Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 23MAT102

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
DIFFERNETIAL 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

Q.No		Question	Marks	CO	BL
Q.1	i.	Find the Integrating Factor for $\dfrac{dy}{dx}+\dfrac{y}{x\log x}=\dfrac{1}{\log x}$	1M	1	2
	ii.	Check whether $\left(y\left(1+\dfrac{1}{x}\right)+\cos y\right)dx+\left(x+\log x-x\sin y\right)dy=0$ is exact or not	1M	1	2
	iii.	Find the particular integral of $\left(D^2-5D+4\right)y=e^{4x}$	1M	2	2
	iv.	Find the Wronskian of $y_1\left(x\right)=e^x$ and $y_2\left(x\right)=xe^x$	1M	2	2
	v.	Form the partial differential equation by eliminating the arbitrary constants a and b from $z=ax+by+a^2+b^2$	1M	3	1
	vi	Write one multiplier to solve $x(y-z)p+y(z-x)q=z(x-y)$	1M	3	2
	vii.	Find the unit vector normal to the surface $z=x^2+y^2+2$ at the point (1,2,3)	1M	4	2
	viii.	Show that $\bar{f}=(y+z)\bar{i}+(z+x)\bar{j}+(x+y)\bar{k}$ is irrotational.	1M	4	2
	ix.	If $\bar{F}=xi+yj$ then evaluate $\int_C \bar{F}.dr$ where C is the line $y=x$ in the $xy-$plane from $(0,0)$ to $(3,3)$	1M	5	2
	x.	State Stoke's theorem.	1M	5	1
Q.2(A)		(i). Solve $(1+y^2)\,dx-(x-e^{-\tan^{-1}y})\,dy=0$	6M	1	3
		(ii). Solve $\operatorname{Cosh}x\dfrac{dy}{dx}+y\sinh x=2\cosh^2 x\sinh x$	6M	1	3
		OR			
Q.2(B)		(i). Solve $(e^{x+y}+ye^y)dx+(xe^y-1)dy=0$	6M	1	3
		(ii). If the air is maintained at 30°C and the temperature of the body cools down from 80°C to 60°C in 12 minutes, find the temperature of the body after 24 minutes.	6M	1	3
Q.3(A)		Solve $y''-6y'+9y=\dfrac{e^{3x}}{x^2}$ by the method of Variation of Parameters.	12M	2	3
		OR			
Q.3(B)		Solve the Simultaneous Linear Differential Equation $\dfrac{dx}{dt}+2x-3y=t,$ $\dfrac{dy}{dt}-3x+2y=e^{2t}$	12M	2	3
Q.4(A)		(i). Form the Partial Differential Equation by eliminating arbitrary function from $f(x^2+y^2,\ z-xy)=0$	6M	3	3
		(ii). Solve $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$	6M	3	3
		OR			

| | | 6M | 3 | 3 |

Q.4(B) (i). Solve $\frac{\partial^3 z}{\partial x^3} - 2\frac{\partial^3 z}{\partial x^2 \partial y} = 2e^{2x} + 3x^2 y$ — 6M 3 3

(ii). Solve $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6\frac{\partial^2 z}{\partial y^2} = \cos(2x + y)$ — 6M 3 3

Q.5(A)

(i). Find the directional derivative of the function $f = x^2 - y^2 + 2Z^2$ at the point $P(1,2,3)$ in the direction of line PQ where Q is the point $(5,0,4)$. — 6M 4 3

(ii). Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $x^2 + y^2 - 3 = z$ at the point $(2, -1, 2)$ — 6M 4 3

OR

Q.5(B)

(i). Show that $\nabla^2 f(r) = f''(r) + \frac{2}{r} f'(r)$ — 6M 4 3

(ii). If $f = (x^2 + y^2 + z^2)^{-n}$, find $div\ grad\ f$ and determine n if $div\ grad\ f = 0$ — 6M 4 3

Q.6(A)   Verify Green's theorem for $\int_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$ where C is the boundary of the region bounded by $x = 0, y = 0$ and $x + y = 1$. — 12M 5 4

OR

Q.6(B)   Verify divergence theorem for $F = 4xzi - y^2 j + yzk$ taken over the cube bounded by $x = 0, x = 1; y = 0, y = 1$ and $z = 0, z = 1$. — 12M 5 4

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
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 A or B only**

| Q.No		Question	Marks	CO	BL
Q.1	i.	What is parallelogram law of forces?	1M	1	1
	ii.	Discuss about rigid and non-rigid body.	1M	1	2
	iii.	Explain about Lami's theorem?	1M	2	1
	iv.	State and explain equilibrium of forces.	1M	2	1
	v.	Write about polar moment of inertia?	1M	3	2
	vi	What do you understand by axis of reference?	1M	3	1
	vii.	Differentiate kinetic and kinematics?	1M	4	2
	viii.	What do you know about erratic motion?	1M	4	1
	ix.	Discuss about potential energy of a particle.	1M	5	1
	x.	Define the principle of work and energy for a system of particle?	1M	5	1
Q.2(A)		The resultant of the force system is shown in fig. below is 520 N along the negative direction of Y axis. Determine P and θ.	12M	1	4
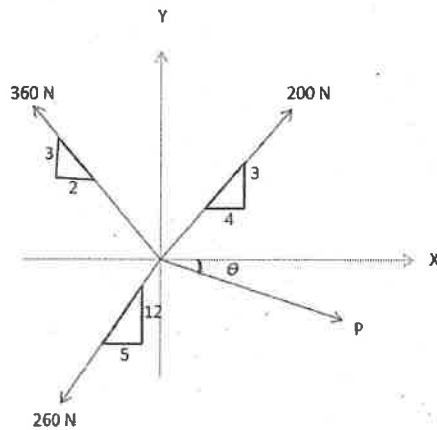
OR

|					
Q.2(B)		The four coplanar forces are acting at a point as shown in figure. Determine the resultant in magnitude and direction.	12M	1	4
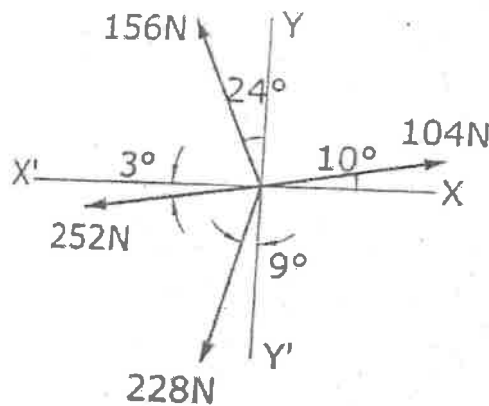
Q.3(A) Draw the free body diagrams for all cylinders. Find the reaction forces at all contact points. Cylinders A and B are resting on a horizontal channel of width 60 cm. The diameters of all the cylinders is 40 cm   **12M**   **2**   **4**
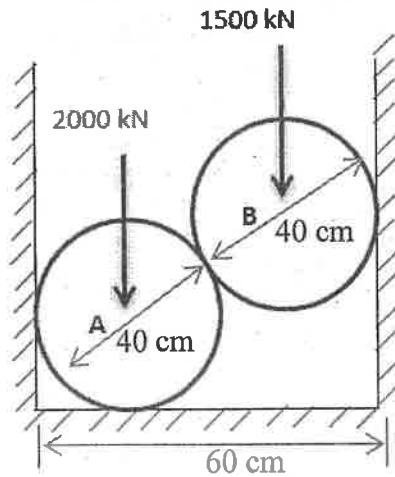

OR

Q.3(B) A wire is fixed at A and D as shown in Figure below 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.   **12M**   **2**   **4**
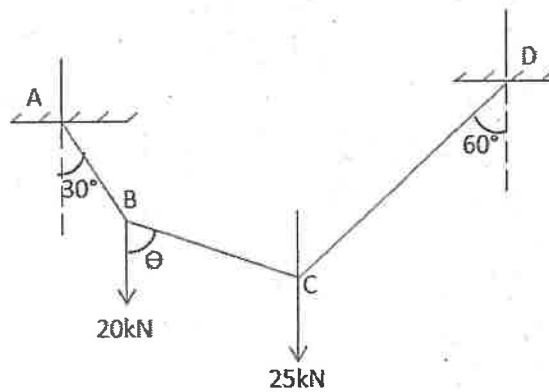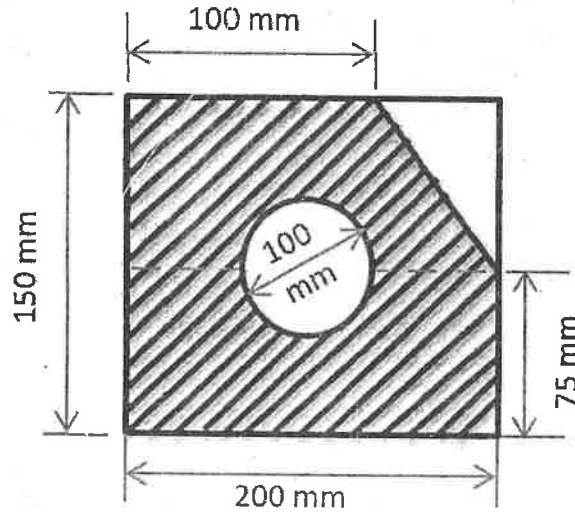

**Q.4(A)** Determine the moment of inertia of the L section shown in Figure with respect to its centroidal axes.   **12M**   **3**   **4**
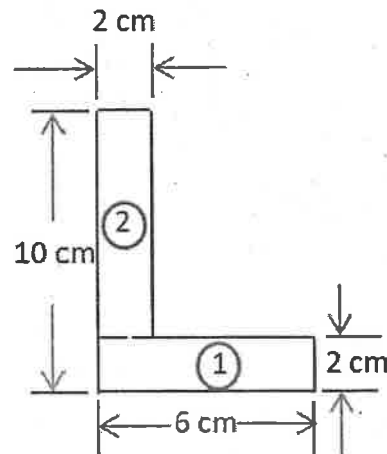
OR

Q.4(B)   Locate the Centroid of the shaded area of the lamina as shown in figure.   12M   3   4

100 mm

150 mm

100 mm

200 mm

75 mm

Q.5(A)   A particle travels along a straight track such that its position is described by (s-t) graph. Construct the u-t graph for the same time interval. In figure. Construct the u-t and a-t graph for $0 \leq t \leq 30 \sec$.   12M   4   3

$s\ (m^t)$

$s = 108\,m^t$

108

$s = 0.5t^3$

100

$t\ (sec)$

6   8   10
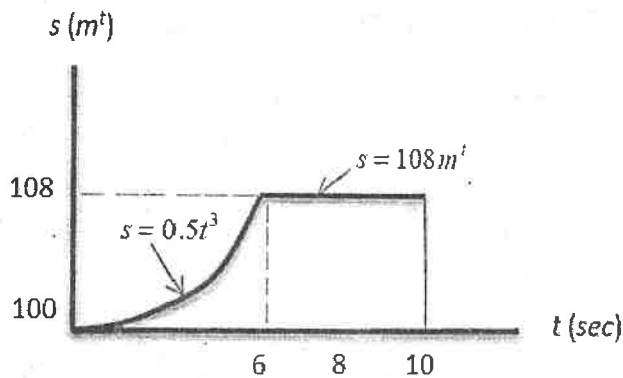
OR

Q.5(B)   In a police investigation of tyre marks, it was concluded that a car while in motion along a straight level road skidded for a total of 60 meter after the breaks were applied. If the coefficient of friction between the tyre and the pavement is estimated as 0.5, what was the probable speed of the car just before the breaks were applied?   12M   4   4

Q.6(A)   A football of mass 200 gm is at rest. A player kicks the ball which moves with a velocity of 20 m/s at an angle of 30° with respect to ground level. Find the force exerted by the player on the ball if duration of strike is 0.02 seconds.   12M   5   3

OR

Q.6(B)   A flywheel weighing 50 kN and having radius of gyration 1m loses its speed from 400 rpm to 280 rpm in 2 minutes. Calculate (i) the retarding torque acting on it (ii) change in its kinetic energy during the above period (iii) change in its angular momentum during the same period.   12M   5   4

*** END***
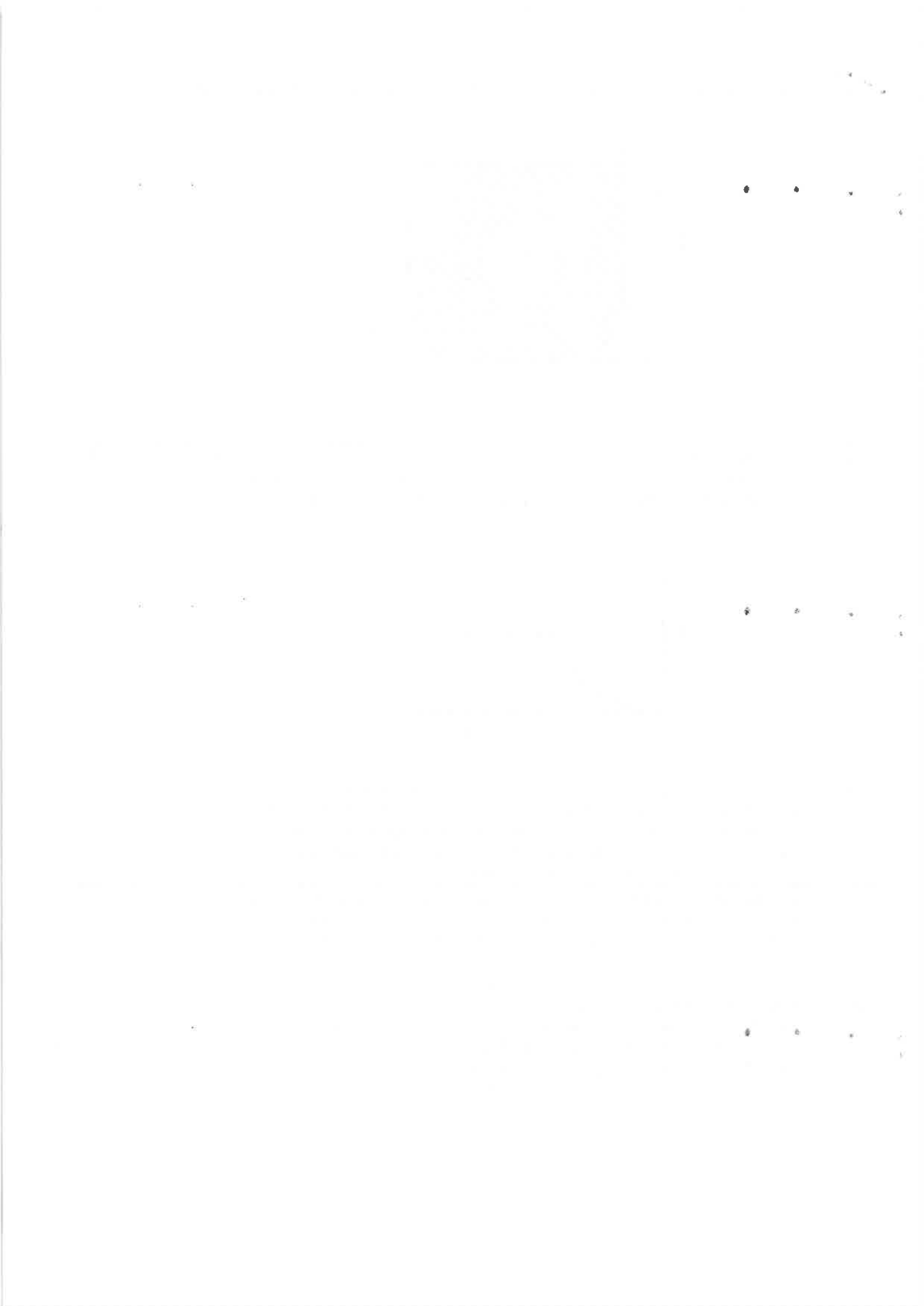
MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
## ENGINEERING MECHANICS
(Mechanical Engineering)

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 A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	Define triangle law of vector addition	1M	1	1
	ii.	Difference between static friction and dynamic friction?	1M	1	2
	iii.	State Lami's theorem	1M	2	1
	iv.	Give example of truss structure stable?	1M	2	2
	v.	What is area of MOI	1M	3	1
	vi	State the difference between speed and velocity.	1M	3	1
	vii.	What is the physical significance of area moment of inertia?	1M	4	1
	viii.	What will be the momentum of a stone having mass of 10 kg when it is thrown with a velocity of 2m/s?	1M	4	2
	ix.	What is meant by D. Alembert's principle?	1M	5	2
	x.	Calculate the angular acceleration of an object if its angular velocity changes at the rate of 100 rad/s for 10 seconds.	1M	5	2
Q.2(A)		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.	12M	1	3
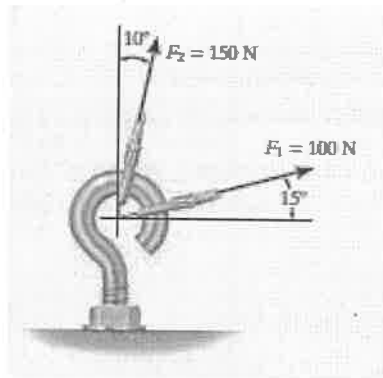
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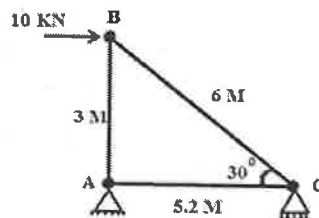|					
Q.2(B)		A 1 kg block is resting on a surface with coefficient of friction μ = 0.1. A force of 0.8 N is applied to the block as shown in the figure. Calculate	12M	1	3
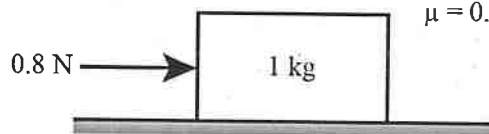
the friction force.

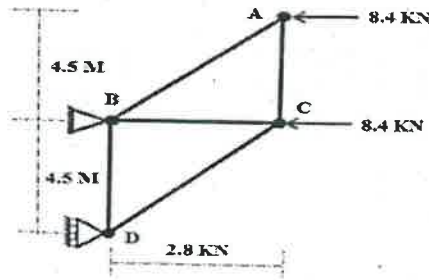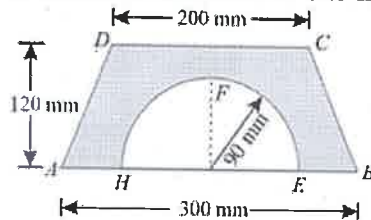|					
Q.3(A)		The truss is supported by roller at C and hinge at A. Find the magnitude and nature of forces in all the member of the truss.	12M	2	3

OR

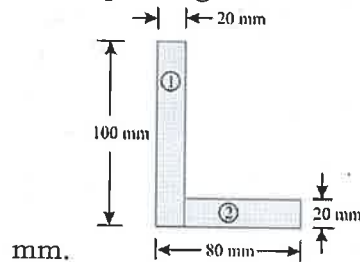|			
Q.3(B)	Determine the magnitude and nature of forces in all the member of the truss structure.	12M	2	3

|			
Q.4(A)	Semi-circle of 90 mm radius is cut out from a trapezium as shown in fig. Find the position of center of centroid of the figure.	12M	3	4

OR

Q.4(B)	Find the centroid of an unequal angle section 100 mm × 80 mm × 20 mm.	12M	3	3

Q.5(A)	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.	12M	4	3
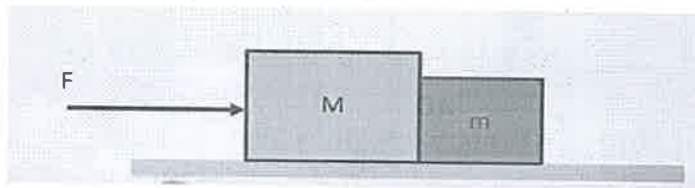
OR

Q.5(B)	A 80 N body moving to the right at a speed of 3 m/sec strikes a 10 N body that is moving to the left at a speed of 10m/sec. The final velocity of 10 N body is 4m/sec to the right. Calculate the coefficient of restitution and the final velocity of the 80 N body.	12M	4	3

Q.6(A)	A fly wheel rotates with a uniform angular acceleration. If its angular velocity increases from 20π rad/s to 40π rad/s in 10 seconds. Find the number of rotations in that period.	12M	5	3

OR

Q.6(B)	A child stands at the centre of a turntable with his arms outstretched. The turntable is set rotating with an angular speed of 40 rev/min. How much is the angular speed of the child if he folds his hands back and thereby reduces his moment of inertia to 2/5 times the initial value? Also, show that the child's new kinetic energy of rotation is more than the initial kinetic energy of rotation.	12M	5	3

*** END***

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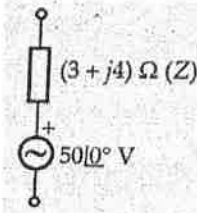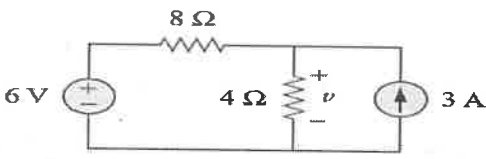## NETWORK ANALYSIS
(Electronics & Communication Engineering)

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 A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	What is the condition for maximum power transfer to the load?	1M	1	1
	ii.	Write the superposition theorem.	1M	1	1
	iii.	Draw the transient current graph with time (t =0 to ∞) for a series RC circuit for the DC excitation source.	1M	2	2
	iv.	What is the Laplace transform of u(t)?	1M	2	3
	v.	How is an AC quantity different from a DC quantity?	1M	3	1
	vi	Convert the given voltage source to an equivalent current source.	1M	3	3

$(3 + j4)\,\Omega\ (Z)$

$50\underline{|0°}$ V

	vii.	What do you understand by the coefficient of coupling (K)?	1M	4	1
	viii.	What is the Q-factor of series RLC resonating circuit?	1M	4	1
	ix.	What is the relation between the Z-parameter and the Y-parameter?	1M	5	2
	x.	Why is ABCD-parameter called as transmission parameter?	1M	5	2
Q.2(A)		State superposition theorem. Write the steps to solve the network problem using the superposition theorem. Use this theorem to find voltage drop, v, across 4 Ω resistance	12M	1	3

$8\ \Omega$

6 V $4\ \Omega$ v 3 A

OR

Q.2(B)	Evaluate the power transferred to the load for a circuit with a Thevenin equivalent voltage of 10V and a Thevenin equivalent resistance of 5Ω. Calculate the power transferred to the load for load resistances of 1Ω, 5Ω, and 10Ω. Determine the load resistance that results in maximum power transfer. Write your conclusion after analyzing the results.	12M	1	4
Q.3(A)	(i) Derive the transient response of a series RL circuit having DC excitation. (ii) What is the Laplace transform for $6t^n$ and e^{-at}	12M	2	3

OR

Q.3(B)	State and explain the Initial Value Theorem and the Final Value Theorem for Laplace Transforms. Provide a brief example to illustrate each theorem.	12M	2	2

Q.4(A)	(i) Obtain the current expression for the sinusoidal response of a series RL circuit. (ii) In a series R-L circuit, the current and voltage are given as: $$i = 1\cos(314t - 20^0), v = 10\cos(314t + 10^0)$$ Find the value of R and L.	12M	3	3

OR

Q.4(B)	Write the expression for a star-to-delta and delta-to-star conversion. In the given figure $R_1=2\Omega$, $R_2= 4\ \Omega$, and $R_3= 6\ \Omega$, Find R_x, R_y, R_z values.	12M	3	3
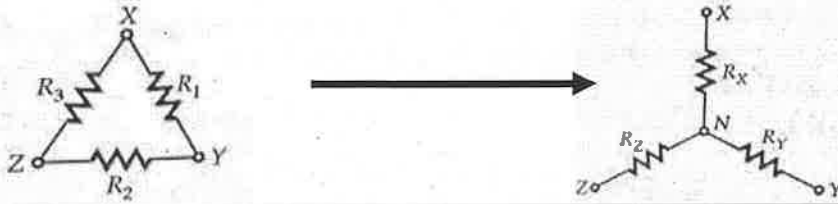
Q.5(A)	(i) What is the resonance frequency of a series RLC circuit, where $R = 10\Omega$, L = 25H and C =100 µF? Calculate the Q-factor as well. (ii) Derive and establish the expression that relates to Q-factor, Bandwidth and Resonance frequency.	12M	4	3

OR

Q.5(B)	(i) Obtain the expression for frequency at series resonance. Write down a few properties of the series resonating circuit. How is series resonance different from parallel resonance? (ii) Discuss the effect of resistance on the frequency response curve of a series resonating circuit.	12M	4	2

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

OR

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

$$Z_1 = \begin{pmatrix} 2 & 3 \\ 1 & 5 \end{pmatrix} \quad \text{and} \quad Z_2 = \begin{pmatrix} 3 & 1 \\ 5 & 5 \end{pmatrix}$$

What will the overall Z-parameter matrix of the network be when these two networks are cascaded?

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
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DATA STRUCTURES
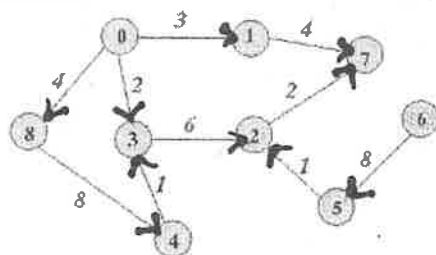(Common to CSE, CST, CSE-AI, CSE-DS, CSE-CS, CSE-AI&ML, and CSE-CN)

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.	Distinguish between linear and nonlinear data structures.	1M	1	2
	ii.	Define ADT. Give any two examples.	1M	1	1
	iii.	Define Linked List. List out the various types.	1M	2	1
	iv.	What is circular linked list?	1M	2	1
	v.	List the properties and operations queues.	1M	3	2
	vi	What causes underflow of stack? How it could be avoided?	1M	3	1
	vii.	Define a heap and show how it can be used to represent a priority queue.	1M	4	1
	viii	Define height of the tree.	1M	4	1
	ix.	What is the condition for complete directed graph?	1M	5	1
	x.	List the applications of hashing.	1M	5	2
Q.2(A)		Illustrate binary search and linear search algorithm with suitable example	12M	1	4
		OR			
Q.2(B)		Sort the following values using Selection Sort : 65, 70 ,75 ,80, 85, 60 ,55 ,50 ,45 Illustrate each step of the sorting process	12M	1	3
Q.3(A)		What is Stack? Develop the algorithms for implementing Stack using Linked List.	12M	2	2
		OR			
Q.3(B)		Analyze and write code for create, insert, delete, display operations in circular linked list.	12M	2	4
Q.4(A)		Discuss the Queue implementation using arrays.	12M	3	2
		OR			
Q.4(B)		Develop the suitable code to perform the operations in double ended queues with examples.	12M	3	4
Q.5(A)		Discuss the property of Binary Search Tree and Create a binary search tree following data elements 45,39, 56, 12, 34, 78, 32, 10, 89, 54, 67, 81 ε deletion of nodes 81and 78.	12M	4	2
		OR			
Q.5(B)		Illustrate the construction of heaps and its operations with a suitable example.	12M	4	4
Q.6(A)		Consider the graph given below and show its adjacency matrix & adjacency Linked list representations.	12M	5	3

OR

| Q.6(B) | Given input {7371, 2323, 5173, 5199, 5344, 8679, 2989} and a hash function h(x) =x mod 10. Prepare the resulting for the following: (i) Open hash table (ii) Open addressing hash table using linear probing. (iii) Open addressing hah table using quadratic probing. | 12M | 5 | 4 |

*** END***

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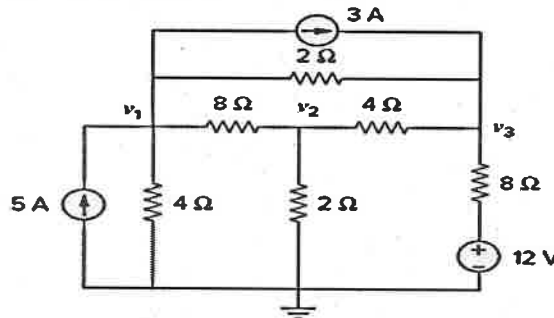## ELECTRICAL CIRCUIT ANALYSIS -I
(Electrical & Electronics Engineering)

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 A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	What is dependent source?	1M	1	1
	ii.	What is voltage division rule?	1M	1	1
	iii.	Compare series and parallel magnetic circuit.	1M	2	1
	iv.	Define MMF.	1M	2	1
	v.	Define form factor.	1M	3	1
	vi	Draw the phasor diagram of series RC circuit.	1M	3	1
	vii.	What is resonance?	1M	4	1
	viii.	Define bandwidth.	1M	4	1
	ix.	What are the limitations of reciprocity theorem?	1M	5	1
	x.	State Compensation theorem.	1M	5	1
Q.2(A)		Use nodal analysis to determine the node voltages v1, v 2 and v 3and current drawn by 4 Ω resistors.	12M	1	4

OR

Q.2(B)	Derive the expression to transfer resistance in star connected network into delta connected network.	12M	1	3
Q.3(A)	A magnetic circuit with a single air gap is shown in Fig. The core dimensions are: Cross-sectional area Ac = 1.8 × 10-3 m2, Mean core length lc = 0.6 m, Gap length g = 2.3 x 10-3 m, N = 83 turns. Assume that the core has a permeability of μr = 2500 and neglect the effects of fringing fields at the air gap and leakage flux.	12M	2	5

(a) Calculate the reluctance of the core Rc and that of the gap Rg. For a current of i = 1.5 A, calculate (b) the total flux , (c) the flux linkages of the coil, and (d) the coil inductance L.
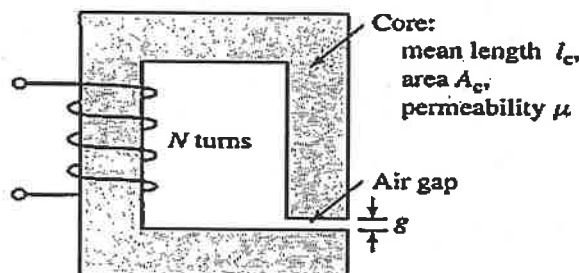

OR

Q.3(B)	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
Q.4(A)	A series combination of R = 1.191 ohms and L=14.1 mH is connected to a 230∟45° V, 50Hz supply. Determine the impedance of the circuit, input current, drop across the elements, power factor of the circuit, real power, reactive power, apparent power and draw the phasor diagram.	12M	3	4

OR

Q.4(B)	Determine the Average value, RMS value, Form factor and Peak factor of the signal shown.	12M	3	4
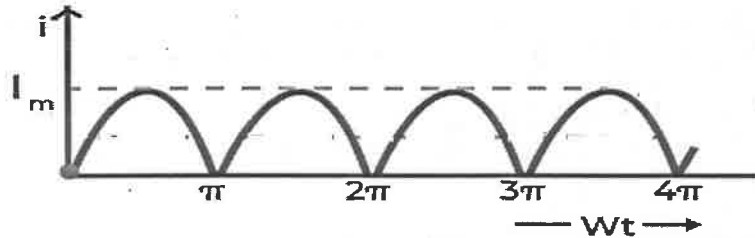
Q.5(A)	Derive the relation between co-efficient of coupling, the self-inductance and mutual inductance.	12M	4	3

OR

Q.5(B)	Derive the expression for the resonant frequency of the RLC circuit shown. Also determine the two possible values of C for the network to resonate at 2000 rad/s. Take RL = 4 Ω, L= 5 mH and RC = 4 Ω.	12M	4	5
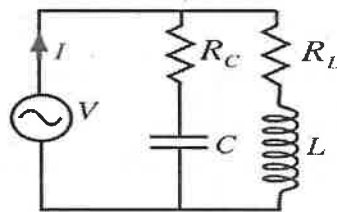
Q.6(A)	State and Verify the reciprocity theorem for the circuit shown below:	12M	5	4
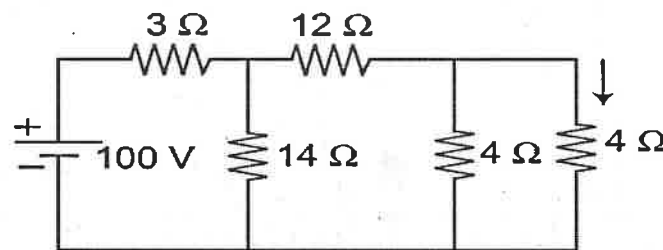
OR

Q.6(B)	(i) State Norton's theorem and explain the procedure to obtain the Norton equivalent circuit.	6M	5	2
	(ii) Find the Norton equivalent circuit of the network at the terminals a-b.	6M	5	4
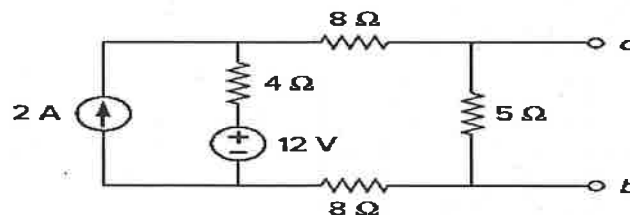
*** END ***

Page 2 of 2

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II/I Semester (R23) Regular / Supplementary End Semester Examinations, July – 2024
ENGINEERING PHYSICS
(Common to CE, ME, CSE, CSE-AI, CSE-DS and CSE-AIML)

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.	Mention any three conditions for obtaining a sustained interference.	1M	1	1
	ii.	Differentiate between Fresnel and Fraunhofer diffractions.	1M	1	2
	iii.	Define packing fraction of a crystal.	1M	2	1
	iv.	Discuss unit cell and lattice parameters.	1M	2	2
	v.	Mention various properties of a wave function.	1M	3	1
	vi	Write two demerits of classical free electron theory.	1M	3	2
	vii.	Define electrical conductivity in a solid.	1M	4	1
	viii.	Define diffusion current.	1M	4	1
	ix.	Explain dielectric polarization.	1M	5	2
	x.	Mention various types of magnetic materials.	1M	5	1
Q.2(A)		Derive an expression for determining the wavelength of a light using Newton's rings experiment with suitable diagrams.	12M	1	3
		OR			
Q.2(B)		(i) Discuss the construction and working of Nicol's prism.	8M	1	3
		(ii) Explain Quarter wave and Half wave plates and mention the expression for the thickness of the plate.	4M	1	2
Q.3(A)		Define coordination number. Derive the coordination number for the SC, BCC and FCC lattices.	12M	2	3
		OR			
Q.3(B)		With suitable diagrams, explain the crystal structure determination by powder method.	12M	2	3
Q.4(A)		Derive expressions for energy and wave function of particle trapped in a one-dimensional infinite potential well.	12M	3	4
		OR			
Q.4(B)		Using quantum free electron theory, derive an expression for electrical conductivity.	12M	3	3
Q.5(A)		Discuss the density of charge carriers in intrinsic semiconductors with suitable diagrams. Obtain an expression for electrical conductivity.	12M	4	3
		OR			
Q.5(B)		Define Hall effect and derive expressions for Hall coefficients. Mention any four applications of Hall effect.	12M	4	2
Q.6(A)		(i) Discuss dielectric constant and displacement vector.	4M	5	2
		(ii) Derive Clausius-Mosotti equation for a solid dielectric displaying polarizability.	8M	5	3
		OR			
Q.6(B)		(i) Discuss the classification of magnetic materials with one example each.	4M	5	2
		(ii) Define magnetic hysteresis. Discuss the magnetic hysteresis based on domain concept with suitable schematics.	8M	5	3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II/I Semester (R23) Regular/Supplementary End Semester Examinations, July – 2024
CHEMISTRY
(Common to EEE, ECE, CST, CSE-CS, and CSE-CN)

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.1		Question	Marks	CO	BL
Q.1	i.	When O_2 changes to O^{2-}, the electron goes to which of the orbitals?	1M	1	2
	ii.	Write the time dependent Schrodinger equation for any quantum particle.	1M	1	1
	iii.	The temperature at which a conductor becomes superconductor is called_____.	1M	2	1
	iv.	What are nano materials? Give examples.	1M	2	1
	v.	Write the anodic half-cell reaction for the Zn-air battery.	1M	3	2
	vi	What are Fuel cells?	1M	3	1
	vii.	What are the criteria for conduction in polymers?	1M	4	2
	viii.	Define Co-ordination polymerization.	1M	4	1
	ix.	Which types of solvents are used in HPLC for mobile phase?	1M	5	2
	x.	Define the stationary phase and mobile phase in chromatography.	1M	5	2
Q.2(A)		(i) Discuss the postulates of quantum mechanics with appropriate expressions.	8M	1	2
		(ii) What are the limitations of the wave function?	4M	1	1
		OR			
Q.2(B)		Explain the molecular orbital energy diagram of N_2 and CO molecule. Comment on their bond order.	12M	1	1
Q.3(A)		Discuss the properties and applications of fullerene and CNT.	12M	2	1
		OR			
Q.3(B)		Classify supercapacitors and explain their properties along with applications.	12M	2	2
Q.4(A)		Discuss the principle, construction, electrochemical reactions and application of Li-ion battery.	12M	3	1
		OR			
Q.4(B)		A cell is constructed by dipping Magnesium and Copper electrodes in 0.001M and 0.0001M solutions respectively. Write the cell reactions, cell representation and calculate the EMF of the following cell at 298 K. Given: $E^0 Cu^{2+} / Cu = 0.34$ V ; $E^0 Mg^{+2} /Mg = -2.37$ V	12M	3	2
Q.5(A)		What are thermosetting polymers? Discuss the synthesis, properties and ap of Bakelite.	12M	4	2
		OR			
Q.5(B)		Define Rubber. Explain the synthesis and application of Buna-S rubber	12M	4	1
Q.6(A)		(i) Explain Beer Lambert law. What are the limitations of Beer Lambert law?	8 M	5	1
		(ii) Discuss the application of IR spectroscopy.	4 M		2
		OR			
Q.6(B)		(i) Elucidate schematically the possible types of vibration which can be observed for any infrared active molecule.	12M	5	2
		(ii) Discuss the principle and applications of HPLC technique.			

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year I Semester (R23) Supplementary End Semester Examinations, July– 2024
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.	Draw the structure of disodium salt of EDTA.	1M	1	2
	ii.	What is sludge formation in boilers?	1M	1	1
	iii.	Define fuel-cell with an example	1M	2	1
	iv.	What do you mean by electroless plating?	1M	2	1
	v.	Name the monomers used in nylon-6,6	1M	3	1
	vi	Define calorific value.	1M	3	1
	vii.	Define composite with an example.	1M	4	1
	viii.	Give two examples of refractory material.	1M	4	1
	ix.	Write the BET equation	1M	5	1
	x.	What are colloids?	1M	5	1
Q.2(A)		Explain with a schematic the industrial treatment of water by ion exchange process.	12M	1	2
		OR			
Q.2(B)		(i) Discuss the principle and process of brackish water purification by reverse osmosis.	6M	1	2
		(ii) Discuss the formation of scale and sludge in boilers.	6M	1	2
Q.3(A)		(i) Discuss the working principle and working of hydrogen-oxygen fuel cell with neat diagram	9M	2	3
		(ii) Give the electrode reactions of lithium-ion battery	3M	2	3
		OR			
Q.3(B)		Briefly describe the factors affecting rate of corrosion	12M	2	2
Q.4(A)		(i) Write the difference between thermoplastic and thermosetting polymers.	6M	3	2
		(ii) Illustrate the synthesis, properties and applications of Thiokol rubber.	6M	3	2
		OR			
Q.4(B)		(i) Discuss the proximate analysis of coal sample.	6M	3	3
		(ii) Explain the synthesis and application of biodiesel.	6M	3	2
Q.5(A)		Classify lubricants and explain various properties of them.	12M	4	2
		OR			
Q.5(B)		Elaborate the various stages of involved manufacturing of Portland cement with neat diagram.	12M	4	2
Q.6(A)		(i) Describe any one method of synthesis of nanomaterials	9M	5	2
		(ii) Mention the applications of nano materials	3M	5	2
		OR			
Q.6(B)		Explain Langmuir adsorption isotherm	12M	5	3

*** END***

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

B.Tech I Year II/I Semester (R23) Regular/Supplementary End Semester Examinations, July – 2024

BASIC ELECTRICAL AND ELECTRONICS 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 ELECTRICAL ENGINEERING

Max Marks: 35

Q.No		Question	Marks	CO	BL
Q.1	i.	Define Kirchhoff's current law.	1M	1	1
	ii.	Define reactive power.	1M	1	1
	iii.	List the applications of Induction motor.	1M	2	1
	iv.	Write the Wheat stone bridge balanced condition	1M	2	2
	v.	What if Tariff?	1M	3	1
Q.2(A)		Find the current through 2-ohm resistor using superposition theorem for the circuit given below.	10M	1	3
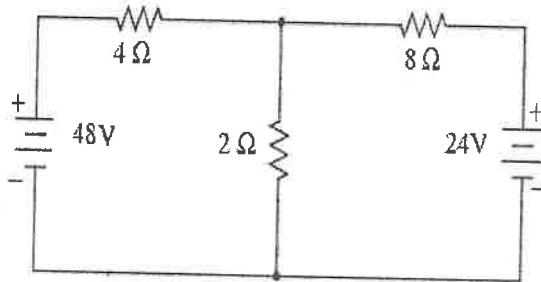
OR

Q.2(B)		An RL series circuit of R = 4.7 kΩ and L = 1H is connected across a voltage source of 150 V,50 Hz. Determine impedance, power factor, phase angle, current and voltage through R and L in the circuit.	10M	1	3
Q.3(A)		Explain the principle of operation, construction, and working of a DC generator with neat sketch	10M	2	2

OR

Q.3(B)		Explain the construction and working principle of MI Instrument	10M	2	2
Q.4(A)		Explain in detail about Hydro Power Generation System.	10M	3	2

OR

Q.4(B)		Explain Earthing and its types and also explain what are the Safety Precautions to avoid shock	10M	3	2

*** END***

PART-B: BASIC ELECTRONICS ENGINEERING

Max Marks: 35

Q.No		Question	Marks	CO	BL
Q.1	i.	What is P-type semiconductor?	1M	1	1
	ii.	Draw the V-I characteristics of a practical Zener diode	1M	1	2
	iii.	What is a rectifier?	1M	2	1
	iv.	convert the decimal number 19 into binary number.	1M	2	3
	v.	What is the difference between latch and flip-flop?	1M	3	1

Q.2(A)	Discuss about the operation of PN junction diode both in Forward bias and Reverse bias conditions with suitable diagrams. Draw and explain the V-I characteristics of PN junction diode.	10M	1	2

OR

Q.2(B)	Draw and explain about the Input characteristics and output characteristics of a BJT in Common Emitter configuration with the help of circuit diagram.	10M	1	2
Q.3(A)	Draw the block diagram of a Public Address system and explain its working principle.	10M	2	2

OR

Q.3(B)	Draw the block diagram of a DC regulated power supply and explain each block with necessary waveforms.	10M	2	2
Q.4(A)	Draw the Logic diagram of Full-adder circuit using basic gates. Explain its operation using Truth table.	10M	3	2

OR

Q.4(B)	Draw the symbols of NOT, OR, AND, NOR, NAND, XOR and XNOR gates. Write their logical expressions and truth-tables.	10M	3	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II/I Semester (R23) Regular/Supplementary End Semester Examinations, July – 2024
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.	What are the types of aggregate?	1M	1	1
	iii.	Write the principles of surveying.	1M	2	1
	iv.	Define permanent way.	1M	2	1
	v.	What are the structures used to store the water?	1M	3	1
Q.2(A)		What are the different types of cement and explain in detail?	10M	1	2
		OR			
Q.2(B)		Explain the major role of Civil Engineers in society.	10M	1	2
Q.3(A)		The following readings were taken with 4m staff by Auto level. Given by BM = 100 m. The instrument is shifted after 3rd and 6th readings. 1.600, 2.050, 2.302, 1.658, 1.315, 2.220, 2.416, 1.012, 2.642, 1.135, 2.156, 1.802. prepare a page of level book and calculate RL of all the points. Use Rise and Fall Method.	10M	2	3
		OR			
Q.3(B)		The Following bearings were observed with a compass. Determine the interior angles.	10M	2	3
Q.4(A)		Explain about the quality and Specification of drinking water.	10M	3	2
		OR			
Q.4(B)		What are the different types of pavements and explain in detail?	10M	3	2

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

*** END***

PART-B: BASIC MECHANICAL ENGINEERING   Max Marks: 35

Q.No		Question	Marks	CO	BL
Q.1	i.	Define why ferrous material get corrosion	1M	1	1
	ii.	List any Two advantages of CNC Machine	1M	1	1
	iii.	What are the advantages of super heater in steam power plat?	1M	2	1
	iv.	What is the principle of casting	1M	2	1
	v.	Write any two Mechanical Power Transmission & give examples	1M	3	1
Q.2(A)		Explain the role of mechanical engineering in automobile and aerospace sector.	10M	1	2
		OR			

Q.2(B)	Write difference between Ferrous and non-ferrous metal. Also classify both metals.	10M	1	2
Q.3(A)	With the help of neat sketch, explain the principle of machining process	10M	2	2
	OR			
Q.3(B)	Explain the working principle of 2 stroke SI engine with a neat sketch. 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 joints and links in robotics?	10M	3	2

*** END***

Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 23ENG101

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

B.Tech I Year II/I Semester (R23) Regular/Supplementary End Semester Examinations, July – 2024

COMMUNICATIVE 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 significant gift that Della buys for Jim?	1M	1	2
	ii.	What is skimming and scanning?	1M	1	2
	iii.	Which company did Elon Musk co-found that focuses on electric vehicles?	1M	2	1
	iv.	What is the main conflict in "The Toys of Peace"?	1M	2	2
	v.	Rewrite the following jumbled sentence in the correct order. **He old songs loved**.	1M	3	3
	vi	Fill in the blank with the correct homophone from the options given in the bracket. I bought a _____ of gloves (pare, pair, pear)	1M	3	3
	vii.	Use an appropriate article I gave him ___ thousand rupees a) an b) the c) a d) no article	1M	4	3
	viii.	Convert the sentence from active to passive voice Has Rita read the books?	1M	4	3
	ix.	How would you punctuate this sentence in direct speech? He said that he was tired.	1M	5	3
	x.	What is self-esteem?	1M	5	2
Q.2(A)		Discuss the character development of Della and Jim in "The Gift of the Magi" and how their relationship evolves throughout the story.	12M	1	2
		OR			
Q.2(B)		What are parts of speech? Explain the eight parts of speech with examples?	12M	1	2
Q.3(A)		Discuss the symbolism of the brook's journey in "The Brook" and its implications for understanding the poem's message about nature and time.	12M	2	2
		OR			
Q.3(B)		Identify the following sentences as simple, compound or complex sentence: 1. He is innocent, but he is trapped in the case 2. I will stay at home this Sunday or we will plan for a movie. 3. The students were bored in the class. 4. Jason's father, who works in a garage, likes cars. 5. Jason's father likes cars.	12M	2	3
Q.4(A)		Evaluate the challenges Elon Musk has faced in his career and how he has addressed them.	12M	3	3
		OR			
Q.4(B)		Write a letter to the principal requesting him to provide an extra hour for sports activities in the weekly time table to help the students increase their physical strength.	12M	3	2
Q.5(A)		Do you think Harvey and Elizabeth's experiment failed? Justify your answer.	12M	4	3

OR

Q.5(B)	Rewrite the following sentences:	12M	4	3
	i. Never I have seen such a huge library			
	ii. I have gone out yesterday			
	iii. The place is not as bad like it looks.			
	iv. When did they arrived?			
	v. We are studying only.			
Q.6(A)	How does intrapersonal communication contribute to personal motivation?	12M	5	2

OR

Q.6(B)	Write an essay about 'How to overcome depression and anxiety'.	12M	5	2

*** END***

Hall Ticket No: ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ Question Paper Code: 23ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
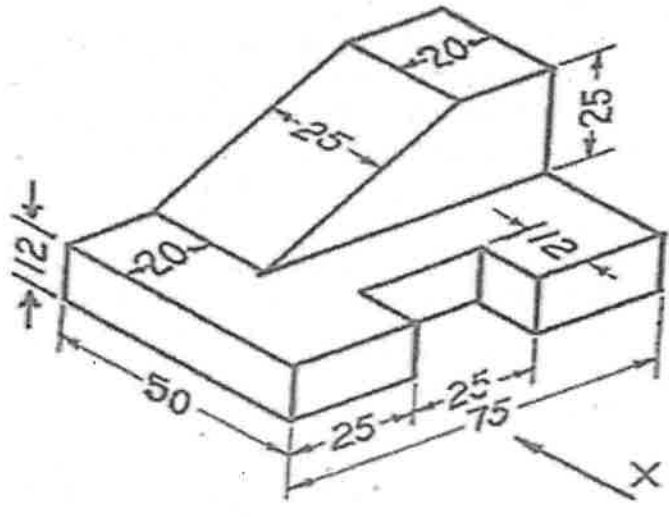### (Common to CE, ME and CSE)

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**

Q.No	Question	Marks	CO	BL
Q.1(A)	Draw a parabola with the distance of the focus from the directrix at 60mm (Eccentricity method), and also draw a normal and tangent through a point 50mm from the directrix.	14M	1	3
	OR			
Q.1(B)	Draw the involute of regular Square 50 mm side. Also, draw a tangent and normal to the curve at a point 80 mm from Centre of the Square.	14M	1	3
Q.2(A)	(i) 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 (ii) Draw the projections of the following points on the same ground line, keeping the distance between the projectors is 50mm, Name the quadrants in which they lie. 1. Point A, 35 mm in front of V.P. and 40 mm above the H.P. 2. Point B, 25mm below the H.P. and 30mm behind the V.P. 3. Point C, 20mm above the H.P. and 25mm behind the V.P.	7+7M	2	3
	OR			
Q.2(B)	Draw the projections of a circle of 50mm diameter resting in the HP and a point A on the circumference. Its plane is inclined at 45° to the HP and the top view of the diameter AB making an angle of 30° with the VP.	14M	2	3
Q.3(A)	A cylinder of base diameter 60mm and height 80mm, which is resting on a point of its base on HP with its axis inclined 30° to HP. Draw the Projections of cylinder.	14 M	3	3
	OR			
Q.3(B)	An Hexagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the VP Such that the axis is inclined at 30º to the VP and Parallel to the HP. Draw its Projections.	14M	3	3
Q.4(A)	A hexagonal pyramid, base 30 mm side and axis 65 mm long is resting on its base on the HP, with two edges of the base parallel to the VP. It is cut by a section plane perpendicular to VP and inclined at 45º to the HP, intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of the section.	14M	4	3
	OR			
Q.4(B)	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 º to the HP and bisecting the axis. Draw its development of the remaining portion using radial line method.	14M	4	3

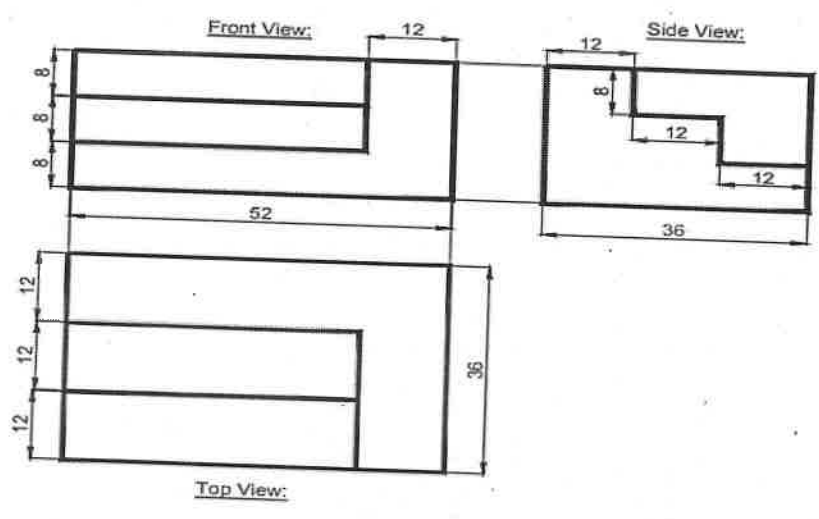Q.5(A)   Draw Front view ,Topview and sideview for the given isometric view.   14M   5   3

OR

Q.5(B)   Draw the isometric view of given orthographic Projection.   14M   5   3

*** END***

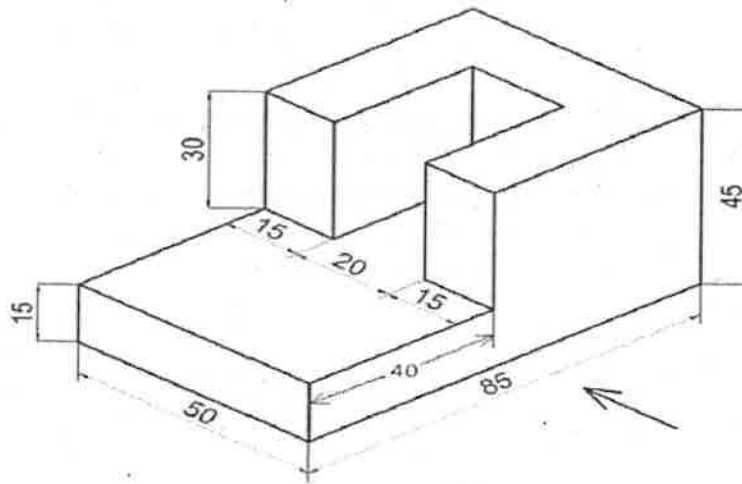Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 23ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
(Common to CE, ME and CSE)

Time: 3Hrs   Max Marks: 70

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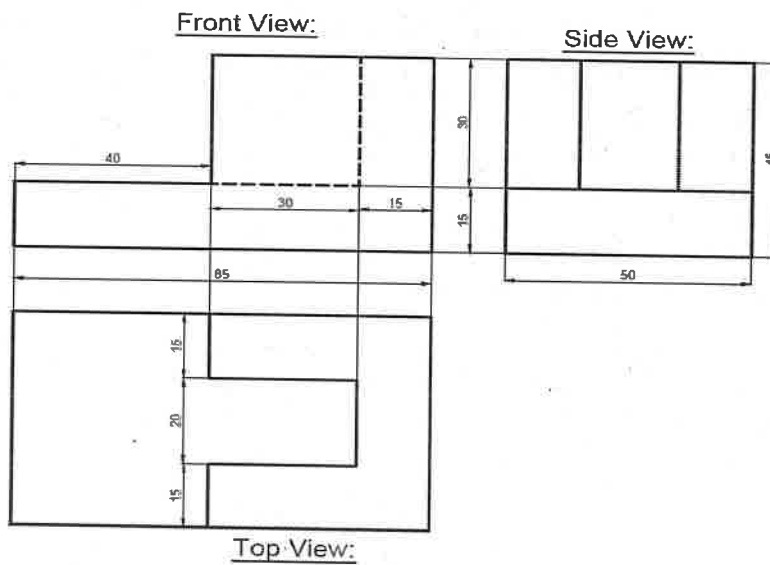**In Q.no 1 to 5 answer either Part-A or B only**

Q.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)	Draw an involute of a circle of 50mm diameter. Also, draw a tangent and normal to the curve at a point 90 mm from Centre of the circle.	14M	1	3
Q.2(A)	Draw the projections of the following points on the same reference line by keeping the distance between projectors as 50mm. 1. A – 30mm below HP and 50mm behind VP 2. B – 40mm above HP and 60mm behind VP 3. C – Point is in HP and 20mm behind VP 4. D – 40mm below HP and 30mm in front of VP 5. E- Point is in VP and 20 mm above HP.	14M	2	3
	OR			
Q.2(B)	Draw the projections of a regular hexagon of 25mm side, having one of its sides in HP and inclined at 60° to VP. The surface of the hexagon is making an angle of 45° with HP.	14M	2	3
Q.3(A)	A circular cone, 50 mm base diameter and 60 mm long axis is resting on HP, on one point of base circle such that its axis makes 45⁰ inclinations with HP. Draw it's projections.	14M	3	3
	OR			
Q.3(B)	A Hexagonal Prism having a base side 30 mm and 75 mm long axis, has an edge its base on the HP. Its axis is Parallel to the VP and inclined at 45⁰ to the HP Draw its projections?	14M	3	3
Q.4(A)	A pentagonal prism, 30 mm base side & 50 mm axis is standing on HP on its base whose one side is perpendicular to VP. It is cut by a section plane 45⁰ 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 45° 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 Front view ,Topview and sideview for the given isometric view.	14M	5	3

OR

Q.5(B)   Draw the isometric view of ginen orthographic Projection.   14M   5   3

Front View:

Side View:

Top View:

*** END***

Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 23ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
(Computer Science & Engineering)

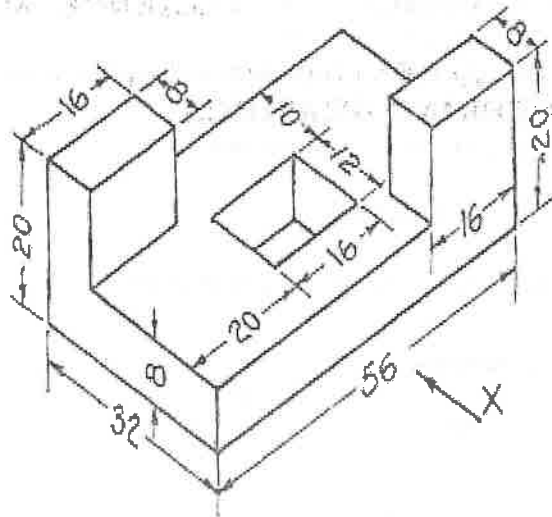Time: 3Hrs   Max Marks: 70

> 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**

Q.No	Question	Marks	CO	BL
Q.1(A)	Construct an ellipse with the distance between the focus and directrix as 50 mm and eccentricity as 2/3. Also draw tangent and normal at a point 40 mm from directrix.	14M	1	3
	OR			
Q.1(B)	Draw an involute of a circle of 50mm diameter. Also, draw a tangent and normal to the curve at a point 90 mm from centre of the circle.	14M	1	3
Q.2(A)	(i) 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. (ii) Draw the projections of the following points on the same ground line, keeping the distance between the projectors is 50mm, Name the quadrants in which they lie. 1. Point A, 35 mm in front of V.P. and 40 mm above the H.P. 2. Point B, 25mm below the H.P. and 30mm behind the V.P. 3. Point C, 20mm above the H.P. and 25mm behind the V.P.	14 M	2	3
	OR			
Q.2(B)	Draw the projections of a regular pentagon of 30 mm side, having one of its sides in HP and inclined at 60° to VP. The surface of the hexagon is making an angle of 45° with HP.	14M	2	3
Q.3(A)	An Hexagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the HP Such that the axis is inclined at 30⁰ to the HP and Parallel to the VP. Draw its Projections?	14M	3	3
	OR			
Q.3(B)	A Pentagonal prism, having a base with a 30mm side and an 70mm long axis, rests on one of its rectangular face in the H.P such that the axis is inclined at 30⁰ to the VP. Draw its projections?	14M	3	3
Q.4(A)	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 the front view, sectional top view, sectional side view and true shape of the 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 45° 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

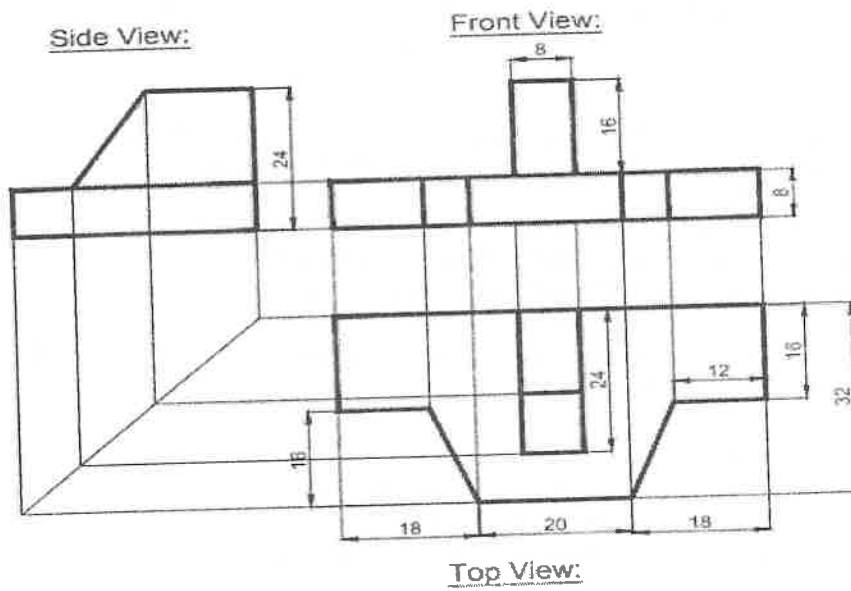Q.5(A)   Draw Front view ,Topview and sideview for the given isometric view.   14M   5   3

OR

Q.5(B)   Draw the isometric view of given orthographic Projection.   14M   5   3

Side View: Front View:

Top View:

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
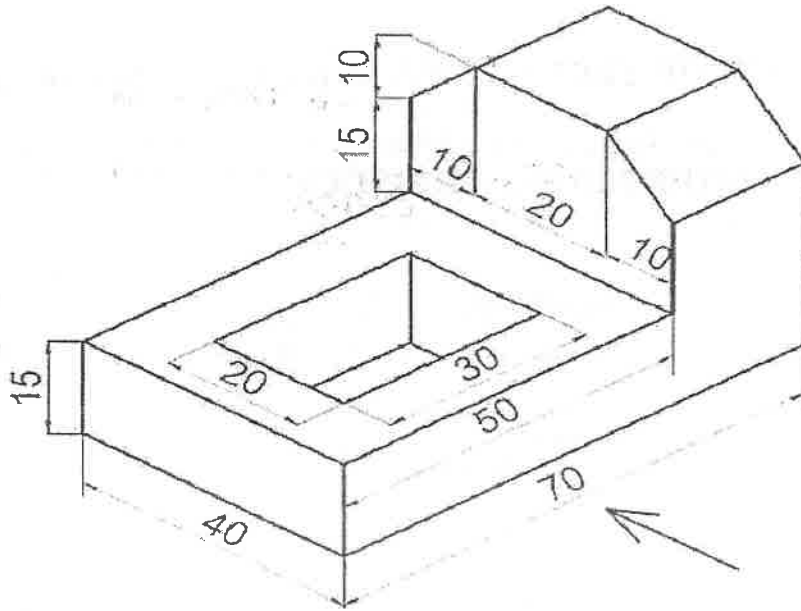### (Computer Science & Engineering)

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

Q.No	Question	Marks	CO	BL
Q.1(A)	Draw a hyperbola with the distance of the focus from the directrix at 60mm and e=3/2 (Eccentricity method). Also draw tangent and normal 50 mm from directrix.	14M	1	3
	OR			
Q.1(B)	Draw the involute of regular Hexagon 40 mm side. Also, draw a tangent and normal to the curve at a point 100 mm from centre of the Hexagon.	14M	1	3

Q.2(A)	(i) A point A is on HP and 40mm in front of VP. Another point B is on VP and below HP. The line joining their front view makes an angle of 45° with XY. While the joining their top views makes an angle of 30°. Find the distance of the point B from HP.
	
	(ii) Draw the projections of the following points on the same ground line, keeping the distance between the projectors is 50mm, Name the quadrants in which they lie.
	  1. Point A, 25 mm in front of V.P. and 25 mm above the H.P.
	  2. Point B, 15mm below the H.P. and 20mm behind the V.P.
	  3. Point C, 10mm above the H.P. and 15mm behind the V.P.
		14 M	2	3

	OR			
Q.2(B)	A square ABCD of 50mm side has its corner A in the H.P. Its diagonal AC is inclined at 30° the H.P and the diagonal BD inclined at 45° to the VP and parallel to H.P. Draw its Projections.	14M	2	3
Q.3(A)	A pentagonal Prism having a base with a 30 mm side and 60mm long axis, is resting on one of its rectangular faces on the HP. with axis parallel to the VP. Draw its projections.	14M	3	3
	OR			
Q.3(B)	A circular cone, 40 mm base diameter and 60 mm long axis is resting on HP, on one point of base circle such that its axis makes 45° inclinations with HP and 40° inclination with VP. Draw its projections.	14M	3	3
Q.4(A)	A Cone base 75 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, 30 mm base side & 50mm axis is standing on HP on its base with one side of the base perpendicular to VP. It is cut by a section plane inclined at 45° to the HP, through mid-point of axis. Draw the development of the remaining surface.	14M	4	3

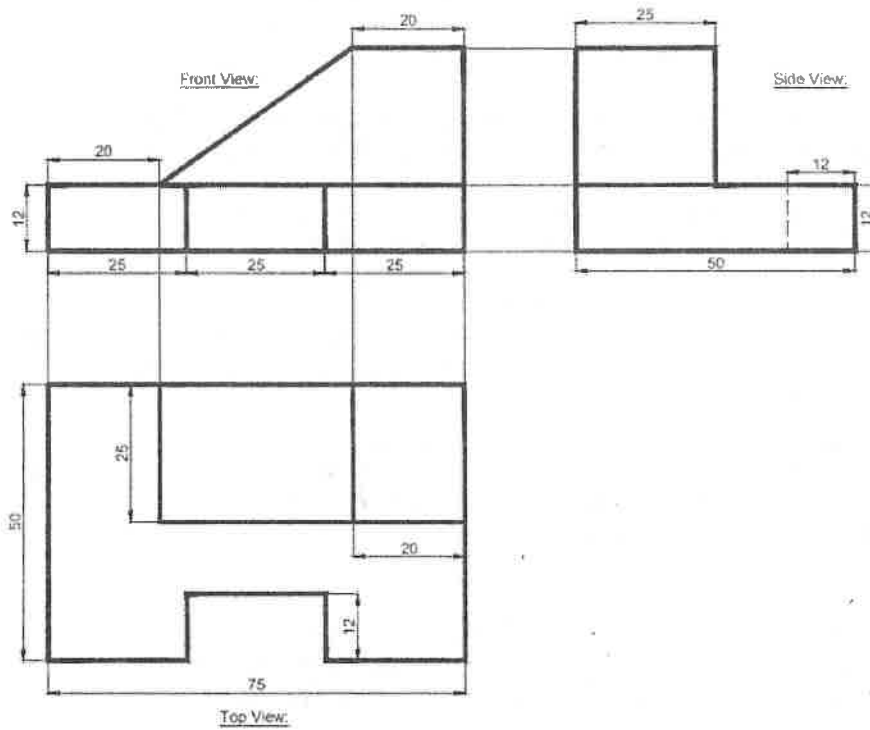Draw Front view ,Topview and sideview for the given isometric view.   14M   5   3

OR

Q.5(B)   Draw the isometric view of ginen orthographic Projection.   14M   5   3

*** END***

Jall Ticket No: ⬜⬜⬜⬜⬜⬜⬜⬜⬜⬜ Question Paper Code: 23ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
(Common to CSE, and CSE-AI)

Time: 3Hrs   Max Marks: 70

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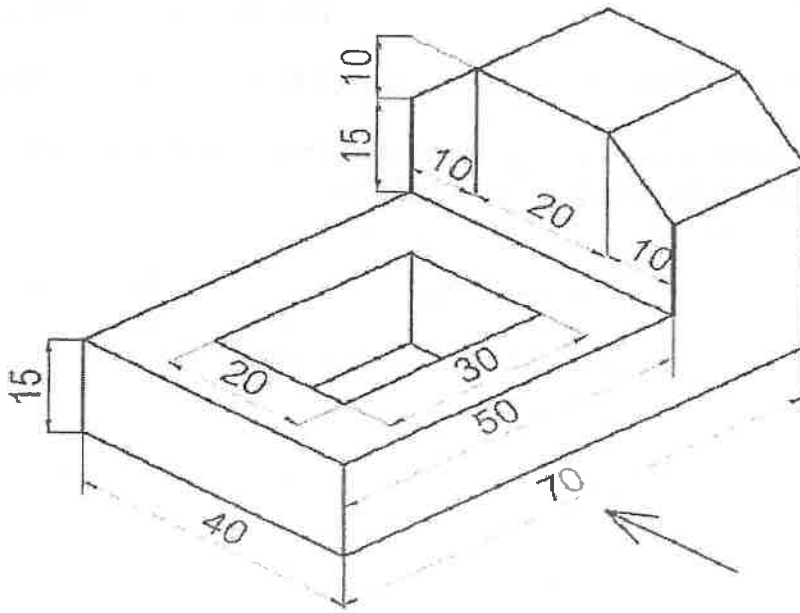**In Q.no 1 to 5 answer either Part-A or B only**

Q.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 an ellipse with the distance between the focus and directrix as 50 mm and eccentricity as 2/3. Also draw tangent and normal at a point 40 mm from directrix	14M	1	3
Q.2(A)	A line AB 80mm long is inclined at an angle of 30° to H.P and 45° to V.P. The point A is 20mm above H.P and 30mm Infront of V.P. Draw its Projections.	14M	2	3
	OR			
Q.2(B)	(i) 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 (ii) Draw the projections of the following points on the same ground line, keeping the distance between the projectors is 50mm, Name the quadrants in which they lie. 1. Point A, 35 mm in front of V.P. and 40 mm above the H.P. 2. Point B, 25mm below the H.P. and 30mm behind the V.P. 3. Point C, 20mm above the H.P. and 25mm behind the V.P.	14M	2	3
Q.3(A)	A circular cone, 50 mm base diameter and 60 mm long axis is resting on HP, on one point of base circle such that its axis makes 45⁰ inclinations with HP. Draw it's projections.	14M	3	3
	OR			
Q.3(B)	A pentagonal Prism having a base with a 30 mm side and 60mm long axis, is resting on one of its rectangular faces on the HP. with axis parallel to the VP. Draw its projections	14M	3	3
Q.4(A)	A Hexagonal prism of base edge 40 mm side and axis 80 mm has its base horizontal and an edge of the base parallel to V.P. A horizontal section plane cuts it at a distance of 40 mm above the base. Draw its front view and sectional top view and true shape of the 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 45° 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

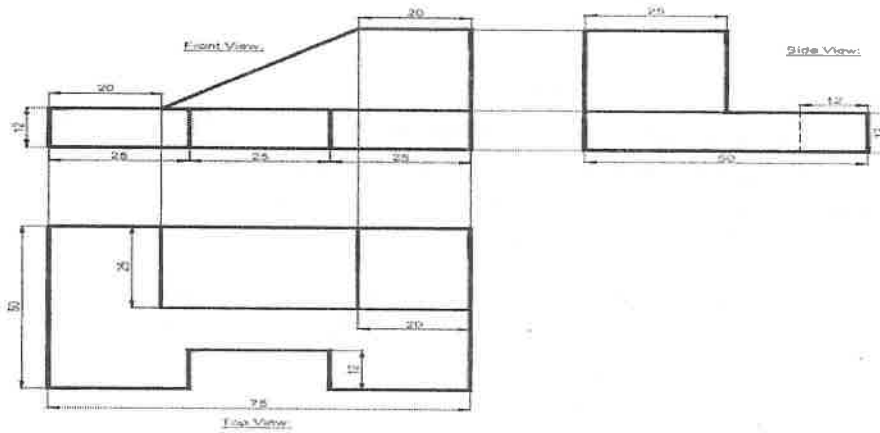**Q.5(A)** Draw Front view ,Topview and sideview for the given isometric view.   14M   5   3

OR

Q.5(B) Draw the isometric view of given orthographic Projection.   14M   5   3
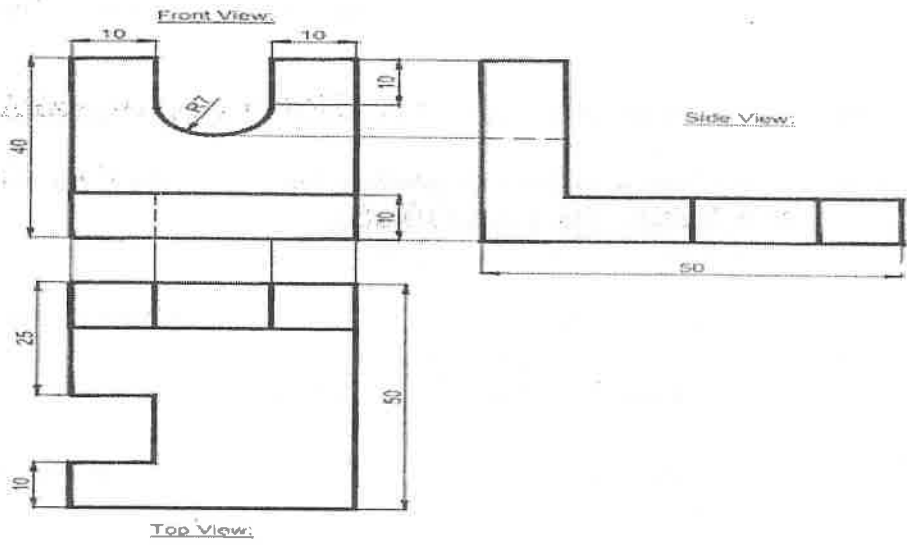

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
(Common to CSE, and CSE-AI)

Time: 3Hrs
Max Marks: 70

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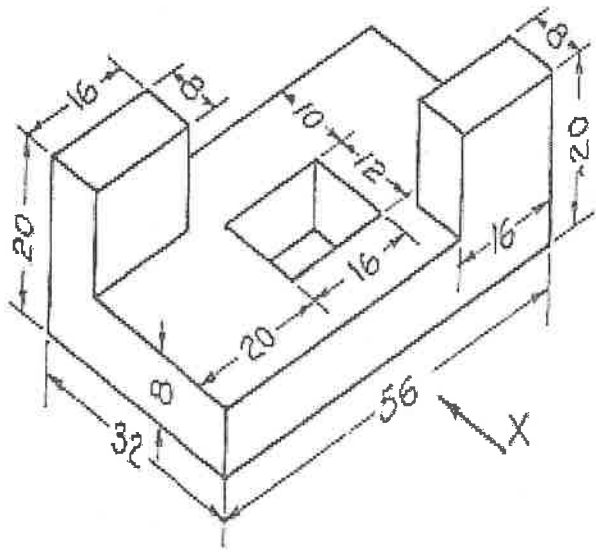**In Q.no 1 to 5 answer either Part-A or B only**

Q.No	Question	Marks	CO	BL
Q.1(A)	Draw the involute of regular Hexagon 40 mm side. Also, draw a tangent and normal to the curve at a point 100 mm from Centre of the Hexagon.	14M	1	3
	OR			
Q.1(B)	Draw a cycloid of a circle of diameter of 60mm for one revolution. Also, draw a normal and tangent to the curve at a point 40mm above the baseline.	14M	1	3
Q.2(A)	A Rectangular plane 30mm and 50mm sides is resting on HP on one small side which is 30° inclined to VP, while the surface of the plane makes 45° inclination with HP. Draw its Projections.	14M	2	3
	OR			
Q.2(B)	Draw the projections of a regular hexagon of 25mm side, having one of its sides in HP and inclined at 60° to VP. The surface of the hexagon is making an angle of 45° with HP.	14M	2	3
Q.3(A)	A Pentagonal prism, having a base with a 30mm side and an 70mm long axis, rests on one of its rectangular facein the H.P such that the axis is inclined at 30⁰ to the VP. Draw its projections.	14M	3	3
	OR			
Q.3(B)	A Hexagonal Prism having a base side 30 mm and 75 mm long axis, has an edge its base on the HP. Its axis is Parallel to the VP and inclined at 45⁰ to the HP. Draw its projections.	14M	3	3
Q.4(A)	A square pyramid base 40 mm side and 65 mm long axis, has its base on the HP and all the edges of the base equally inclined to VP. It is cut by a section plane perpendicular to VP and inclined 45⁰ to HP and bisecting the axis. Draw the development of remaining solid of the pyramid.	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 45° 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 isometric view of given orthographic Projection.	14M	5	3

Front View:

Side View:

Top View:

OR

Q.5(B)   Draw Front view ,Topview and sideview for the given isometric view.   14M   5   3

*** END***

Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 23ME101

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

B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
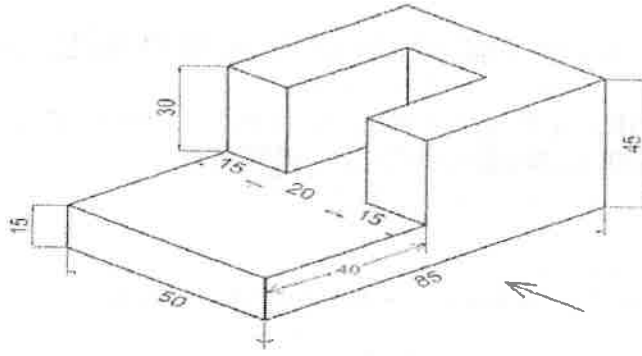(Common to CSE-AI, and CSE-DS)

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

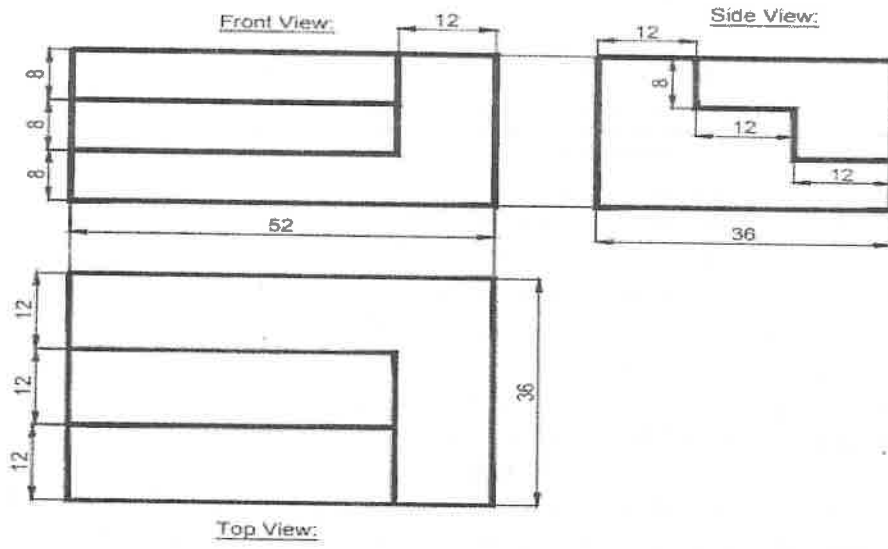| Q.No	Question	Marks	CO	BL
Q.1(A)	Draw a parabola with the distance of the focus from the directrix at 60mm (Eccentricity method), and also draw a normal and tangent through a point 50mm from the directrix.	14M	1	3
	OR			
Q.1(B)	Draw the involute of regular Square 50 mm side. Also, draw a tangent and normal to the curve at a point 80 mm from Centre of the Square.	14M	1	3
Q.2(A)	Draw the projections of the following points on the same reference line by keeping the distance between projectors as 50mm. 1. A – 30mm below HP and 50mm behind VP 2. B – 40mm above HP and 60mm behind VP 3. C – Point is in HP and 20mm behind VP 4. D – 40mm below HP and 30mm in front of VP 5. E- Point is in VP and 20 mm above HP. 6. F – 30 mm below HP and 40mm in front of VP 7. G – Point is in VP and 30mm above HP	14M	2	3
	OR			
Q.2(B)	Draw the projections of a circle of 50mm diameter resting in the HP and a point A on the circumference. Its plane is inclined at 45° to the HP and the top view of the diameter AB making an angle of 30° with the VP.	14M	2	3
Q.3(A)	A cube of 50 mm long edges is so placed on HP on one corner that a body diagonal is Parallel to HP and perpendicular to VP. Draw it's projections.	14M	3	3
	OR			
Q.3(B)	An Pentagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the VP Such that the axis is inclined at 30⁰ to the VP and Parallel to the HP. Draw its Projections?	14M	3	3
Q.4(A)	A hexagonal pyramid, base 30 mm side and axis 65 mm long is resting on its base on the HP, with two edges of the base parallel to the VP. It is cut by a section plane perpendicular to VP and inclined at 45⁰ to the HP, intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of the section.	14M	4	3
	OR			
Q.4(B)	A cone, 50 mm base diameter and 70 mm axis is standing on its base on HP. It cut by a section plane 45⁰ inclined to HP through base end of end generator. Draw development of surfaces of remaining solid using radial line method.	14M	4	3
Q.5(A)	Draw Front view ,Top view and side view for the given isometric view.	14M	5	3

OR

Q.5(B)   Draw the isometric view of ginen orthographic Projection.   14M   5   3
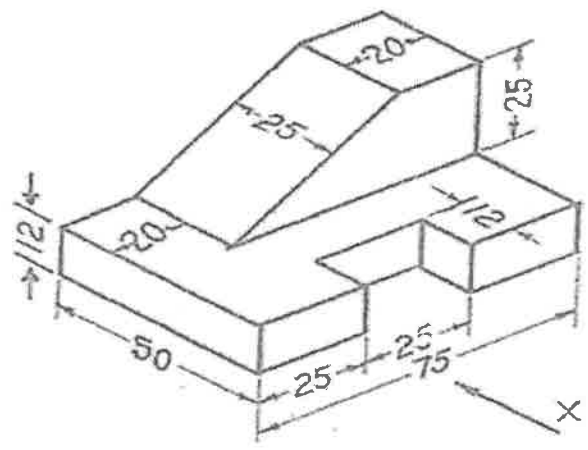

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MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
ENGINEERING GRAPHICS
(Common to CSE-AI, and CSE-DS)
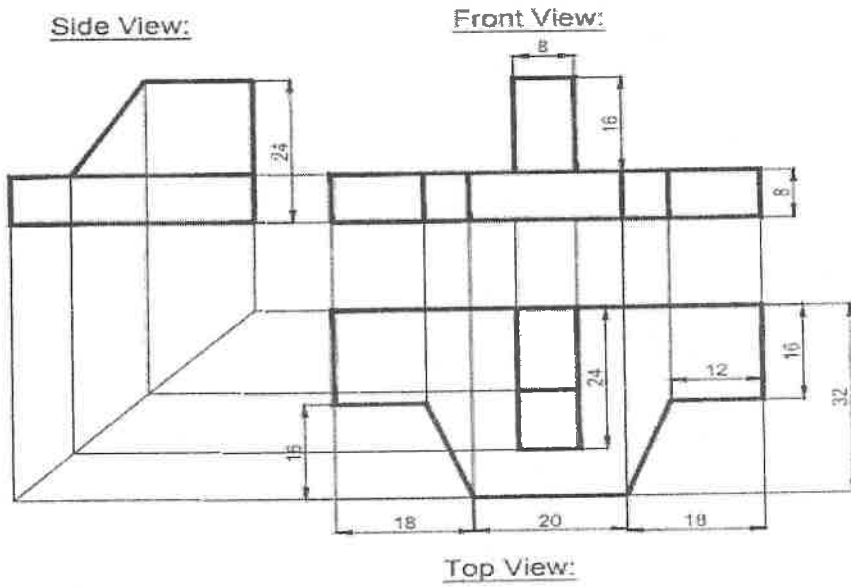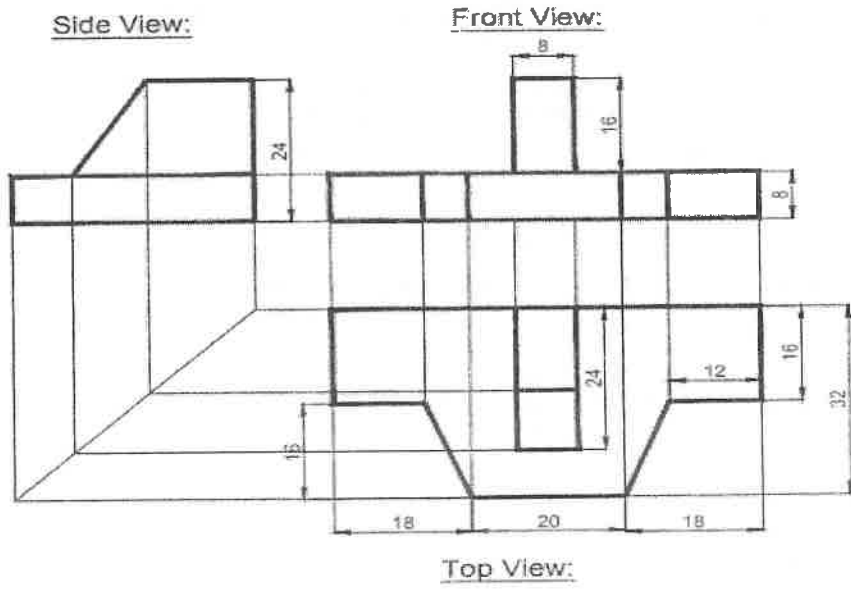
Time: 3Hrs | Max Marks: 70

	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

Q.No	Question	Marks	CO	BL
Q.1(A)	Draw an involute of a circle of 50mm diameter. Also, draw a tangent and normal to the curve at a point 90 mm from Centre of the circle.	14M	1	3
	OR			
Q.1(B)	Construct an ellipse with the distance between the focus and directrix as 50 mm and eccentricity as 2/3. Also draw tangent and normal at a point 40 mm from directrix.	14M	1	3
Q.2(A)	Draw the projections of a regular pentagon of 30 mm side, having one of its sides in HP and inclined at 60° to VP. The surface of the pentagon is making an angle of 45° with HP.	14M	2	3
	OR			
Q.2(B)	A line AB measuring 70mm has its end A 20mm above HP and 15mm in front of VP and the other end B is 60mm in front of VP and 50mm above HP. Draw the projection of the line and find the inclinations of the line.	14M	2	3
Q.3(A)	A cylinder of base diameter 60mm and height 80mm, which is resting on a point of its base on HP with its axis inclined 30° to HP. Draw the Projections of cylinder.	14M	3	3
	OR			
Q.3(B)	A Hexagonal Prism having a base side 30 mm and 75 mm long axis, has an edge its base on the HP. Its axis is Parallel to the VP and inclined at 45⁰ to the HP Draw its projections.	14M	3	3
Q.4(A)	A cone, 50 mm base diameter and 70 mm axis is standing on its base on HP. It cut by a section plane 45⁰ inclined to HP through base end of end generator. Draw development of surfaces of remaining solid using radial line method.	14M	4	3
	OR			
Q.4(B)	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 the front view, sectional top view, sectional side view and true shape of the section.	14M	4	3
Q.5(A)	Draw Front view ,Top view and side view for the given isometric view.	14M	5	3

OR

Side View:

Front View:

Top View:

Side View:

Front View:

Top View:

*** END***

Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 23ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024
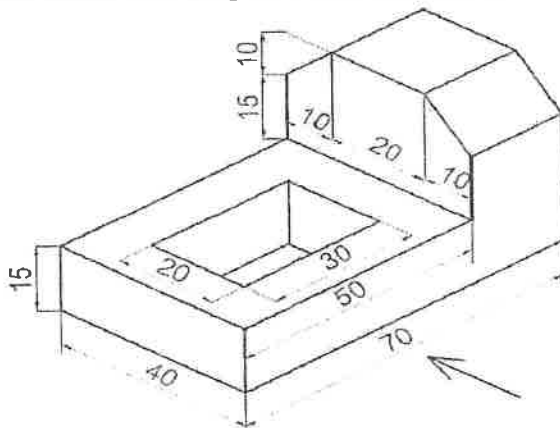## ENGINEERING GRAPHICS
(CSE-Data Science)

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

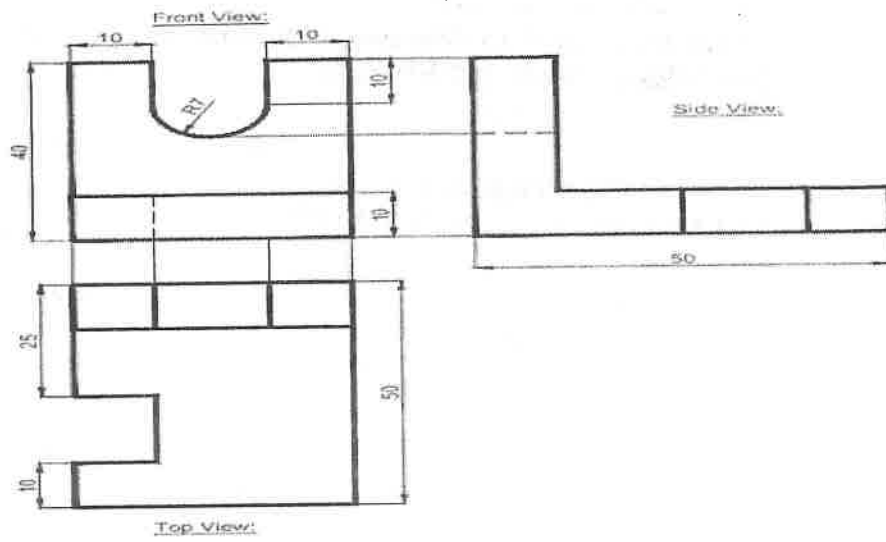| Q.No	Question	Marks	CO	BL
Q.1(A)	Draw a hyperbola with the distance of the focus from the directrix at 60mm and e=3/2 (Eccentricity method). Also draw tangent and normal 50 mm from directrix.	14M	1	3
	OR			
Q.1(B)	Draw the involute of regular Square 50 mm side. Also, draw a tangent and normal to the curve at a point 80 mm from Centre of the Square.	14M	1	3
Q.2(A)	A line AB measuring 70mm has its end A 20mm above HP and 15mm in front of VP and the other end B is 60mm in front of VP and 50mm above HP. Draw the projection of the line and find the inclinations of the line.	14M	2	3
	OR			
Q.2(B)	Draw the projections of a circle of 50mm diameter resting in the HP and a point A on the circumference. Its plane is inclined at 45° to the HP and the top view of the diameter AB making an angle of 30° with the VP.	14M	2	3
Q.3(A)	A cube of 50 mm long edges is so placed on HP on one corner that a body diagonal is Parallel to HP and perpendicular to VP. Draw it's projections.	14M	3	3
	OR			
Q.3(B)	An Hexagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the VP Such that the axis is inclined at 30^0 to the VP and Parallel to the HP. Draw its Projections.	14M	3	3
Q.4(A)	A pentagonal prism, 30 mm base side & 50 mm axis is standing on HP on its base whose one side is perpendicular to VP. It is cut by a section plane 450 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 45° 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 Front view ,Topview and sideview for the given isometric view.	14M	5	3

Q.5(B) Draw the isometric view of ginen orthographic Projection   14M   5   3

Front View:

Side View:

Top View:

*** END***

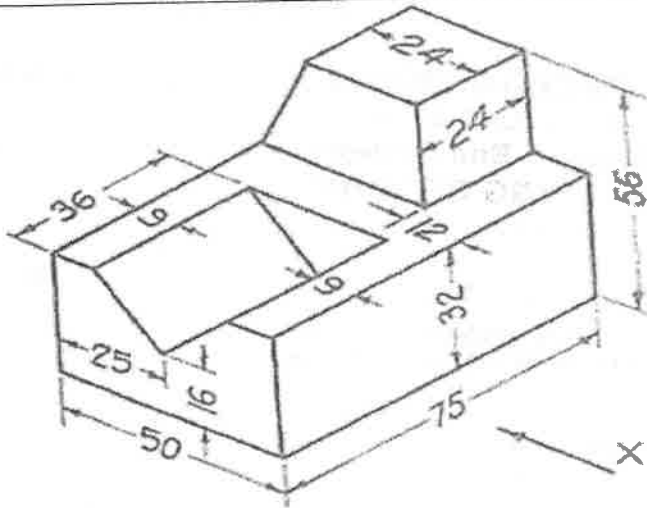Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 23ME101

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

B.Tech I Year II Semester (R23) Regular End Semester Examinations, July– 2024

ENGINEERING GRAPHICS
(CSE-Data Science)

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

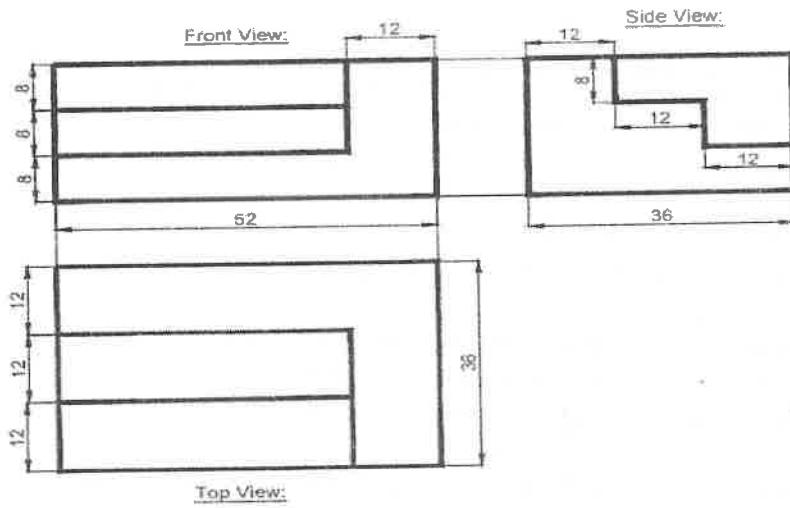| Q.No	Question	Marks	CO	BL
Q.1(A)	Draw a hyperbola with the distance of the focus from the directrix at 50mm and e=3/2 (Eccentricity method). Also draw tangent and normal 40 mm from directrix.	14M	1	3
	OR			
Q.1(B)	Draw the involute of regular Hexagon 40 mm side. Also, draw a tangent and normal to the curve at a point 100 mm from Centre of the Hexagon.	14M	1	3
Q.2(A)	(i) 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 (ii) Draw the projections of the following points on the same ground line, keeping the distance between the projectors is 50mm, Name the quadrants in which they lie. 1. Point A, 35 mm in front of V.P. and 40 mm above the H.P. 2. Point B, 25mm below the H.P. and 30mm behind the V.P. 3. Point C, 20mm above the H.P. and 25mm behind the V.P.	14M	2	3
	OR			
Q.2(B)	Draw the projections of a regular hexagon of 25mm side, having one of its sides in HP and inclined at 60° to VP. The surface of the hexagon is making an angle of 45° with HP.	14M	2	3
Q.3(A)	An Hexagonal Prism, having a base with a 30 mm side and 65 mm long axis, has an edge it's base in the VP Such that the axis is inclined at 30° to the VP and Parallel to the HP. Draw its Projections?	14M	3	3
	OR			
Q.3(B)	A cone 40mm diameter and 50mm axis is resting on one of its generator on HP which makes 30° inclinations with VP. Draw its projections?	14M	3	3
Q.4(A)	A Hexagonal prism of base edge 40mm side and axis 80 mm has its base horizontal and an edge of the base parallel to V.P. A horizontal section plane cuts it at a distance of 40mm above the base. Draw its front view and sectional top view and true shape of the section.	14M	4	3
	OR			
Q.4(B)	A square pyramid base 40 mm side and 65 mm long axis, has its base on the HP and all the edges of the base equally inclined to VP. It is cut by a section plane perpendicular to VP and inclined 45° to HP and bisecting the axis. Draw the development of remaining solid of the pyramid using radial line method.	14M	4	3
Q.5(A)	Draw Front view ,Top view and side view for the given isometric view.	14M	5	3

| Q.5(B) | Draw the isometric view of given orthographic Projection | 14M | 5 | 3 |

Front View:

Side View:

Top View:

*** END***

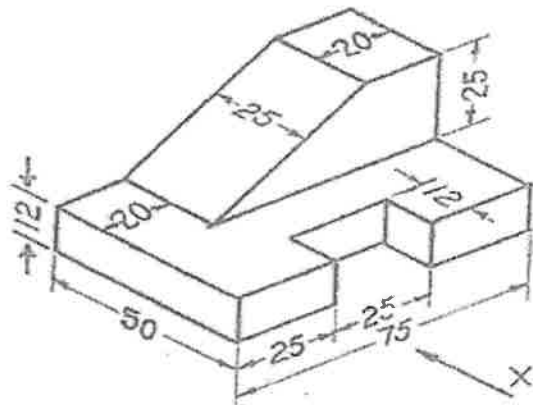Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐   Question Paper Code: 23ME101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year II/I Semester (R23) Regular & Supplementary End Semester Examinations, July – 2024
ENGINEERING GRAPHICS
(Common to All)

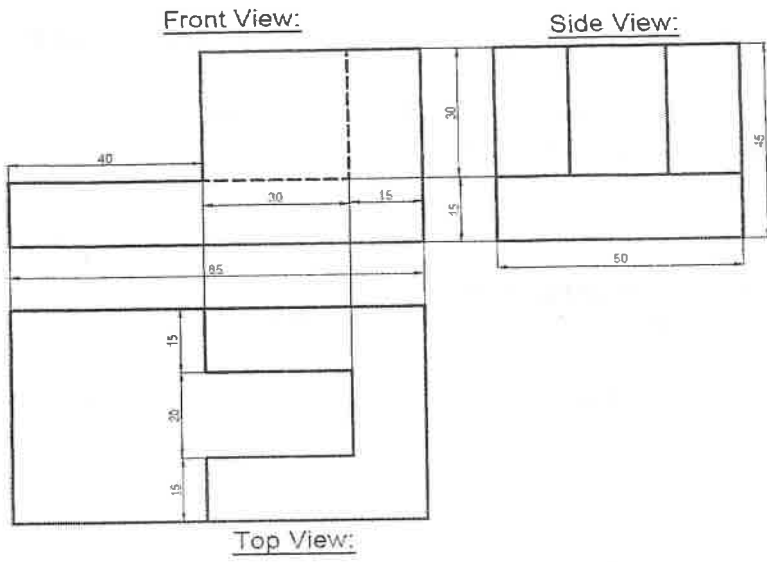Time: 3Hrs   Max Marks: 70

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

Q.No	Question	Marks	CO	BL
Q.1(A)	Construct an ellipse with the distance between the focus and directrix as 50 mm and eccentricity as 2/3. Also draw tangent and normal at a point 40 mm from directrix.	14M	1	3
	OR			
Q.1(B)	Draw a cycloid of a circle of diameter of 60mm for one revolution. Also, draw a normal and tangent to the curve at a point 40mm above the baseline.	14M	1	3
Q.2(A)	A line PQ 100 mm long is inclined at 30⁰ to the H.P. and at 45⁰ to the V.P. Its mid-point is in the V.P. and 20 mm above the H.P. Draw its projections, if its end P is in the third quadrant and Q is in the first quadrant	14M	2	3
	OR			
Q.2(B)	Draw the projections of a regular pentagon of 30 mm side, having one of its sides in HP and inclined at 60° to VP. The surface of the hexagon is making an angle of 45° with HP.	14M	2	3
Q.3(A)	A circular cone, 50 mm base diameter and 60 mm long axis is resting on HP, on one point of base circle such that its axis makes 45⁰ inclinations with HP. Draw it's projections.	14M	3	3
	OR			
Q.3(B)	A Pentagonal prism, having a base with a 30mm side and an 70mm long axis, rests on one of its rectangular face in the H.P such that the axis is inclined at 30⁰ to the VP. Draw its projections?	14M	3	3
Q.4(A)	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 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, 30 mm base side & 50mm axis is standing on HP on its base with one side of the base perpendicular to VP. It is cut by a section plane inclined at 45⁰ to the HP, through mid-point of axis. Draw the development of the remaining surface using parallel line method.	14M	4	3
Q.5(A)	Draw Front view ,Topview and sideview for the given isometric view.	14M	5	3

OR

Q.5(B)	Draw the isometric view of ginen orthographic Projection.	14M	5	3

Front View:

Side View:

Top View:

40

30

30

15

15

50

45

85

15

20

15

*** END***

Iall Ticket No:

Question Paper Code: 23ME101

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

B.Tech I Year II/I Semester (R23) Regular & Supplementary End Semester Examinations, July – 2024
ENGINEERING GRAPHICS
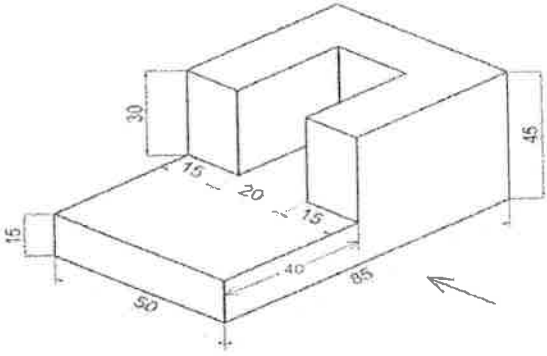(Common to All)

Time: 3Hrs   Max Marks: 70

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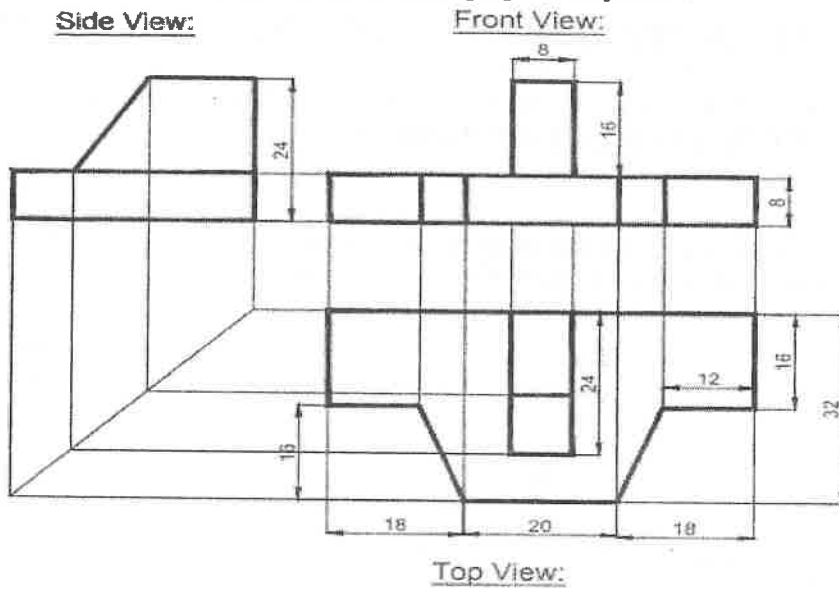> **In Q.no 1 to 5 answer either Part-A or B only**

Q.No	Question	Marks	CO	BL
Q.1(A)	Draw a parabola with the distance of the focus from the directrix at 60mm (Eccentricity method), and also draw a normal and tangent through a point 50mm from the directrix.	14M	1	3
	OR			
Q.1(B)	Draw an involute of a circle of 50mm diameter. Also, draw a tangent and normal to the curve at a point 90 mm from Centre of the circle.	14M	1	3
Q.2(A)	Draw the projections of the following points on the same reference line by keeping the distance between projectors as 50mm. 1. A – 30mm below HP and 50mm behind VP 2. B – 40mm above HP and 60mm behind VP 3. C – Point is in HP and 20mm behind VP 4. D – 40mm below HP and 30mm in front of VP 5. E- Point is in VP and 20 mm above HP.	14M	2	3
	OR			
Q.2(B)	A square ABCD of 50mm side has its corner A in the H.P. Its diagonal AC is inclined at 30° the H.P and the diagonal BD inclined at 45° to the VP and parallel to H.P. Draw its Projections.	14M	2	3
Q.3(A)	A pentagonal Prism having a base with a 30 mm side and 60mm long axis, is resting on one of its rectangular faces on the HP. with axis parallel to the VP. Draw its projections.	14M	3	3
	OR			
Q.3(B)	A Hexagonal Prism having a base side 30 mm and 75 mm long axis, has an edge its base on the HP. Its axis is Parallel to the VP and inclined at 45° to the HP Draw its projections?	14M	3	3
Q.4(A)	A hexagonal pyramid, base 30 mm side and axis 65 mm long is resting on its base on the HP, with two edges of the base parallel to the VP. It is cut by a section plane perpendicular to VP and inclined at 450 to the HP, intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of the section.	14M	4	3
	OR			
Q.4(B)	A cone, 50 mm base diameter and 70 mm axis is standing on its base on HP. It cut by a section plane 45° inclined to HP through base end of end generator. Draw development of surfaces of remaining solid using radial line method.	14M	4	3
Q.5(A)	Draw Front view ,Topview and sideview for the given isometric view.	14M	5	3

Q.5(B) Draw the isometric view of given orthographic Projection. 14M 5 3

Side View: **Front View:**

Top View:

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech I Year I Semester (R23) Supplementary End Semester Examinations, July– 2024
LINEAR ALGEBRA AND 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

Q.No		Question	Marks	CO	BL
Q.1	i.	Determine the rank of $A = \begin{bmatrix} 1 & 2 & 1 \\ 1 & 1 & 2 \\ 2 & 1 & 5 \end{bmatrix}$ by converting to normal form	1M	1	2
	ii.	Suppose that the augmented matrix of a system of equation has been reduced to row echelon form $\begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$. Solve the system.	1M	1	2
	iii.	Consider the matrix A of order 3×3 with eigenvalues $1, 5$ and determinant of A is 20. Find the trace of the matrix.	1M	2	2
	iv.	Find the eigenvalues of Adj(A) for the matrix $A = \begin{bmatrix} 5 & -6 & -7 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$	1M	2	2
	v.	Find the value of 'c' for the function $f(x) = x^2 + 2x - 1$ in the interval $[1, 2]$	1M	3	2
	vi	State Lagrange's mean value theorem	1M	3	1
	vii.	Evaluate $\dfrac{dw}{dt}$ if $w = xy + z$, $x = \cos t$, $y = \sin t$ and $z = t$	1M	4	2
	viii.	When the function $f(x, y)$ has minima at a point (a,b)	1M	4	1
	ix.	Evaluate $\displaystyle\int_0^2 \int_0^{x^2} x \, dy \, dx$	1M	5	2
	x.	Write the equations relating Cartesian and spherical coordinate system	1M	5	1
Q.2(A)		Determine the values of λ for which the following system of equations: $(\lambda - 1)x + (3\lambda + 1)y + 2\lambda z = 0$; $(\lambda - 1)x + (4\lambda - 2)y + (\lambda + 3)z = 0$; $2x + (3\lambda + 1)y + 3(\lambda - 1)z = 0$ are consistent and find the ratios of $x : y : z$ when λ has the smallest of these values. What happens when λ has the greatest of these values?	12M	1	3
		OR			
Q.2(B)		Solve the system by Gauss- Seidel iteration method: $20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$	12M	1	3

Q.3(A)	Reduce the quadratic form $3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$ to Canonical form by an orthogonal transformation and specify the matrix of transformation.	12M	2	3

OR

Q.3(B)

Find the Characteristic equation of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence

compute A^{-1}.   Also   find   the   matrix   represented   by
$A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$.

12M   2   3

Q.4(A)   (i). If $f(x) = \sin^{-1}(x)$ (if $0 < a < b < 1$), Use mean value theorem to prove

6M   3   3

that $\dfrac{b-a}{\sqrt{1-a^2}} < \sin^{-1} b - \sin^{-1} a < \dfrac{b-a}{\sqrt{1-b^2}}$

(ii). Verify the Cauchy's mean value theorem for the functions a) $\sin x$ and $\cos x$ in the interval $[a,b]$

6M   3   3

OR

Q.4(B)   Expand $\tan^{-1} x$ in powers of $(x-1)$ up to the term containing x^4

12M   3   3

Q.5(A)

(i). If $u = x^2 + y^2 + z^2$, $v = xy + yz + zx$, $w = x + y + z$. Evaluate $\dfrac{\partial(u,v,w)}{\partial(x,y,z)}$

6M   4   3

(ii)   If $u = f(r,s,t)$ and $r = \dfrac{x}{y}$, $s = \dfrac{y}{z}$, $t = \dfrac{z}{x}$ Prove   that

6M   4   3

$x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} + z\dfrac{\partial u}{\partial z} = 0$

OR

Q.5(B)   Find the minimum value of $x^2 + y^2 + z^2$, given that (i) $xyz = a^3$ (ii) $ax + by + cz = p$.

12M   4   3

Q.6(A)   (i). Evaluate the integral $\displaystyle\int_0^\infty \int_x^\infty \dfrac{e^{-y}}{y} dy dx$ by changing the order of Integration

6M   5   3

(ii). Evaluate the integral $\displaystyle\int_0^\infty \int_0^x xe^{-\frac{x^2}{y}} dy dx$ by changing the order of Integration

6M   5   3

OR

Q.6(B)   (i). Evaluate $\displaystyle\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$ by changing into polar coordinates. Hence

6M   5   3

show that $\displaystyle\int_0^\infty e^{-x^2} dx = \dfrac{\sqrt{\pi}}{2}$.

(ii). Evaluate $\displaystyle\int_{-1}^{1} \int_0^z \int_{x-z}^{x+z} (x+y+z) dy dx dz$

6M   5   3

*** END***

Hall Ticket No: ☐☐☐☐☐☐☐☐☐☐

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
.Tech I Year I Semester (R23) Supplementary End Semester Examinations, July– 2024
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 ALU?	1M	1	1
	ii.	List out the primitive data types.	1M	1	2
	iii.	Write a syntax of 'for' loop statement.	1M	2	2
	iv.	Write a simple program using 'if' statement.	1M	2	2
	v.	List the types of array.	1M	3	1
	vi	How to represents a single array in 'C' Programming?	1M	3	2
	vii.	Define structure.	1M	4	1
	viii.	Define pointer.	1M	4	1
	ix.	What is function call?	1M	5	1
	x.	What is File?	1M	5	1
Q.2(A)		Explain the basic organization of a computer with a neat diagram.	12M	1	2
		OR			
Q.2(B)		Illustrate the function of logical and bitwise operators with examples.	12M	1	3
Q.3(A)		List all control statements used in C. Explain with syntax and example.	12M	2	3
		OR			
Q.3(B)		Write a C program to store Fibonacci series in an array.	12M	2	3
Q.4(A)		Define array. Illustrate and develop the code for Linear Search to find the key 56 in a given array. a[10]={3,6,2,5,8,12,56,72,45,90}.	12M	3	2
		OR			
Q.4(B)		Explain any four string handling functions with examples.	12M	3	3
Q.5(A)		Explain in detail the concept of pointer and address arithmetic.	12M	4	2
		OR			
Q.5(B)		What are the differences between a structure and union? Illustrate with the help of a suitable example.	12M	4	3
Q.6(A)		Define function. Explain the four different ways of calling a function with suitable example.	12M	5	2
		OR			
Q.6(B)		Write a program to open a file and read the file and print the file contents in reverse order	12M	5	3

*** END***