

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE – APRIL - 2022**

**ENGINEERING MECHANICS**

(Maximum Marks : 75)

[Time : 3 hours]

**PART-A**

**I. Answer all the following questions in one word or sentence. Each question carries 1 mark.**

**(9x1=9 marks)**  
Module Outcome      Cognitive level

1	Forces whose line of action pass through a common point are called.....forces.	M 1.01	R
2	The S.I unit of Force is.....	M 1.02	R
3	In a roller support, the line of reaction is.....to the plane of rollers.	M2.01	U
4	Maximum value of static friction is known as .....friction.	M2.05	R
5	.....is the point where the entire weight of the body is assumed to be concentrated.	M3.01	R
6	The moment of inertia of an area is minimum about its.....axis.	M3.03	U
7	The ratio of change in dimension to the original dimension of a body is known as.....	M4.01	R
8	.....is the mechanical property of a material to fracture with very little deformation.	M4.02	R
9	The ratio of lateral strain to longitudinal strain is called.....	M4.05	R

**PART B**

**II. Answer any Eight questions from the following. Each question carries 3 marks.**

**(8x3=24)**  
Module Outcome      Cognitive level

1	Define scalar and vector quantities.	M 1.02	R
2	Define moment of a force.	M 1.04	R
3	State Lami's Theorem.	M1.05	R
4	List any 3 types of supports.	M2.02	R
5	Explain angle of friction.	M2.05	R
6	Draw and label the centroid of an isosceles triangle.	M3.02	U
7	State perpendicular axis theorem.	M3.03	R
8	Draw the stress-strain curve for mild Steel.	M4.02	U

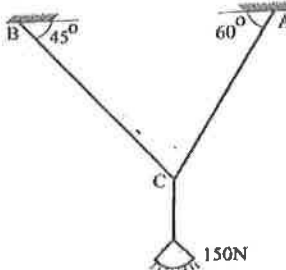
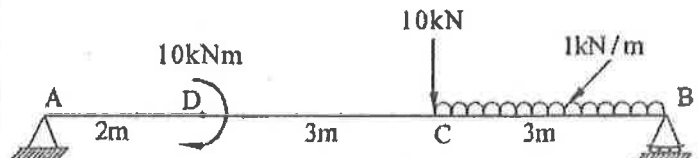
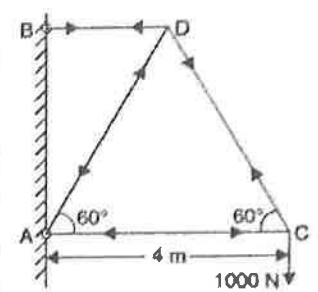
9	Explain the material properties (a) Hardness (b) Toughness.	M4.04	R
10	Explain Modulus of Rigidity.	M4.05	R

**PART**

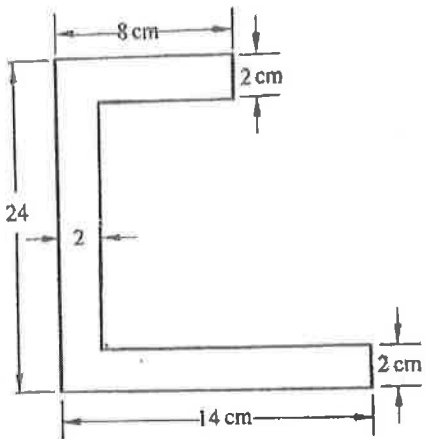
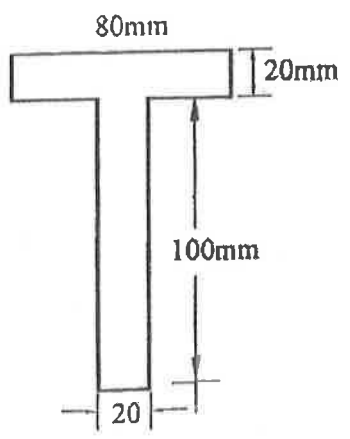
**III. Answer all questions from the following. Each question carries 7 marks.**

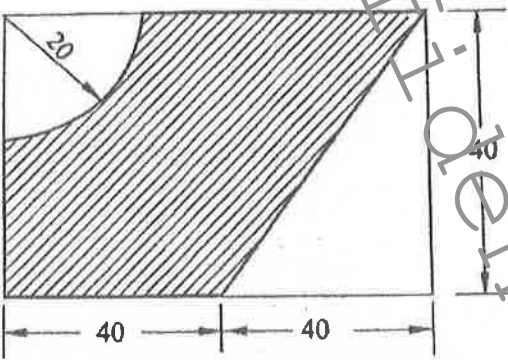
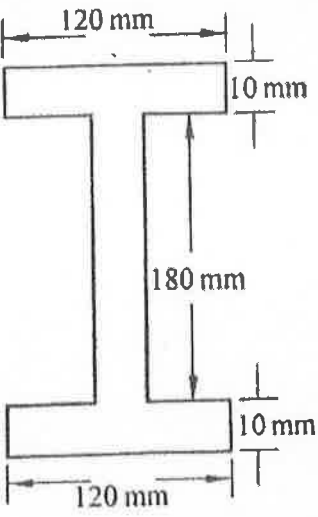
**(6x7=42marks)**

Module Outcome Cognitive level

1	Two forces P and Q of magnitude 25 N and 10 N are acting at a point. The forces P and Q make angle $15^\circ$ and $45^\circ$ , measured counter clockwise with the horizontal. Determine the resultant in magnitude and direction.	M1.03	U
<b>OR</b>			
2	An electric light fixture weighing 150 N hangs from a point C by two stay wires AC and BC as shown in figure. Determine the tensions in the stay wire using Lami's theorem.	M1.05	U
			
3	A beam 6 m long is loaded as shown in figure. Calculate the reactions at A and B.	M2.02	A
			
<b>OR</b>			
4	Determine the forces in all the members of a cantilever truss shown in figure.	M2.03	A
			

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5	Explain the different types of load with figure.  <b>OR</b>	M2.01	U
6	Explain friction. State the laws of friction.	M2.05	U
7	Find the centroid of the area shown in figure.   <b>OR</b>	M3.02	A
8	Calculate the moment of inertia of T-section shown in figure about the centroidal axis.  	M3.04	A

9	<p>Determine the centroid of the shaded area. All dimensions are in mm.</p> 	M3.03	U
OR			
10	<p>Find the moment of inertia of the I-section shown in figure about centroidal XX and YY axes.</p> 	M3.04	U
11	<p>A steel specimen of 14 mm diameter and length 200 mm was found to elongate 0.2 mm when it is subjected to a tensile load of 40 kN. Find the Young's modulus of the steel specimen.</p>	M4.03	U
OR			
12	<p>A steel bar of 50 mm wide, 12 mm thick and 300 mm long is subjected to an axial pull of 84 kN. Find the changes in length, width and the thickness of the bar. Take <math>E = 2 \times 10^5 \text{ N/mm}^2</math> and Poisson's ratio = 0.32.</p>	M4.05	U