MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Supplementary End Semester Examinations, Dec– 2025
## NETWORK ANALYSIS
(ECE)

Time: 3Hrs

Max Marks: 70

> 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 the Norton's theorem.	1M	1	1
	ii.	What is the energy equation for inductor (L) and capacitor (C)?	1M	1	1
	iii.	What is a time constant? Write the time constant for series RC and RL circuits.	1M	2	1
	iv.	Does the voltage through a capacitor change immediately after the switch is closed in an RC circuit with a DC excitation? Explain.	1M	2	2
	v.	A series RL circuit has R = 4 Ω and L = 0.02 H. Find the impedance at 150Hz.	1M	3	2
	vi.	"In the sinusoidal response of a series R-C circuit, the current leads to the voltage." - Is this statement true or false?	1M	3	2
	vii.	What is the Q-factor of series RLC resonating circuit?	1M	4	1
	viii.	"Parallel resonance is also called anti-resonance." - explain this statement.	1M	4	2
	ix.	How can you relate the Y-parameter to the Z-parameter?	1M	5	2
	x.	Why h-parameter is called a hybrid parameter?	1M	5	1
Q.2(A)		Find an equivalent circuit of a current source parallel with resistance to the left of x-y terminals in the below circuit. Also, state the relevant network theorem.	12M	1	4

OR

| Q.2(B) | State and explain Thevenin's theorem. What is the advantage of using this theorem? Find the Thevenin equivalent circuit of the circuit shown in figure to the left of terminal a-b. Then find the current through load resistance R_L =4 Ω | 12M | 1 | 3 |
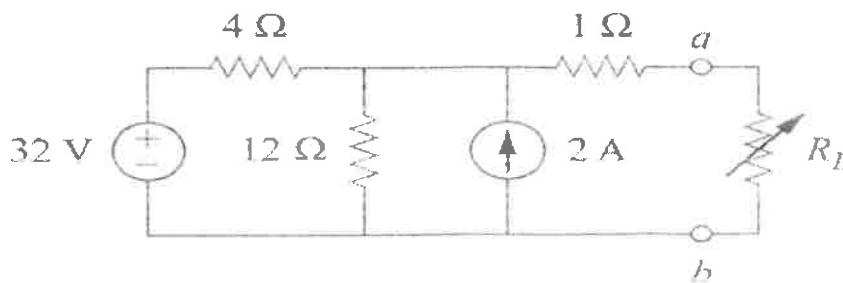
Q.3(A)   (a) Obtain the current expression for the series RL circuit using a DC source.   12M   2   3
(b) What is the current value after 3 sec in the following circuit after the switch is moved from A to B.
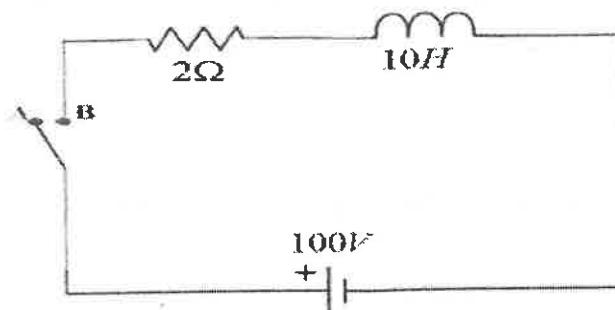
OR

Q.3(B)   Apply Laplace transformation to find the impulse response of the (i) series R-C and (ii) series R-L-C circuits.   12M   2   3

Q.4(A)   What do you understand by steady-state analysis of AC circuits? Obtain the expression for a sinusoidal response of a series RLC circuit and analyse the current and voltage leading or lagging condition with a suitable phasor diagram.   12M   3   3

OR

Q.4(B)   Define the alternative and direct voltage with a suitable diagram. In a series R-L circuit, the current and voltage are given as: 12M   3   3

$$i = 1\cos(314t - 20^0), \qquad v = 10\cos(314t + 10^0)$$

Find the value of R and L.

Q.5(A)   What do you understand by the bandwidth of a series resonating circuit? Derive and establish the expression that relates to Q-factor, bandwidth, and Resonance frequency.   12M   4   2

OR

Q.5(B)   What do you understand by mutual inductance? Find the total inductance of the three-coil connected as shown in figure.   12M   4   3
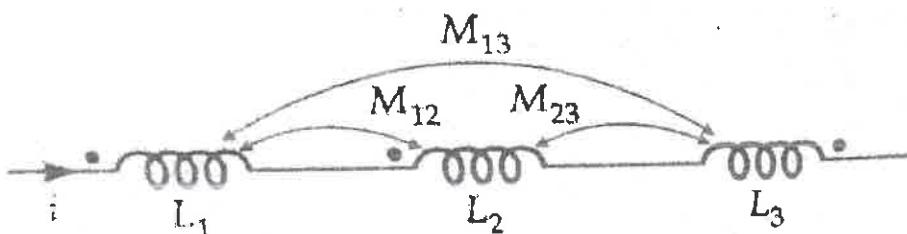
Given,
$$L_1 = 1H \quad L_2 = 2H \quad L_3 = 5H \quad M_{12} = 0.5H \quad M_{23} = 1H \quad \text{and} \quad M_{31} = 1H$$

Q.6(A)   Two different networks are characterized by their Z-parameter matrices as follows: 12M   5   3

$$Z_1 = \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix} \qquad \text{and} \qquad Z_2 = \begin{pmatrix} 2 & 4 \\ 6 & 3 \end{pmatrix}$$

Analyse the procedure to solve and obtain the overall Z-parameter matrix of the network when these two networks are connected in parallel.

OR

Q.6(B)   Find the expression for the inter-conversion equation from Z-parameter to Y-the y-parameter and vice versa.   12M   5   3

*** END***

Question Paper Code: 23CSE102

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B. Tech I Year II Semester (R23) Supplementary End Semester Examinations, December– 2025
DATA STRUCTURES
(CSE, CST, CSE(CS), CSE(AI), CSE(DS), CSE (AI & ML), CSE(NW))

Time: 3Hrs   Max Marks: 70

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 linear data structure.	1M	1	1
	ii.	Define time complexity.	1M	1	1
	iii.	Write applications of doubly linked list.	1M	2	1
	iv.	In a doubly linked list, how many pointers are there in each node?	1M	2	1
	v.	List the properties and operations of queues.	1M	3	1
	vi	State the reason for overflow condition in a stack.	1M	3	1
	vii.	Write properties of max heap.	1M	4	1
	viii	Define full binary tree.	1M	4	1
	ix.	What is the purpose of hash function?	1M	5	1
	x.	Define articulation point in a graph.	1M	5	1
Q.2(A)		Explain Time Complexity with their components and examples.	12M	1	2
		OR			
Q.2(B)		Discuss the algorithm for Binary Search. Apply Binary search algorithm on 45, 54, 58, 65,78, 82, 93 for searching 93.	12M	1	2
Q.3(A)		Illustrate algorithm for insertion of elements into circular linked list with an example. Write advantages and disadvantages of circular linked list.	12M	2	2
		OR			
Q.3(B)		Illustrate algorithm for operations of stack with example.	12M	2	2
Q.4(A)		Evaluate the postfix expression: 6 2 3 + - 3 8 2 / + * using a stack. Show stack content after each step.	12M	3	4
		OR			
Q.4(B)		Differentiate input-restricted and output-restricted deques? Provide an example for each.	12M	3	2
Q.5(A)		Construct a Binary Search Tree by inserting the values: 50, 30, 70, 20, 40, 60, 80. and Delete node 30 from the BST created above. Show the updated structure.	12M	4	3

Q.5(B)	Construct a max-heap and min-heap for the elements: 10, 40, 20, 30, 50, 85, 92, 55, 42.	12M	4	3
Q.6(A)	Explain different types of hashing techniques in detail with an example.	12M	5	2

<div align="center">**OR**</div>

Q.6(B)	Given a hash table of size 11, use the linear probing. And quadratic probing technique to insert the keys:10, 22, 31, 4, 15, 28, 17, 88, 59 Use the hash function: h(k) = k mod11. Show each step and the resulting hash table.	12M	5	3

<div align="center">*** END***</div>

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS INSTITUTION)
B. Tech I Year II Semester (R23) Supplementary End Semester Examinations, December – 2025
## ENGINEERING MECHANICS
### (ME)

Time: 3Hrs

Max Marks: 70

> 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
1.	i)	Why coefficient of friction is a unit less quantity?	1	1	1
	ii)	What is meant by concurrent forces?	1	1	1
	iii)	Draw the free body diagram of the sphere of mass M resting on a platform as shown in figure.	1	2	1
	iv)	What is a truss?	1	2	1
	v)	If the material is homogenous and the gravitational field in which the object exist is uniform, then centre of mass, centre of gravity and centroid will be at the same point. Is the statement true or false?	1	3	1
	vi)	Define parallel axis theorem.	1	3	1
	vii)	What is the difference between curvilinear and rectilinear motion?	1	4	1
	viii)	The displacement value of a particle may be negative. The statement is true or false?	1	4	1
	ix)	Calculate the angular acceleration of an object if its angular velocity changes at the rate of 50 rad/s for 5 seconds.	1	5	1
	x)	What is the principle of conservation of angular momentum?	1	5	1
2(A)	(i)	The screw eye in figure is subjected to two forces, F1 = 150 N and F2 – 100 N. Determine the magnitude and direction of the resultant force.	6	1	3
	(ii)	A body weighing 200 N is resting on a rough horizontal surface. A pull of 100 N applied at an angle of 30° with horizontal just causes the body to slide over the surface. What will be coefficient of friction between the body and the surface?	6	1	3
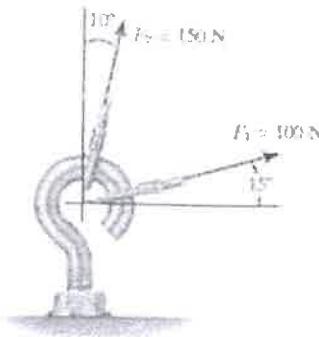
OR

|					
2(B)	(i)	A 1 kg block is resting on a surface with coefficient of friction μ = 0.1. A force of 0.8 N is applied to the block as shown in the figure. Calculate the friction force.	6	1	3

0.8 N ⟶ 1 kg   μ = 0.1
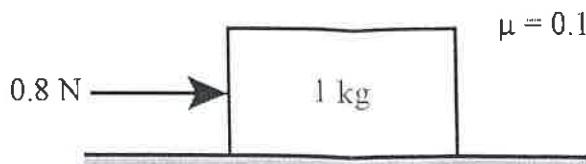
(ii) A block of mass 10 kg resting on a horizontal surface is connected by a cord passing over a light frictionless pulley to a hanging block of mass 10 kg as shown in the figure. The coefficient of friction between the block and the surface is 0.5. Calculate the acceleration of the system.
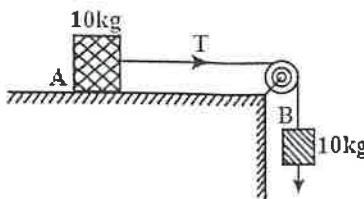
6   1   3

3(A) (i) A light string ABCDE whose extremity A is fixed, has weights W1 and W2 attached to it at B and C respectively. It passes round peg at D carrying a weight of 300 N at the free end E as shown in figure. The entire system is in the equilibrium. Find tension in the portion AB, BC and CD of the string. Also, find magnitude of W1 and W2.
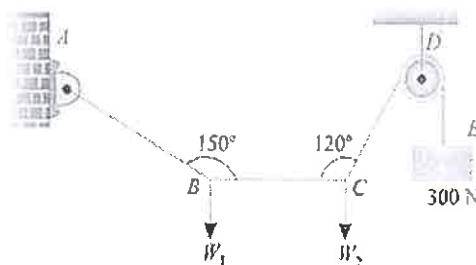
6   2   3

(ii) The truss is supported by roller at C and hinge at A. Find the magnitude and nature of forces in all the member of the truss.
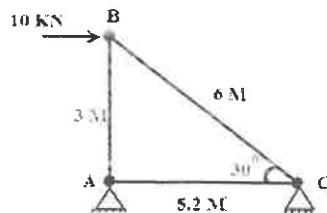
6   2   3

OR

3(B) (i) A uniform sphere of weight 'w' and radius 3 m is being held by a string of length 2 m attached to a friction less wall as shown in the figure. Find the tension in the string as well as normal reaction force on the sphere by the wall.
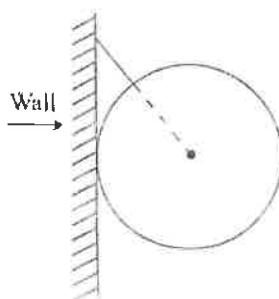
6   2   3

(ii) Calculate the force in the cable AB shown in the figure.

6   2   3

$30°$

C

B

A

100 N
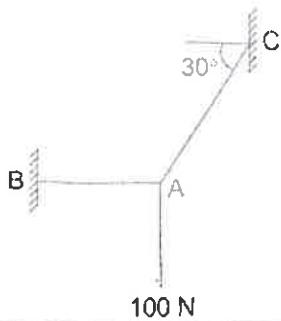
4(A) (i) Determine the centroid of the rectangle shown below.
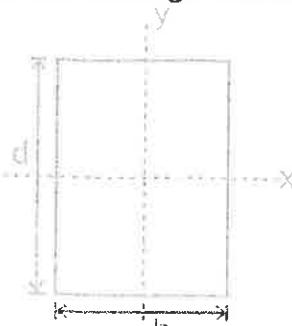
6 3 3

(ii) Locate the centroid of the shaded area.

r = 16 cm

a = 8 cm

a = 8 cm
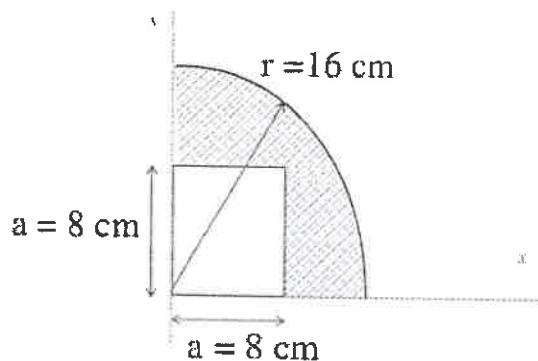
6 3 3

OR

4(B) (i) Two point masses 3 kg and 5 kg are at 4 m and 8 m from the origin on X-axis. Locate the position of center of mass of the two point masses

    i.   From the origin

    ii.   From 3 kg mass

6 3 3

(ii) An equilateral triangle section ABC has a base width of 80 mm and height 60 mm. calculate the moment of inertia about the base BC.

6 3 3

5(A) (i) If the stone fall past a window of 2.45 m height in half second, find the height (h) from which the stone fall.

h

B

2.45 m

C
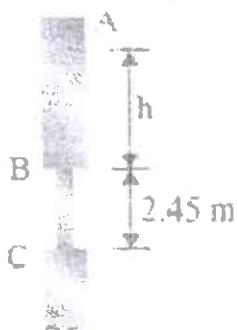
6 4 3

(ii) The velocity of a particle moving in a straight line is given by the expression, V = t³ - t² - 2t + 2. The particle is found to be at a distance 4 m from station A after 2 sec. Determine:

6 4 3

		i.	Acceleration and displacement after 4 seconds		
		ii.	Maximum/Minimum acceleration		

OR

5(B) (i) 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. $g=10 \ m/s^2$ 6   4   3

(ii) Two block of masses M and m are in contact with each other and are resting on a horizontal frictionless surface. When a horizontal force is applied to the heavier, the block accelerates to the right. Calculate the force between the two block.
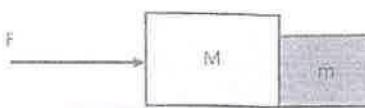
    6   4   3

6(A) (i) A solid cylinder of mass 20 kg rotates about its axis with angular speed 100 rad s-1. The radius of the cylinder is 0.25 m. What is the kinetic energy associated with the rotation of the cylinder? Also, calculate the magnitude of angular momentum of the cylinder about its axis.   6   5   3

(ii) A wheel of moment of inertia 1 Kg-m² is rotating at speed of 30 rad/sec. Due to friction on the axis, it come to rest in 10 minutes. Calculate

    i. Total work done by the friction   6   5   3
    ii. The average torque of the friction
    iii. Angular momentum of the wheel two minutes before it stops rotating.

OR

6(B) (i) A wheel of moment of inertia 2 Kg-m² is rotating about an axis passing through the center and perpendicular to its plane at a speed of 60 rad/ sec. Due to friction, it come to rest in 5 minutes. Calculate the angular momentum of the wheel three minutes before it stops rotating.   6   5   3

(ii) What will be the duration of the day if the earth suddenly shrinks to 1/27th of its original volume, mass being unchanged?   6   5   3

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech I Year II Semester (R23) Supplementary End Semester Examinations, December–2025

Engineering Mechanics

(Civil Engineering)

Time: 3Hrs

Max Marks: 70

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 Part A or Part B only.

Q.No		Questions	Marks	CO	BL
Q.1	(i)	Explain the term 'Force'.	1M	1	1
	(ii)	Write about Newton's First and second law.	1M	1	1
	(iii)	Explain about Lami's theorem?	1M	2	1
	(iv)	State and explain equilibrium of forces.	1M	2	1
	(v)	Write the formula for moment of inertia of a rectangular body about centroidal axis x-x?	1M	3	1
	(vi)	What is radius of gyration?	1M	3	1
	(vii)	Differentiate about kinetic and kinematics.	1M	4	1
	(vii)	Discuss the term impulse and momentum?	1M	4	1
	(xi)	Define the relation between linear and angular velocity?	1M	5	1
	(x)	Discuss the principle of work and energy for a system of particle?	1M	5	1
Q.2(A)		Block A weighing 1000 N rests over block B which weights 2000 N as shown in figure. Block A is tied to wall with a horizontal string If the coefficient of friction between blocks A and B is 0.25 and between B and floor is 1/3, what should be the value of P to move the block B, if			
		(a) P is horizontal?			
		(b) P acts at 30° upwards to horizontal?	12 M	1	5
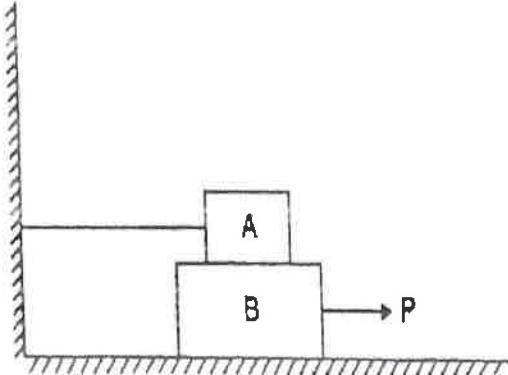
OR

Q.2(B)	A system of four forces acting at a point on a body is as shown in Fig below. Determine the magnitude and direction of the resultant force.	12 M	1	5
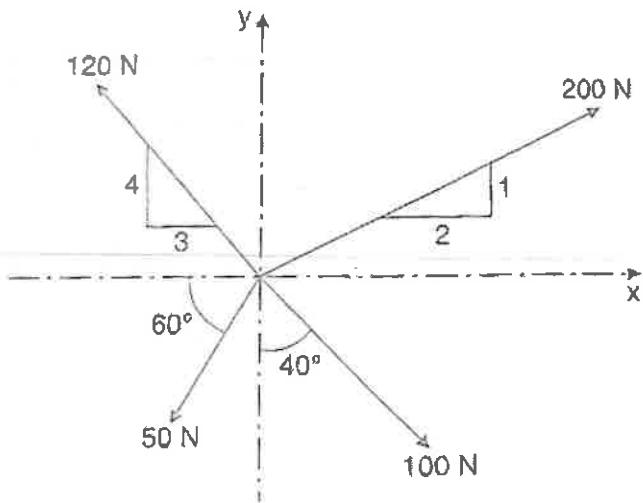
Q.3(A) Draw the free body diagrams for all cylinders. Find the reaction forces at all contact points. Cylinders A and B are resting on a horizontal channel of width 60 cm. The diameters of all the cylinders is 40 cm.

1500 kN
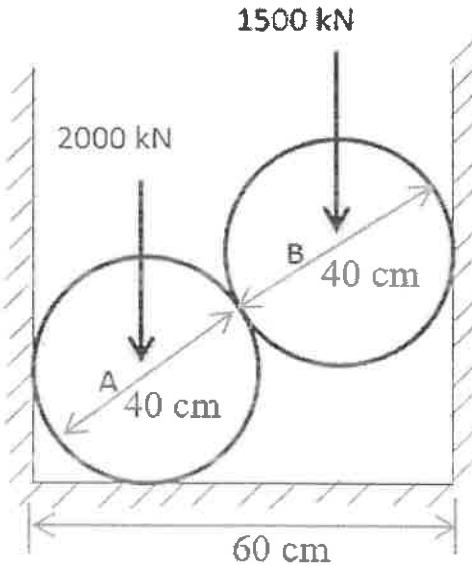
12 M   2   5

OR

Q.3(B) Find the forces developed in the wires, supporting electric fixtures as shown in fig. below.

12 M   2   5
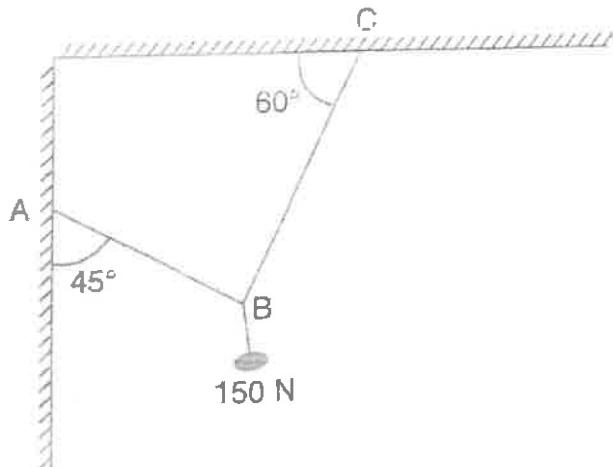
Q.4(A) Determine the moment of inertia of the symmetrical T section shown in Figure with respect to its centroidal axes.

120 mm

12 mm

120 mm

12 mm
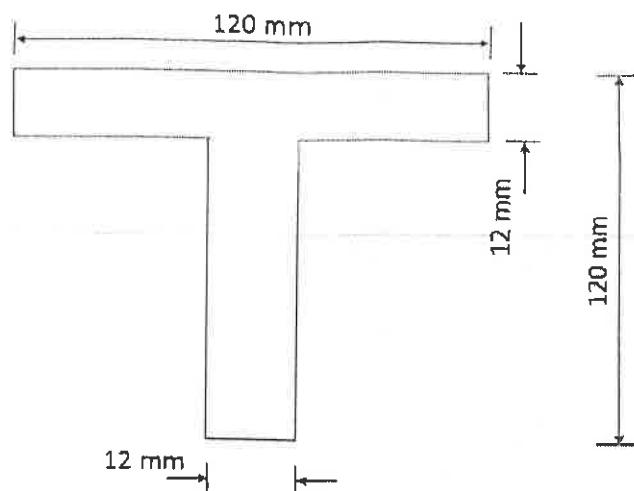
12M   3   5

OR

Q.4(B) Locate the Centroid of the sectioned area as shown in figure.

110mm

30mm

30mm

20mm

30mm

10mm

40 mm   20 mm   50 mm
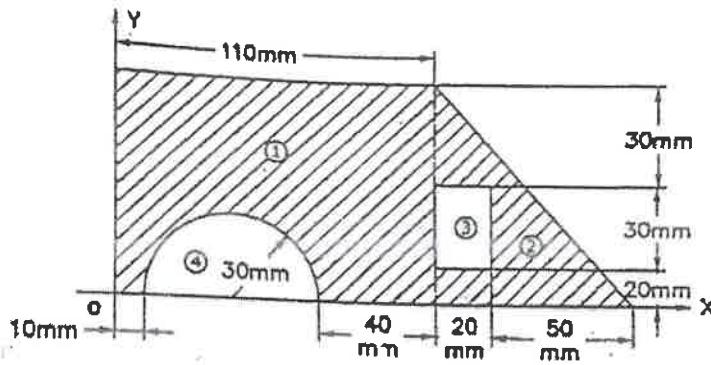
12M   3   5

Q.5(A) A bicycle moves along a straight road such that its position is described by the graph shown in figure. Construct the u-t and a-t graph for $0 \leq t \leq 30 \sec$.

$s\ (m^t)$

500

100

$s = 15t\text{-}80$

10   30

$t\ (Sec)$

$s = 0.5 * t^2$
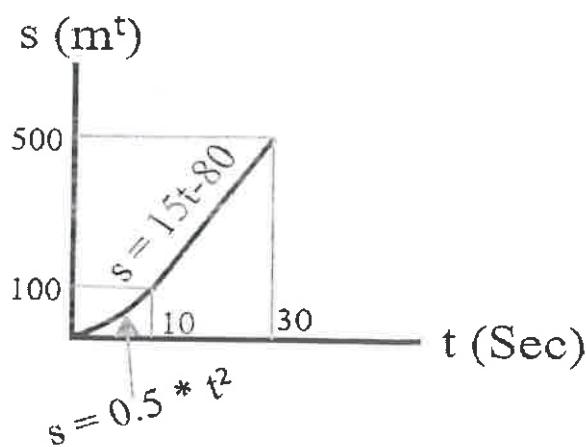
12M   4   5

OR

Q.5(B) Two weights 800 N and 200 N are connected by a thread and move along a rough horizontal plane under the action of force 400N applied to the first weight of 800 N as shown in figure. The coefficient of friction between the sliding surfaces of the weights

12M   4   5

and the plane is 0.3. Determine the acceleration of the weights and the tension of the thread using D'Alembert's principle. and, When t = 0 sec

800 N

200 N

→ 400 N

Rough horizontal plane
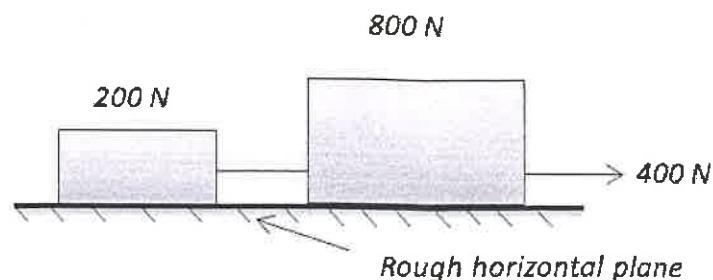
Q.6(A) A block weighting 2500 N rests on a level horizontal plane for which coefficient of friction is 0.2. The block is pulled by a force of 1000 N acting at an angle of 30° to the horizontal. Find the velocity of the block after it moves 30 m starting from the rest. If the force of 1000 N then removed, how much further will it move? Use work energy method.

W
W
P=1000 N
30°

F
N
N
F
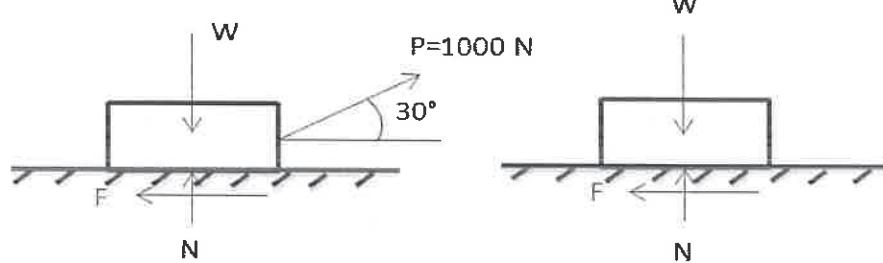
12M   5   5

OR

Q.6(B) A wheel rotating about a fixed axis at 20 revolutions per minute is uniformly accelerated for 70 seconds during which it makes 50 revolutions.

Find the   12M   5   5
    (i) angular velocity at the end of this interval and
    (ii) time required for the velocity to reach 100 revolutions per minute.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Supplementary End Semester Examinations, December-2025
ELECTRICAL CIRCUIT ANALYSIS I
(EEE)

Time: 3Hrs　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　Max Marks: 70

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		Questions	Marks	CO	BL
Q.1	i.	State Kirchhoff voltage and Kirchhoff current law.	1M	1	1
	ii.	Two resistors 4 Ω and 6 Ω are connected in parallel. If the total current is 12 A. Find the current through each resistor.	1M	1	2
	iii.	Compare the similarities of Electric circuit and Magnetic circuit.	1M	2	1
	iv.	Define reluctance.	1M	2	1
	v.	Draw the phasor diagram of series RL circuit.	1M	3	1
	vi	Define form factor.	1M	3	1
	vii.	Define bandwidth.	1M	4	1
	viii.	Define self-inductance.	1M	4	1
	ix.	State Thevenin's theorem.	1M	5	1
	x.	What are the limitations of reciprocity theorem?	1M	5	1
Q.2(A)		Write the mesh equations for the circuit shown in Fig. and determine the currents, I_1, I_2 and I_3. Also find the voltage drop across 3 Ω and power absorbed by 2 Ω.	12M	1	3
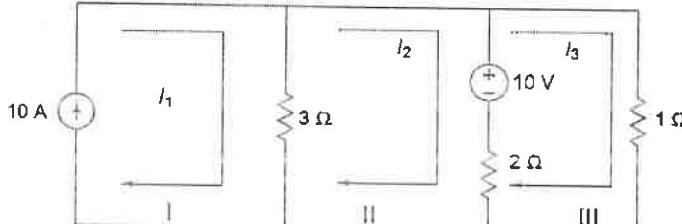
OR

Q.2(B)	Determine the voltages at each node for the circuit shown.	12M	1	3
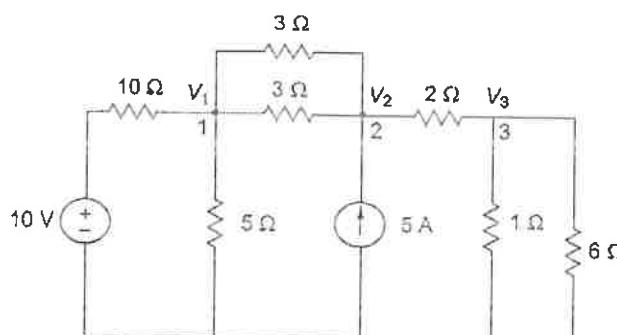
Q.3(A)	Draw and explain the typical magnetic circuit with and without air gap. Hence derive the expression for air gap flux and draw the equivalent electric circuit.	12M	2	3

OR

Q.3(B)	The magnetic circuit shown in Fig. has the core of relative permeability μr = 2000. The depth of the core is 5 cm. The coil has 400 turns and carries a current of 1.5 A.	12M	2	3

Calculate (a) the mean core length lc and the core cross-sectional area Ac (b) The Reluctance of the core (c) the flux and flux density in the core and (d)the inductance of the coil.
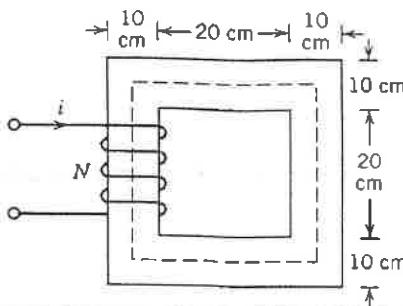
Q.4(A)	A series RLC circuit has R = 75 ohms L = 125 mH and C=200 microfarad. A 115 V, 50Hz supply is applied across the circuit. Find Impedance of the circuit, Input current, Drop across the elements, Power factor of the circuit, Real power, Reactive power, Apparent power.	12M	3	3

OR

Q.4(B)	Determine the Average value, RMS value, Form factor and Peak factor of a half wave rectified signal.	12M	3	3
Q.5(A)	Derive the expression for resonant frequency and bandwidth for a series RLC resonant circuit.	12M	4	3

OR

Q.5(B)	Derive the relation between co-efficient of coupling, the self-inductance and mutual inductance.	12M	4	3
Q.6(A)	Using Superposition theorem, determine the currents through 1 Ω resistor in the network shown.	12M	5	3
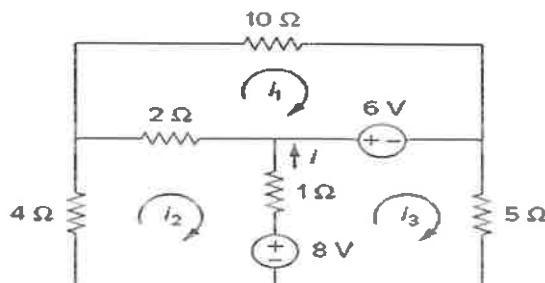
OR

Q.6(B)	The variable resistor R_L in Fig. is adjusted until it absorbs the maximum power from the circuit. (a) Calculate the value of R_L for maximum power (b) Determine the maximum power absorbed by R_L.	12M	5	3
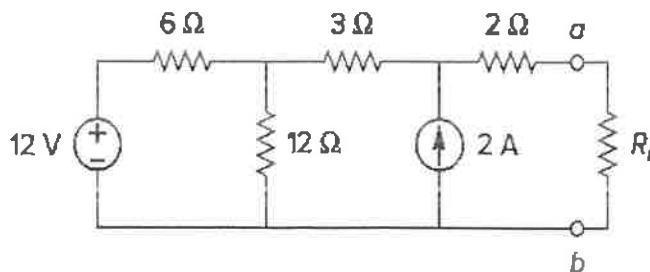
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MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS INSTITUTION)
B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December – 2025
CHEMISTRY
(Common to EEE, ECE, CSE, CST, CSE-AI, CSE-DS, CSE-CS CSE-AI&ML and CSE-N)

Time: 3Hrs

Max Marks: 70

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.	Write down the expression for time dependent Schrodinger wave equation	1M	1	2
	ii.	The bond order associated with N_2 is ……..	1M	1	2
	iii.	What are the majority, and minority charge carriers in N-type semiconductors?	1M	2	2
	iv.	What are nanomaterials?	1M	2	2
	v.	Draw the typical graph for the conductometric titration of strong acid vs. strong base	1M	3	2
	vi	Write the net cell reaction involved in H_2-O_2 Fuel cell	1M	3	2
	vii.	The monomers of Nylon 6,6 are…….	1M	4	2
	viii	Give an example for biodegradable polymers	1M	4	1
	ix.	State Beer-Lambert's Law	1M	5	2
	x.	Write the Hooke's law	1M	5	2
Q.2(A)		Derive the equations for wavefunction and energy for particles in a one-dimensional box and explain the terms	12M	1	2
		OR			
Q.2(B)		(a) Draw the molecular diagram (MO) of oxygen (O_2) molecule	6M	1	2
		(b) Explain the Pi-molecular orbital (π-MO) theory of benzene with a neat diagram	6M	1	2
Q.3(A)		(a) Apply BCS theory to explain the conductivity of Super conductors and list down the applications of super conductors.	8M	2	3
		(b) Summarise the general methods used for the preparation of nanomaterials	4M	2	2
		OR			
Q.3(B)		(a) Construct and explain electrostatic double layer and hybrid supercapacitors with neat sketch	8M	2	3
		(b) Explain any four applications of graphene and fullerenes	4M	2	2
Q.4(A)		(a) Derive Nernst equation	6M	3	2
		(b) Illustrate and elucidate the electrochemical processes occurring in Zn-Air battery	6M	3	3
		OR			
Q.4(B)		Apply the principle of conductometric titrations for the following combinations	12M	3	3
		(i) Strong acid (SA) versus strong base (SB)			
		(ii) Strong acid (SA) versus weak base (WB)			
		(iii) Weak acid (WA) versus strong base (SB), and			
		(iv) Weak acid (WA) versus weak base (WB)			
Q.5(A)		(a) Explain the coordination addition polymerization with a suitable example	6M	4	2

	(b) What are conducting polymers? Explain the reductive doping conduction mechanism in polyacetylene molecule	6M	4	2

OR

Q.5(B)	Explain the mechanism involved in the preparation of Bakelite, and list down the applications of Bakelite	12M	4	2

Q.6(A)	Explain the principle, instrumentation, and applications of Infrared (IR) spectroscopy	12M	5	2

OR

Q.6(B)	Explain the principle, instrumentation, and applications of UV-Visible spectroscopy.	12M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS INSTITUTION)
B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December – 2025
ENGINEERING CHEMISTRY
(Common to CE and ME)

Time: 3Hrs

Max Marks: 70

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 are the units of Hardness	1 M	1	2
	ii.	Draw the structure of EDTA.	1 M	1	1
	iii.	Define EMF and mention its unit.	1 M	2	1
	iv	Define redox reaction	1 M	2	2
	v.	Define condensation polymerization with an example.	1 M	3	1
	vi	What do you mean by Cetane number?	1 M	3	2
	vii.	What is the crucial role of gypsum in Portland cement.	1 M	4	1
	viii	Give two examples of refractory material.	1 M	4	1
	ix.	Give an example of a nanomaterial.	1 M	5	2
	x.	What are micelles?	1 M	5	1
Q.2(A)		Describe with a neat sketch the treatment of water by the ion exchange process.	12 M	1	2
		OR			
Q.2(B)		What is the principle of EDTA titration? How is the permanent hardness of water determined using the EDTA method?	12 M	1	2
Q.3(A)		Illustrate the working principle with chemical reactions and applications of the lithium-ion battery.	12 M	2	3
		OR			
Q.3(B)		Explain the functioning of the H_2-O_2 fuel cell with a schematic diagram. Also, list out its advantages and disadvantages.	12 M	2	2
Q.4(A)		Explain the synthesis, application and properties of Bakelite.	12 M	3	2
		OR			
Q.4(B)		What is addition Polymerization, and explain it by the free radical mechanism?	12 M	3	3
Q.5(A)		Explain (i) cloud and pour point, (ii) flash and fire point and (iii) Viscosity Index of lubricants.	12 M	4	2
		OR			
Q.5(B)		Describe the manufacture of Portland cement with a neat diagram.	12 M	4	2
Q.6(A)		Discuss the precipitation method for the synthesis of nanomaterials.	12 M	5	2
		OR			
Q.6(B)		Explain the Freundlich and Langmuir adsorption isotherms.	12 M	5	3

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS INSTITUTION)
B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December – 2025
ENGINEERING PHYSICS
(Common to All)

Time: 3Hrs

Max Marks: 70

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		Questions	Marks	CO	BL
Q.1	i.	What is the relation between path difference and phase difference?	1M	1	1
	ii.	What is double refraction?	1M	1	1
	iii.	Define Crystal Structure.	1M	2	1
	iv	What are miller indices?	1M	2	1
	v.	Estimate the de-Broglie wavelength of the electron raised to a potential of 2000 V?	1M	3	3
	vi	Write two merits of quantum free electron theory.	1M	3	1
	vii.	What are the majority and minority carriers in n-type semiconductors?	1M	4	1
	viii.	Mention any two differences between intrinsic and extrinsic semiconductors.	1M	4	1
	ix.	Give the relation between Electrical Polarization $\vec{P}$ and Electric Field $\vec{E}$.	1M	5	1
	x.	Mention various types of magnetic materials.	1M	5	1
Q.2(A)		Derive an expression for determining the wavelength of a monochromatic light using Newton's ring experiment with suitable schematics.	12M	1	3
		OR			
Q.2(B)		i) Illustrate Fraunhofer's single-slit diffraction with a corresponding diagram and examine the conditions under which the maximum, minimum, and secondary maximum light intensities occur in the diffracted spectrum.	10M	1	3
		ii) Calculate the angular separation between the first order minimum on either side of central maximum when the slits is 1×10^{-4} cm wide and light illuminating on it has a wave length of 6000Å ?	2M		
Q.3(A)		i) Consider a body centered cubic (BCC) lattice of identical atoms having radius R. Discuss (a) the number of atoms per unit cell (b) the coordination number, (c) the atomic packing fraction and (d) void Space.	6M	2	2
		ii) Describe and derive the Bragg's law of X-ray diffraction.	6M		
		OR			
Q.3(B)		Explain the seven crystal systems and fourteen Bravais lattices with neat diagrams by indicating the lattice parameters.	12M	2	2
Q.4(A)		Applying Schrodinger's equation show that the energy and wave-function for a quantum mechanical particle confined in a 1-D potential box is quantized. Where $V(x) = 0$, $0 \leq x \leq L$ $V(x) = \infty$, elsewhere	10M	3	3

	ii) Calculate the ground and 1st excited energy levels for an electron in a quantum well of width 10 Å with infinite walls?	2M		

<div align="center">**OR**</div>

Q.4(B)	Solve an expression for the density of energy states (DoS) function per unit volume of the crystal.	12M	3	3
Q.5(A)	Derive the electron and hole concentrations for an intrinsic semiconductor. Show that the intrinsic carrier concentration is independent of temperature.	12M	4	4

<div align="center">**OR**</div>

Q.5(B)	Illustrate the Hall effect with the help of diagram and establish the relation between Hall voltage and Hall coefficient. Mention its applications in semiconductors.	12M	4	4
Q.6(A)	i) Analyze the Lorentz internal field equation for dielectrics and deduce Clausius - Mosotti equation for a solid dielectric exhibiting electronic polarizability.	10M	5	4
	ii) The atomic weight and density of Sulphur are 32 and 2.08 g/cm³, respectively. The electronic polarizability of the atom is 3.28 × 10^{-40} F.m². If Sulphur solid has cubic symmetry, what will be its relative permittivity?	2M		

<div align="center">**OR**</div>

Q.6(B)	Define magnetic hysteresis and magnetic domains. Explain the hysteresis curve based on the domain theory of ferromagnetism. Mentions the applications of ferromagnetic materials.	12 M	5	4

<div align="center">*** **END*****</div>

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS INSTITUTION)
B. Tech I Year II Semester (R23) Supplementary End Semester Examinations, December – 2025
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to All)

Time: 3Hrs　　　　　　　　　　　　　　　　　　　　　　　　　**Max Marks: 70**

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

S.No.		Question	Marks	CO	BL
1.	i)	Solve $\frac{dy}{dx} + y = e^x$, find $y(0)$.	1	1	2
	ii)	Check $(2xy + y^2)dx + (x^2 + 2xy)dy = 0$ is exact or not.	1	1	2
	iii)	Find the particular integral of $y'' + y = \cos x$.	1	2	2
	iv)	Find the Wronskian of $y_1 = x, y_2 = x^2$.	1	2	2
	v)	Form the PDE by eliminating arbitrary constants from $z = a(x^2 + y^2) + b$.	1	3	1
	vi)	Find the C.F. of $(D - D')^2 z = 0$.	1	3	2
	vii)	Define Irrotational vector	1	4	1
	viii)	Define Solenoidal vector	1	4	1
	ix)	Evaluate $\int_C x\,dx + y\,dy$ for the path $x = t, y = t^2$, from $t = 0$ to $t = 1$.	1	5	2
	x)	State Stoke's theorem.	1	5	1
2(A)	(i)	Solve $(1 - x^2)\frac{dy}{dx} + 2xy = x(\sqrt{1 - x^2})$	6	1	3
	(ii)	Solve $(y \log x - 2)y\,dx - x\,dy = 0$	6	1	3
		OR			
2(B)	(i)	Solve $(1 + xy)y\,dx + (1 - xy)x\,dy = 0$	6	1	3
	(ii)	The number N of bacteria in a culture grew at a rate proportional to N. The value of N was initially 100 and increased to 332 in one hour. What would be the value of N after $1\frac{1}{2}$ hours?	6	1	3
3(A)	(i)	Solve $\frac{d^2 y}{dx^2} - 3\frac{dy}{dx} + 2y = xe^{3x} + \sin 2x$.	6	2	3
	(ii)	Solve $\frac{dx}{dt} + y = \sin t, \frac{dy}{dt} + x = \cos t$, given $x = 2, y = 0$ when $t = 0$.	6	2	3
		OR			
3(B)		Solve $\frac{d^2 y}{dx^2} + 4y = \tan 2x$ by the method of variation of parameters.	12	2	3
4(A)	(i)	Form the Partial Differential Equation by eliminating arbitrary function from $f(xy + z^2, x + y + z) = 0$.	6	3	3
	(ii)	Solve $(x^2 - y^2 - z^2)p + 2xyq = 2xz$.	6	3	3
		OR			
4(B)		Solve $(D^2 - 3DD' + 2D'^2)z = e^{2x-y} + e^{x+y} + \cos(x + 2y)$.	12	3	3
5(A)	(i)	Find the directional derivative of $\varphi = x^2 yz + 4xz^2$ at $(1, -2, -1)$ in the direction $2i - j - 2k$.	6	4	3
	(ii)	Find div F and curl F at the point $(1, 2, 3)$, given that $F = (x^2 yzI + xy^2 zJ + xyz^2 K)$	6	4	3
		OR			
5(B)		(i)Prove that $div\,(r^n R) = (n + 3)r^n$. Hence show that $\frac{R}{r^3}$ is solenoidal.	6	4	3
		(ii) Show that $\nabla^2 r^n = n(n+1)\,r^{n-2}$.	6	4	3

6(A) Verify the Green's theorem for $\int_C [(x^2 y)dx + (x^2)dy]$ where C is the   12   5   3
boundary described counterclockwise of triangle with vertices
$(0,0), (1,0), (1,1)$.

OR

6(B) Verify divergence theorem for $F = (x^2 - yz)i + (y^2 - zx)j + (z^2 - xy)k$ 12   5   3
taken over the rectangular parallelepiped $0 \leq x \leq a$; $0 \leq y \leq b$; $0 \leq z \leq c$.

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B. Tech I Year I Semester (R23) Supplementary End Semester Examinations, December– 2025

INTRODUCTION TO PROGRAMMING

(Common to All)

Time: 3Hrs

Max Marks: 70

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 an algorithm?	1M	1	1
	ii.	Define variable with example.	1M	1	1
	iii.	What is an entry-controlled loop?	1M	2	1
	iv.	Define switch statement.	1M	2	1
	v.	Write the syntax for declaring a 1-D integer array.	1M	3	1
	vi	What is string literal?	1M	3	1
	vii.	Write syntax to declare a pointer variable.	1M	4	1
	viii	What is dynamic memory allocation?	1M	4	1
	ix.	What is global variable?	1M	5	1
	x.	What does fclose() do?	1M	5	1
Q.2(A)		Develop an algorithm and pseudo-code for calculating factorial of a number.	12M	1	3
		OR			
Q.2(B)		Describe various problem-solving techniques used in computer programming.	12M	1	2
Q.3(A)		i) Write a C program using switch to perform arithmetic operations (+, -, *, /).	6M	2	3
		ii) Write a C program to count even and odd numbers from 1 to 100 using loops.	6M	2	3
		OR			
Q.3(B)		Explain in detail about the different looping structures with examples.	12M	2	2
Q.4(A)		Write a C program to multiply two matrices using 2-D arrays.	12M	3	3
		OR			
Q.4(B)		Describe the various string library functions with suitable examples.	12M	3	2
Q.5(A)		Develop a C program using structures to store and display student details (name, roll number, marks).	12M	4	3
		OR			
Q.5(B)		Explain in detail about the dynamic memory allocation functions with examples.	12M	4	2
Q.6(A)		Explain in detail about call by value and call by reference with suitable example programs.	12M	5	2
		OR			
Q.6(B)		Discuss the various file operation modes available in C with suitable example programs.	12M	5	2

*** END***

Hall Ticket No:

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December – 2025
ENGINEERING GRAPHICS
(Common to All)

Time: 3Hrs

Max Marks: 70

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part-A or B only

S.No.	Question	Marks	CO	BL
Q.1(A)	Draw an involute of a Hexagon of 50mm side. Also, draw a tangent and normal at 130 mm from the center of the hexagon on the curve.	14M	1	3
	OR			
Q.1(B)	Construct an ellipse when the distance between the focus and directrix is 35 mm and eccentricity is 3/4. Also draw the tangent and normal to any point on the curve.	14M	1	3
Q.2(A)	(i) A line AB 70mm long is inclined at an angle of 30° to H.P and 45° to V.P. The point A is 15 mm above H.P and 20mm in front of V.P. Draw its Projections.	7M	2	3
	(ii) Draw the projections of the following points on the same reference line by keeping the distance between projectors as 40mm. a) E – 30mm below HP and 50mm behind VP b) F – 40mm above HP and 60mm behind VP c) G – 50mm above HP and 60mm in front of VP	7M	2	3
	OR			
Q.2(B)	Draw the projections of a circle of 50mm diameter resting in the HP one point on the circumference. Its plane is inclined at 45° to the HP and the top view of the diameter making an angle of 30° with the VP.	14M	2	3
Q.3(A)	A Hexagonal Pyramid of base side 30mm and axis 60mm has a corner of its base on the ground. Its axis is inclined at 30° to the ground and parallel to VP. Draw its Projections.	14M	3	3
	OR			
Q.3(B)	A Cylinder of base diameter 45mm and axis 60mm has a base in V.P and inclined at 50° to V.P. Draw its projections.	14M	3	3
Q.4(A)	A hexagonal prism, 30 mm base side & 60 mm axis stand on HP on its base whose two sides are perpendicular to VP. It is cut by a section plane 45º inclined to HP, through mid-point of axis. Draw Front view, sectional Top view and sectional Side view. Also draw true shape of section	14M	4	3
	OR			
Q.4(B)	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 35° to HP passing through the top of the generator and cuts all other generators. Draw the development of surface using parallel line method.	14M	4	3

Q.5(A) Draw the front view, top view and right side view of the following object. 14M 5 3
Use first angle projection.

OR

Q.5(B) Draw the isometric view of the object, the multi view projection of which is 14M 5 3
shown below.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December – 2025
ENGINEERING GRAPHICS
(Common to All)

Time: 3Hrs

Max Marks: 70

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part-A or B only

S.No.	Question	Marks	CO	BL
Q.1(A)	Draw a hyperbola with the distance of the focus from the directrix at 50mm and e=3/2 (Eccentricity method). Also draw tangent and normal 40 mm from directrix.	14M	1	3
	OR			
Q.1(B)	Construct a cycloid for one and half revolutions when the radius of the generating circle is 25 mm. Also, draw a tangent and normal to the curve at a point 40 mm from the directing line.	14M	1	3
Q.2(A)	(i) 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.	7M	2	3
		7M	2	3
	(ii) Draw the projections of the following points by keeping the projectors 50mm apart. 1. Point A – in HP and 20mm behind VP 2. Point B – 30mm below HP, 45mm behind VP 3. Point C – 40mm above HP, 35mm in front of VP 4. Point D – on HP and on VP			
	OR			
Q.2(B)	A Pentagonal lamina of 30 mm sides is resting on HP on one of its sides with its surface 45° inclined to HP. Draw the projections of the lamina when the side in HP makes 35° angle with VP.	14M	2	3
Q.3(A)	Draw the projections of a hexagonal pyramid with a base side of 30 mm and an axis length of 60 mm. The base rests on the horizontal plane and the axis is inclined at 45° to the H.P and parallel to the V.P.	14M	3	3
	OR			
Q.3(B)	A Cylinder of 50 mm diameter and 60 mm axis is resting on one point of a base circle on VP while its axis makes 45° with VP and parallel to HP. Draw its projections.	14M	3	3
Q.4(A)	A Cone base 70 mm diameter and axis 80 mm long is resting on its base on H.P. It is cut by a section plane perpendicular to the V.P., inclined at 45° to the H.P. and cutting the axis at a point 35 mm from the apex. Draw the front view, sectional top view, sectional side view and true shape of the section.	14M	4	3
	OR			
Q.4(B)	A pentagonal prism of base side 30 mm and height 80 mm resting on its base on H.P with one rectangular face is perpendicular to V.P. It is cut by a section plane inclined at 45° to the H.P and passing though the midpoint of the axis. Draw the development of the lateral surface of the truncated prism.	14M	4	3

Q.5(A) Draw the front view, top view and right side view of the following object.   14M   5   3
   Use first angle projection.

OR

Q.5(B) Draw the isometric view of the object, the multi view projection of which is   14M   5   3
        shown below.

*** END***
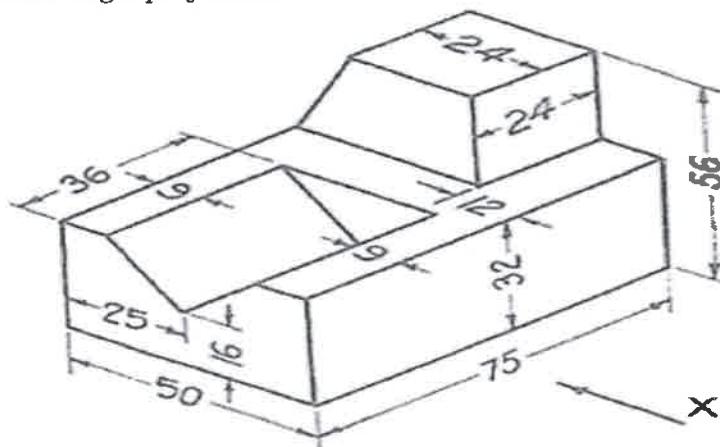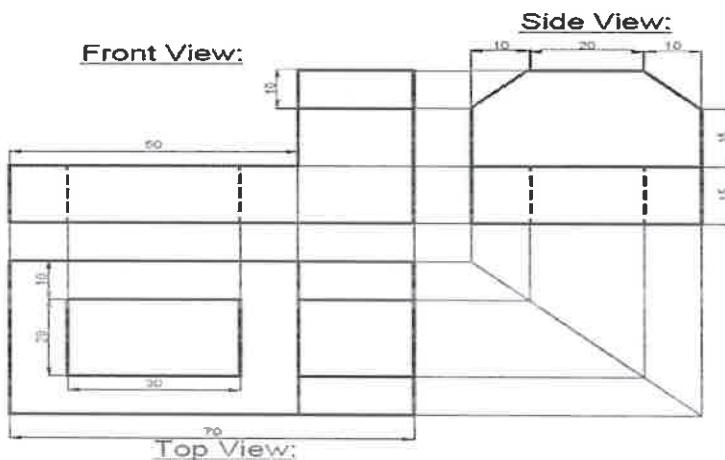
MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December– 2025

BASIC CIVIL & MECHANICAL ENGINEERING

(Common to All)

Time: 3Hrs

Max Marks: 70

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 4 answer either A or B only

PART-A: BASIC CIVIL ENGINEERING

Max Marks: 35

Q.No		Question	Marks	CO	BL
Q.1	i.	What are the various disciplines in Civil Engineering?	1M	1	1
	ii.	Define workability.	1M	1	1
	iii.	What are the principles of surveying.	1M	2	1
	iv.	Difference between plane and geodetic surveying.	1M	2	2
	v.	Define permanent way.	1M	3	1
Q.2(A)		Explain the major role of Civil Engineers in society.	10M	1	2
		OR			
Q.2(B)		Explain briefly any four types of tests conducted on bricks in the laboratories to a certain their qualities.	10M	1	2
Q.3(A)		(i). Convert the following reduced bearing of lines into W.C.B (a) N 45° E (b) S 55° W (c) N 35° W	5M	2	3
		(ii). The Following bearings were observed with a compass Determine the interior angles.	5M	2	3

Lines	F.B.
AB	60°30'
BC	122°00'
CD	46°00'
DE	205°30'
EA	300°00'

OR

Q.3(B)	The following observations were taken with dumpy level and 4 m levelling staff. Observations are: 2.350, 1.625, 0.700, 2.900,1.955, 1.400, 0.900, 0.600, 1.500,1.150. The instrument was shifted after 3rd and7th reading. The first reading was taken on a bench mark whose R.L.was 150.00 m. prepare a page of level book and calculate RL of all the points. Use Rise and Fall Method.	10M	2	3

Q.4(A)	What are the different types of pavements and explain in detail?	10M	3	2
	OR			
Q.4(B)	Explain about Rainwater Harvesting and Write the components of Rainwater Harvesting?	10M	3	2

*** END***

PART-B: BASIC MECHANICAL ENGINEERING

Max Marks: 35

Q.No		Question	Marks	CO	BL
Q.1	i.	Write down the difference between alloy and composite	1M	1	1
	ii.	Write down the importance of ceramic material.	1M	1	1
	iii.	Draw a neat diagram of diesel cycle in P-V chart.	1M	2	1
	iv.	What is the difference between IC and EC engines?	1M	2	1
	v.	State the difference between belt drives and chain drives	1M	3	1
Q.2(A)		Explain the role of mechanical engineering in energy and aerospace sectors.	10M	1	2
		OR			
Q.2(B)		Write the properties and applications of the ceramics.	10M	1	2
Q.3(A)		Briefly describe the advantages, disadvantages, and application of Joining process and Machining Process.	10M	2	2
		OR			
Q.3(B)		Write the differences between 2 stoke and 4 stroke IC engines.	10M	2	2
Q.4(A)		Write a short note on Belt Drives, Gear drives and their applications.	10M	3	2
		OR			
Q.4(B)		What are the different types of robotics? and explain any two types	10M	3	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B. Tech I Year I & II Semesters (R23) Supplementary End Semester Examinations, December– 2025

COMMUNICTIVE ENGLISH
(Common to All)

Time: 3Hrs

Max Marks: 70

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 purpose of skimming while reading a passage?	1M	1	1
	ii.	"she didn't attend the class because she was ill" correct the punctuation and the sentence.	1M	1	1
	iii.	Fill in the blanks using appropriate article (a/an/the). She bought _____ umbrella from the market.	1M	2	2
	iv.	Fill in the blanks using appropriate preposition. The teacher asked the students to submit the assignment _____ Friday.	1M	2	2
	v.	Fill in the blanks using appropriate verb forms. She _____ (work) in this school since 2018.	1M	3	2
	vi	Fill in the blanks with either *be or have* in a form that agrees with the subject. The results of the examination _____ announced yesterday.	1M	3	2
	vii.	Rewrite the following sentence in indirect speech She said, "I will finish my homework today."	1M	4	1
	viii	Rewrite the following sentence in passive voice. The postman delivered the letter yesterday. (begin the sentence with 'the letter')	1M	4	1
	ix.	Correct the errors in the following sentence. He did not knew the answer to the question.	1M	5	2
	x.	Correct the errors in the following sentence. She is **more better** at mathematics than her sister.	1M	5	2
Q.2(A)		**Explain the theme of love and sacrifice** in *The Gift of the Magi.* How do Della and Jim prove their love for each other?	12M	1	5
		OR			
Q.2(B)		Discuss the various career opportunities available to fresh Engineering graduates in India and abroad. What factors should they consider while choosing their career path?	12M	1	5
Q.3(A)		How does the poem reflect Tennyson's Romantic sensibilities? Analyze with reference to the depiction of the Brook and its surroundings.	12M	2	5
		OR			
Q.3(B)		Write a descriptive paragraph on 'Digital Addiction' in 200 words.	12M	2	5
Q.4(A)		In what ways has Elon Musk transformed the automobile and space industries? Discuss with examples from Tesla and SpaceX.	12M	3	5
		OR			
Q.4(B)		Fill in the blanks with appropriate forms of verb given in the brackets.	12M	3	5

1. She _____ (write) a letter to her friend yesterday.
2. They _____ (finish) their homework just now.
3. I _____ (call) him last night.
4. He always _____ (drink) milk in the morning.
5. We _____ (visit) Paris in 2018.
6. My father _____ (work) in this company since 2010.
7. I _____ (will help, helps, helping) you if you need any assistance.
8. Right now, she _____ (prepare) for her exams.
9. By 2035, they _____ (build) a new hospital in our town.
10. When I reached the station, the train _____ already _____ (leave).
11. We shall _____ (complete) our project by next month.
12. Have you ever _____ (travel) to another country?

Q.5(A)	What were the challenges faced by Harvey and Eleanor Bope during their experiment? How did these challenges affect the outcome?	12M	4	5
	OR			
Q.5(B)	Write a letter to the Electricity Board complaining about frequent power cuts in your area and requesting a permanent solution.	12M	4	5
Q.6(A)	Explain the meaning of intrapersonal communication and discuss its importance in decision-making.	12M	5	5
	OR			
Q.6(B)	Write an essay on "Social media and its influence on election campaigns".	12M	5	5

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year I & II Semesters (R23) Supplementary Semester Examinations, December– 2025
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to all)

Time: 3Hrs   Max Marks: 35

> 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 4 answer either A or B only**

PART-A: BASIC ELECTRICAL ENGINEERING

Q.No		Question	Marks	CO	BL
Q.1	i.	In superposition theorem, when we consider the effect of one Voltage source, all the other Voltage sources are .... a) Shorted b) Opened c) Removed d) Undisturbed	1M	1	1
	ii.	100W electric lamp is connected to a 250V supply. Determine current flow in the lamp.	1M	1	1
	iii.	Write some applications of electrical machines.	1M	2	1
	iv.	List the main components of hydro power station.	1M	2	1
	v.	What is MCB?	1M	3	1
Q.2(A)		Find the current in the 12Ω resistor by using superposition theorem.	10M	1	3

OR

Q.2(B)		A Capacitor C is connected in series with a 40Ω resistor across a supply of frequency 50 Hz. A current of 3A flows and the circuit impedance is 50Ω. Calculate (a) The value of capacitance (b) the supply voltage (c) the phase angle between the supply voltage and current (d) the potential drop across the resistor (e) the potential difference across the capacitor (f) Draw the phasor diagram.	10M	1	3
Q.3(A)		Illustrate various components of a DC machine with neat sketch.	10M	2	2

OR

Q.3(B)		Explain the construction and working of Moving Iron instrument with the help of neat sketch.	10M	2	2
Q.4(A)		Draw the layout of Solar power plant and explain the components associated with the power plant.	10M	3	2

OR

Q.4(B)		What is mean by Earthing? Explain any one type of Earthing with diagram.	10M	3	2

*** END***

PART-B: BASIC ELECTRONICS ENGINEERING

Q.No		Question	Marks	CO	BL
Q.1	i.	Define doping.	1M	1	1
	ii.	Draw the VI characteristics for PN Junction diode.	1M	1	1
	iii.	Write the types of flipflops.	1M	2	1
	iv.	Convert Binary $(111000101)_2$ to octal equivalent.	1M	2	2
	v.	What is meant by counter?	1M	3	1
Q.2(A)		Explain in detail the operation of a PN junction diode in forward and reverse bias conditions with the relevant V-I characteristics.	10M	1	2
		OR			
Q.2(B)		With neat sketch, explain the input and output characteristics of Common Collector configuration	10M	1	2
Q.3(A)		Briefly explain about the operation of Zener voltage regulator with circuit diagram.	10M	2	2
		OR			
Q.3(B)		Draw the block diagram of an electronic instrumentation system and explain each block briefly.	10M	2	2
Q.4(A)		Design a Half adder & Full adder circuit using Logic gates and verify the truth table.	10M	3	2
		OR			
Q.4(B)		Draw the circuit diagram of a T type flip-flop and explain its operation with the help of a truth table.	10M	3	2

*** END***