

UNIT-IV

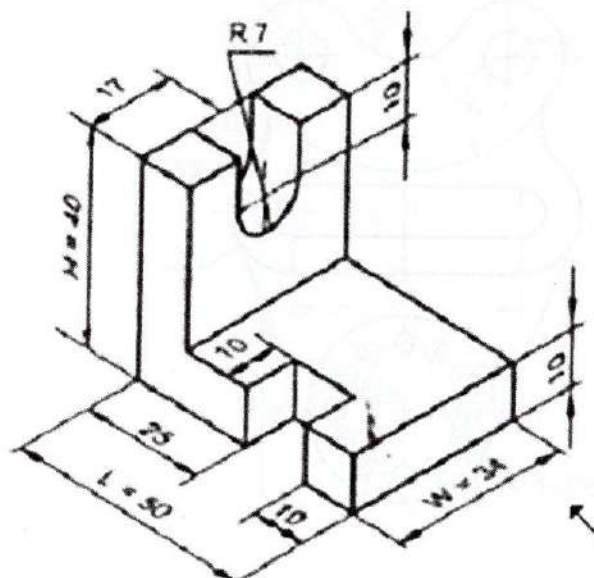
- Q.7.** A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP with two edges of the base perpendicular to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view, sectional side view and true shape of the section. 20 M 4 3

OR

- Q.8.** A hexagonal prism of side of base 30 mm and axis 70 mm long is resting on its base on H.P. such that a rectangular face is parallel to V.P. It is cut by a section plane perpendicular to V.P. and inclined at 30° to H.P. The section plane is passing through the axis at a height of 40mm from the base. Draw the development of the lateral surface of the cut prism, Use parallel line method. 20 M 4 3

UNIT-V

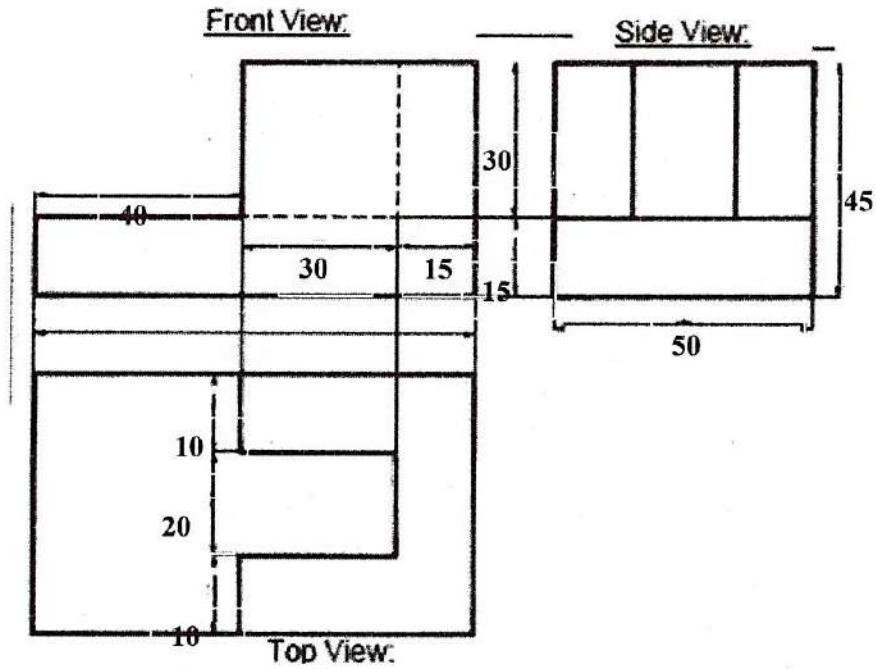
- Q.9.** Draw the three Orthographic Views of the given solid. 20 M 5 3



SET-8

OR

Q.10. Draw the isometric View from the given orthographic views of a solid 20 M 5 3



End

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**CALCULUS FOR COMPUTER SCIENCE**

(Common to CSE, CAI, CDS, CCS, CAM)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. State Limit Comparison test	1	1	2
	ii. Identify whether the series $\sum_{n=1}^{\infty} \left(\frac{1}{n+1}\right)^n$ converges or diverges	1	1	2
	iii. Find the value of a_0 for the function $f(x) = x^3$ in $(-2, 2)$	1	2	2
	iv. Find the value of $\Gamma\left(\frac{5}{2}\right)$	1	2	2
	v. Determine the value of the limit $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sec x}{1 + \tan x}$	1	3	1
	vi. Replace the cartesian equation $x^2 + (y-4)^2 = 16$ with equivalent polar equation	1	3	1
	vii. Calculate the first order partial derivatives of $f(x, y) = 5xy + \sin x + 7e^x$	1	4	2
	viii. Write a chain rule formula for $\frac{\partial w}{\partial s}$ and $\frac{\partial w}{\partial t}$ for $w = g(u, v), u = h(s, t)$	1	4	1
	ix. Calculate the area $\int_0^1 \int_{x^2}^x dy dx$	1	5	2
	x. State the equations relating from Cartesian coordinates to cylindrical coordinates.	1	5	2
Q.2(A)	Investigate whether the series converges (or) diverges i) $\sum_{n=1}^{\infty} \frac{5n^3 - 3n}{n^2(n-2)(n^2+5)}$ ii) $\sum_{n=1}^{\infty} \left(\ln\left(e^2 + \frac{1}{n}\right)\right)^{n+1}$ iii) $\sum_{n=1}^{\infty} \frac{(n+3)!}{3!n!3^n}$	18	1	3
OR				
Q.2(B)	For what values of x do the following power series converge? i) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n-1}}{2n-1}$ ii) $\sum_{n=1}^{\infty} \frac{x^n}{n!}$ iii) $\sum_{n=1}^{\infty} n! x^n$	18	1	3
Q.3(A)	i. Find the half-range sine series for the function $f(t) = t - t^2$ in $0 < t < 1$.	9	2	3
	ii. Find half-range cosine series for $f(x) = (x-1)^2$ in $0 < x < 1$.	9	2	3

OR

Q.3(B) i.

Show that $\int_0^1 y^{q-1} \left(\log \left(\frac{1}{y} \right) \right)^{p-1} dy = \frac{\Gamma(p)}{q^p}$, where $p > 0, q > 0$. Hence

18 2 3

find the value of $\int_0^1 x^5 \left(\log \left(\frac{1}{x} \right) \right)^3 dx$.

ii. $\Gamma(n) = \int_0^1 \left(\log \frac{1}{y} \right)^{n-1} dy \quad (n > 0)$.

Q.4(A) i. Show that $|\cos x - 1| \leq |x|$ for all values of x .

6 3 3

ii. $f(x) = \tan x$ at $a = \frac{\pi}{4}$ up to the term containing x^4

6 3 3

iii. Evaluate $\lim_{x \rightarrow \infty} \left(\frac{x+2}{x-1} \right)^x$

6 3 3

OR

Q.4(B) i. Graph the curve $r = 1 + \sin \theta$

9 3 3

ii. Graph the curve $r^2 = 4 \sin 2\theta$

9 3 3

Q.5(A)

i. Determine whether the function $f(x, y) = \begin{cases} \frac{2xy}{x^2 + y^2}, & (x, y) \neq (0, 0) \\ 0, & (x, y) = (0, 0) \end{cases}$ is

9 4 3

continuous or not at the origin.

ii. Find $\frac{\partial w}{\partial u}$ and $\frac{\partial w}{\partial v}$, if $w = xy + \ln z$, $x = \frac{v^2}{u}$, $y = u + v$, $z = \cos u$ at $(u, v) = (-1, 2)$.

9 4 3

OR

Q.5(B) i. Find the derivative of $f(x, y, z) = xy + yz + zx$ at the point $(1, -1, 2)$ in the direction of $u = 3i + 6j - 2k$.

9 4 3

ii. Find the point $P(x, y, z)$ on the plane $x + 2y + 3z = 13$ closest to the point $(1, 1, 1)$.

9 4 3

Q.6(A) i. Sketch the region of integration, reverse the order of integration, and

9 5 3

evaluate the integral $\int_0^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} 6x dy dx$

ii. Find the area enclosed by the lemniscate $r^2 = 4 \cos 2\theta$

9 5 3

OR

Q.6(B) i. Find the volume of the "Ice cream cone" D cut from the solid sphere $\rho \leq 1$ by the cone $\phi = \pi/3$.

9 5 3

ii. Evaluate $\int_0^\pi \int_0^\pi \int_0^{2 \sin \phi} \rho^2 \sin \phi d\rho d\phi d\theta$

9 5 3

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**ENGINEERING CALCULUS**

(Common to CE, EEE, ME & ECE)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. Determine the value of the limit $\lim_{x \rightarrow 0} \frac{1 - \cos x}{3x^2}$	1	1	1
	ii. Illustrate the equation $r^2 = 4r \cos \theta + 2r \sin \theta$ from polar to cartesian coordinates	1	1	2
	iii. Write the formula for the area of the curve $y = f(x)$.	1	2	1
	iv. Define Gamma function	1	2	1
	v. Calculate the first order partial derivatives of $f(x, y) = \sqrt{x^2 + y^2} + e^{xy}$	1	3	2
	vi. When the function $f(x, y)$ has saddle point at the point (a, b)	1	3	1
	vii. Find $\iint_R dA$ where $0 \leq r \leq 2, 0 \leq \theta \leq \pi$	1	4	2
	viii. State the equations relating to Cartesian coordinates to cylindrical coordinates	1	4	1
	ix. Find the $\text{Div} F$ if $F = \sin xi + \cos 2yj + \sec zk$	1	5	2
	x. Find the $\text{Curl} F$ if $F = xzi + xyj + yzk$	1	5	2
Q.2(A)	i. State Lagrange's mean value theorem. Find the value of c for the function $f(x) = x^2$ in $[a, b]$ in the specified interval	9	1	3
	ii. Expand $x \ln(1+2x)$ by Taylor's series about $x=0$ up to the term containing x^4	9	1	3
OR				
Q.2(B)	i. Graph the curve $r = 1 + \sin \theta$	9	1	3
	ii. Graph the curve $r^2 = 4 \sin 2\theta$	9	1	3
Q.3(A)	i. Find the volume of the solid generated by the revolution of the cardioid $r = a(1 - \cos \theta)$ about the initial line.	9	2	3
	ii. Find the surface area of the solid generated by the revolution of the astroid $x = a \cos^3 t, y = a \sin^3 t$ i.e., $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ about y - axis.	9	2	3
OR				
Q.3(B)	i. Show that $\int_0^1 y^{q-1} \left(\log \left(\frac{1}{y} \right) \right)^{p-1} dy = \frac{\Gamma(p)}{q^p}$, where $p > 0, q > 0$	9	2	3
	ii. Evaluate $\int_0^{\frac{\pi}{2}} \sin^6 \theta \cos^7 \theta d\theta$	9	2	3

- Q.4(A)** i. Find $\frac{\partial w}{\partial u}$ and $\frac{\partial w}{\partial v}$, if $w = xy + yz + zx$, $x = u + v$, $y = u - v$, $z = uv$ at $(1, 2)$. 9 3 3
- ii. Using the implicit derivative, find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ at $(1, \ln 2, \ln 3)$, if $xe^y + ye^z + 2 \ln x - 2 - 3 \ln 2 = 0$. 9 3 3

OR

- Q.4(B)** i. Find the local extreme values of the function $f(x, y) = x^3 + 3xy^2 - 15x + y^3 - 15y$ 9 3 3
- ii. Find the point on the sphere $x^2 + y^2 + z^2 = 4$ farthest from the point $(1, -1, 1)$. 9 3 3

- Q.5(A)** i. Sketch the region of integration, reverse the order of integration, and evaluate the integral $\int_0^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} 6xy \, dy \, dx$. 9 4 3
- ii. Find the area enclosed by the lemniscate $r^2 = 4 \cos 2\theta$ 9 4 3

OR

- Q.5(B)** i. Evaluate i) $\int_0^{2\pi} \int_0^1 \int_{-1/2}^{1/2} (r^2 \sin^2 \theta + z^2) \, dz \, r \, dr \, d\theta$ 18 4 3
- ii. ii) $\int_0^\pi \int_0^\pi \int_0^{2 \sin \phi} \rho^2 \sin \phi \, d\rho \, d\phi \, d\theta$

- Q.6(A)** i. Use Green's theorem to find the counter clockwise circulation for the field $F = (x^2 + 4y)i + (x + y^2)j$ over the square bounded by $x = 0$, $x = 1$, $y = 0$, $y = 1$ 9 5 3
- ii. Apply Stokes theorem for the hemisphere $S: x^2 + y^2 + z^2 = 9$; $z \geq 0$ its boundary circle $C: x^2 + y^2 = 9$, $z = 0$ and the field $F = yi - xj$. 9 5 3

OR

- Q.6(B)** i. Apply Green's Theorem to evaluate the integral $\oint_C y^2 \, dx + x^2 \, dy$ where C : the triangle bounded by $x = 0$, $x + y = 1$, $y = 0$. 9 5 3
- ii. Use Divergence theorem to evaluate outward flux of $F = x^2i + y^2j + z^2k$ through the surface of the cube cut by the planes $x = \pm 1$, $y = \pm 1$, $z = \pm 1$. 9 5 3

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**FUNDAMENTALS OF WEB TECHNOLOGY**

(Computer Science & Engineering)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. How do you embed HTML5 audio?	1	1	2
	ii. Differentiate absolute and relative links.	1	1	2
	iii. Write basic CSS syntax.	1	2	1
	iv. Write the syntax for displaying corner rounded with 10px border.	1	2	1
	v. What does DOM stand for	1	3	1
	vi. Define an array in JavaScript?	1	3	2
	vii. Name any one semantic tag introduced in HTML5.	1	4	1
	viii. What is responsive web design?	1	4	1
	ix. Which language is used to structure a web page?	1	5	1
	x. What is an interactive navigation menu?	1	5	1
Q.2(A)	i) Analyse how HTML tags and attributes contribute to the structure and presentation of web pages.	9	1	4
	ii) Explain how links and images are added in an HTML page.	9	1	2
OR				
Q.2(B)	You are creating a webpage for a music company that wants to showcase their latest album. The page should include: • A background image about music theme from URL • An audio player for one song • A video player showing the album trailer • A link to download the full album	18	1	3
Q.3(A)	Explain the concept of the CSS Box Model.	18	2	2
OR				
Q.3(B)	Design and explain a CSS layout using all three types of CSS (Inline, Internal, and External)	18	2	3
Q.4(A)	i) Explain the features of JavaScript and its role in web development.	9	3	3
	ii) Describe JavaScript syntax with suitable examples.	9	3	3
OR				
Q.4(B)	i) Explain different data types in JavaScript with examples.	9	3	3
	ii) Explain operators in JavaScript. Classify them with examples.	9	3	3
Q.5(A)	i) Explain CSS transitions and transformations with examples.	9	4	2
	ii) Explain how icons are implemented using Font Awesome and SVG.	9	4	2

OR

Q.5(B)	i)	Describe CSS animations using keyframes with an example.	9	4	2
	ii)	Design a mobile-friendly website layout for an e-commerce application using CSS Grid and media queries	9	4	3
Q.6(A)	i)	Explain the basics of domain names and the domain name registration process.	9	5	2
	ii)	Discuss various methods for optimizing images and media for better website performance	9	5	2
OR					
Q.6(B)	i)	Design and explain an interactive navigation menu using HTML, CSS, and JavaScript.	9	5	3
	ii)	Inspect the testing and debugging process in web development.	9	5	2

*****END*****

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(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**MATERIALS SCIENCE FOR ENGINEERS**

(Mechanical Engineering)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. What is a unit cell in a crystal lattice?	1	1	1
	ii. What are Miller indices?	1	1	1
	iii. What is the difference between iron and steel?	1	2	1
	iv. What is the difference between annealing and normalizing?	1	2	1
	v. What are the main constituents of a composite material?	1	3	1
	vi. List some techniques to prepare metallic powder.	1	3	1
	vii. What is the purpose of the beneficiation process in ceramics manufacturing?	1	4	1
	viii. What is meant by refractoriness?	1	4	1
	ix. Why is biocompatibility important in biomaterials?	1	5	1
	x. What is the need for self-healing materials?	1	5	1
Q.2(A)	What are the steps involved in the extraction of metals from their ores?	18	1	2
OR				
Q.2(B)	Calcium crystallizes in a face-centered cubic structure. The edge length of its unit cell is 558.8 pm. Calculate the atomic radius of calcium in the structure. Also, calculate the atomic packing factor. Compare the atomic packing factors of FCC, BCC, and simple cubic crystal structures.	18	1	3
Q.3(A)	What is the significance of the Impact test? Briefly describe the Charpy impact test and Izod impact test.	18	2	2
OR				
Q.3(B)	Briefly describe the different types of steels based on their chemical composition. Also, explain the composition range, characteristics, and typical applications of each type.	18	2	2
Q.4(A)	Explain the powder metallurgy process with a neat flow chart and discuss each step in detail.	18	3	2
OR				
Q.4(B)	A plate of glass/epoxy composite is manufactured using the hand lay-up technique. The dimensions of the manufactured laminate are (60 cm x 60 cm x 0.4 cm). The fiber volume fractions are 30%. A 300 g/m ² chopped glass fiber was used, and the density of the fiber is 2.56 g/cm ³ . Determine the number of layers of glass fiber in the laminate?.	18	3	3

Q.5(A)	Briefly discuss the steps in the slip casting process of ceramics. Also, state its advantages and limitations.	18	4	2
OR				
Q.5(B)	Explain in detail the classification of polymers based on molecular forces and mode of polymerization.	18	4	2
Q.6(A)	Explain photonic crystals in detail. Discuss their principle, classification, properties, and applications.	18	5	2
OR				
Q.6(B)	Explain piezoelectric materials in detail. Discuss their principle, types, properties, and applications.	18	5	2

*****END*****

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B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**SENSORS AND TRANSDUCERS**

(Electronics and Communication Engineering)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. Define an actuator.	1	1	1
	ii. Define repeatability.	1	1	1
	iii. Define inductive displacement sensor.	1	2	1
	iv. State the principle used for acceleration measurement using strain gauges.	1	2	1
	v. Identify any one capacitive sensor used in measurement systems.	1	3	1
	vi. Define thermistor.	1	3	1
	vii. Define a photodiode.	1	4	1
	viii. State the basic operating principle of a Light Dependent Resistor	1	4	1
	ix. Define a biosensor.	1	5	1
	x. Name one smart sensor used in automobile applications.	1	5	1
Q.2(A)	i) Explain in detail the fundamental concepts of a sensor, transducer, actuator, and signal conditioning, and illustrate the structure of a measurement system using a neat block diagram.	18	1	2
OR				
Q.2(B)	i) Compare and analyse accuracy, precision, sensitivity, and resolution of sensors with illustrative examples.	9	1	4
	ii) Illustrate the concepts of resolution and hysteresis with suitable practical examples.	9		3
Q.3(A)	i) Analyse the operating principle of resistive strain gauges and describe their use in force and pressure measurement systems.	18	2	4
OR				
Q.3(B)	i) Compare and contrast potentiometric sensors, LVDT, capacitive, and inductive sensors based on accuracy, sensitivity, linearity, and applications.	9	2	4
Q.4(A)	i) Describe the operating principle of piezoelectric sensors and evaluate their applications in pressure and vibration measurement systems.	9	3	2
OR				
Q.4(B)	i) Describe the characteristics and applications of thermistors.	9	3	2
	ii) Explain the working principle of a thermocouple.			2

Q.5(A) i) With neat diagrams, explain the working principle of Hall-effect sensors and evaluate their performance parameters for magnetic field measurement. 18 4 2

OR

Q.5(B) i) Explain the working principle of a Light Dependent Resistor (LDR). 9 4 2
ii) Describe the operating principle of fibre-optic sensors and analyse their advantages in measurement applications. 2

Q.6(A) i) Analyse the integration of smart sensors in IoT systems and evaluate their role in automation and monitoring. 18 5 4

OR

Q.6(B) i) Explain the working principle of a biosensor with a neat block diagram. 9 5 2
ii) Illustrate the use of smart sensors in industrial automation applications. 9 3

*****END*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026**FOUNDATIONS OF ARTIFICIAL INTELLIGENCE**

(Common to CIV, EEE, MEC)

Time: 3Hrs**Max Marks: 100**

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. Define Artificial Intelligence.	1	1	1
	ii. What is automation?	1	1	1
	iii. Define testing data.	1	2	1
	iv. What is forecasting?	1	2	1
	v. Give one example of a decision rule.	1	3	1
	vi. What is inference?	1	3	1
	vii. What is an intelligent agent?	1	4	1
	viii. Define actuator.	1	4	1
	ix. State one social impact of AI.	1	5	1
	x. What is automation risk?	1	5	1
Q.2(A)	i. Explain intelligent behaviour with engineering examples.	9	1	2
	ii. Discuss challenges in implementing AI systems.	9	1	3
OR				
Q.2(B)	i. Discuss the benefits of Artificial Intelligence in engineering systems.	9	1	2
	ii. Explain the use of AI in Manufacturing and Construction with examples.	9	1	2
Q.3(A)	Explain applications of learning in equipment maintenance.	18	2	3
OR				
Q.3(B)	Discuss data pre-processing in machine learning with an example	18	2	2
Q.4(A)	i. Explain how AI systems store information.	09	3	3
	ii. Describe simple rules for decision-making.	09	3	3
OR				
Q.4(B)	Describe an AI-based building for traffic signal control.	18	3	2
Q.5(A)	Explain agent architectures.	18	4	2
OR				
Q.5(B)	Discuss role of sensors and actuators in AI.	18	4	2
Q.6(A)	Analyse six AI tools used for various purposes in our daily routine.	18	5	2
OR				
Q.6(B)	Discuss AI in healthcare and transportation and analyse how they can be enhanced.	18	5	4

END

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(Deemed to be University under Section 3 of UGC Act, 1956)

B.Tech. I Year I Semester (R25) Supplementary End Semester Examinations - June 2026

C PROGRAMMING FOR PROBLEM SOLVING

(Common to ECE, CSE, CAI, CDS, CCS, CAM)

Time: 3Hrs

Max Marks: 100

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No.	Question	Marks	CO	BL
Q.1.	i. What is meant by problem decomposition?	1	1	1
	ii. What does the selection symbol indicate in RAPTOR?	1	1	1
	iii. Name any four C keywords.	1	2	1
	iv. What is the difference between float and double?	1	2	1
	v. What is recursion?	1	3	1
	vi. Define two-dimensional array.	1	3	1
	vii. What is the dereference operator?	1	4	1
	viii. What is dynamic memory access using pointers?	1	4	1
	ix. How are structure members accessed?	1	5	1
	x. What is a file pointer?	1	5	1
Q.2(A)	Explain flowchart symbols and their significance in algorithm representation and draw a flowchart to check whether a given number is prime or not.	18	1	2
OR				
Q.2(B)	Compare Scratch and RAPTOR in terms of usage, interface and learning outcomes and explain how these tools help beginners understand algorithmic thinking.	18	1	2
Q.3(A)	Explain storage classes in C with scope, lifetime and examples and differentiate between auto, static, extern and register storage classes.	18	2	2
OR				
Q.3(B)	Explain looping statements in C (for, while, do-while) with examples and develop a C program to generate Fibonacci series.	18	2	3
Q.4(A)	Explain how arrays are passed to functions with examples and write a C program to find the sum and average of array elements using a function.	18	3	2
OR				
Q.4(B)	Explain array in detail and develop a C program to perform matrix addition and subtraction.	18	3	3
Q.5(A)	Explain pointer to pointer and array of pointers with examples and write a C program to demonstrate pointer arithmetic on an integer array.	18	4	2

OR

Q.5(B)	Explain string handling functions in C with syntax and examples and write a C program using built-in functions to reverse a string.	18	4	2
Q.6(A)	Demonstrate dynamic memory allocation in C and describe the functions malloc(), calloc(), realloc() and free() with examples.	18	5	2
OR				
Q.6(B)	Explain text files and binary files with differences and write a C program to copy contents of one file to another file.	18	5	2

*****END*****

Q.No.	Question	Mark	CO	BL
Q.1	What is meant by problem decomposition?	1	1	1
Q.2	What does the selection symbol indicate in PAFLOW?	1	1	1
Q.3	Write any four C keywords.	1	2	1
Q.4	What is the difference between float and double?	1	2	1
Q.5	What is recursion?	1	3	1
Q.6	Define two-dimensional array.	1	3	1
Q.7	What is the difference operator?	1	4	1
Q.8	What is dynamic memory access using pointers?	1	4	1
Q.9	How are structures initialized?	1	5	1
Q.10	What is a file pointer?	1	5	1
Q.11(A)	Explain flowchart symbols and their significance in algorithm representation and draw a flowchart to check whether a given number is prime or not.	18	1	1
OR				
Q.11(B)	Compare Search and B/T/TOR in terms of usage, interface and testing outcomes and explain how these tools help programmers in testing algorithm thinking.	18	1	2
Q.12(A)	Explain storage classes in C in scope, lifetime and examples and differentiate between auto, static, extern and register storage classes.	18	2	1
OR				
Q.12(B)	Explain looping constructs in C (for, while, do-while) with examples and develop a C program to generate Fibonacci series.	18	2	1
Q.13(A)	Explain how arrays are passed to functions with examples and write a C program to find the sum and average of array elements using a function.	18	1	0
OR				
Q.13(B)	Explain array in C and develop a C program to perform matrix addition and subtraction.	18	1	2
Q.14(A)	Explain pointer in C with examples and write a C program to demonstrate pointer arithmetic on an integer array.	18	2	1