

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026

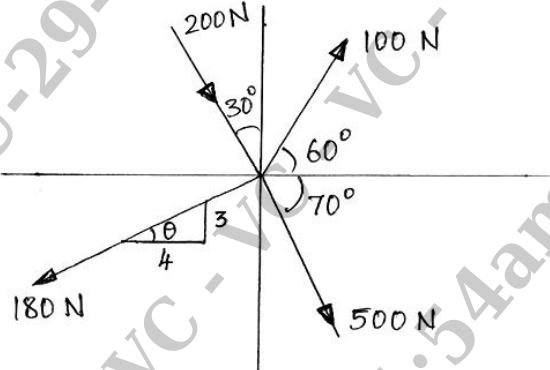
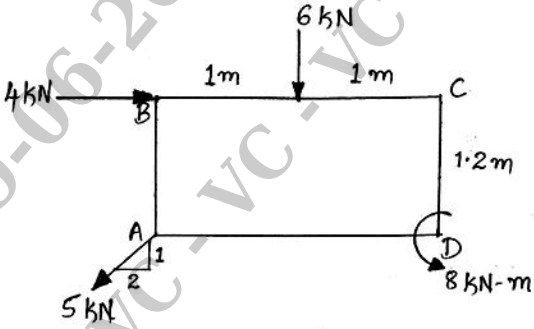
Engineering Mechanics

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks, L: Bloom's level, C: Course outcomes.

Module – 1				M	L	C
Q.1	a.	Explain the following : i) Principles of transmissibility of forces ii) Forces and its characteristics		10	L2	CO1
	b.	Determine the magnitude and direction of the resultant force for the force system shown in Fig.Q1(b).  Fig.Q1(b)		10	L3	CO1
OR						
Q.2	a.	State and prove Varignon's theorem of moments.		6	L3	CO1
	b.	Determine the magnitude and direction of the resultant force for the force system shown in Fig.Q2(b). Locate the resultant force with respect to point 'D'.  Fig.Q2(b)		10	L3	CO1
	c.	Explain Free body diagrams.		4	L2	CO1
Module – 2						
Q.3	a.	Explain the condition of equilibrium of coplanar concurrent and non concurrent force system.		6	L2	CO2

Q.3	b.	State and prove Lami's theorem.	4	L2	CO2
	c.	Compute the tensions in the strings AB, BD, BC and CE shown in Fig Q3(c).	10	L3	CO2

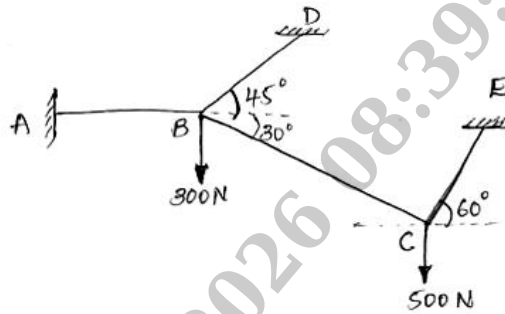


Fig Q3(c)

OR

Q.4	a.	Distinguish between: i) Statically determinate and indeterminate beams ii) Hinged support and fixed support.	6	L2	CO2
	b.	Determine the reaction components for the loaded beam shown in Fig.Q4(b).	10	L3	CO2

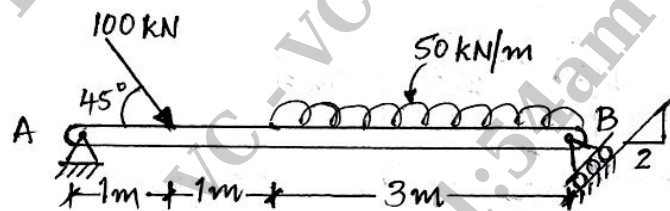


Fig.Q4(b)

Module – 3					
Q.5	a.	Define static and kinetic (dynamic) friction and state the laws of dry friction.	10	L2	CO3
	b.	A small block of weight 1000 N as shown in Fig.Q5(b) is placed on a 30° inclined plane with $\mu=0.25$. Determine the horizontal force to be applied for (i) Impending motion down the plane (ii) Impending motion up the plane	10	L3	CO3

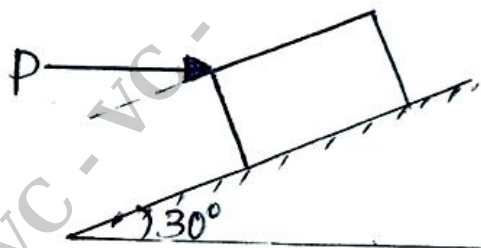
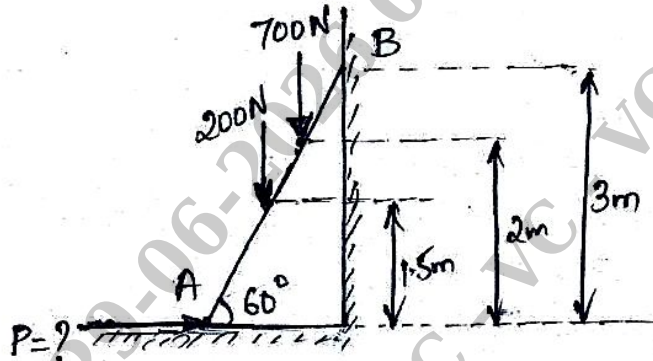


Fig.Q5(b)

OR

Q.6	a.	Explain with sketches: i) Angle of friction ii) Cone of friction iii) Angle of repose	10	L2	CO3
	b.	A Ladder weighing 200N is to be kept in position as shown in Fig.Q6(b) resting on a smooth floor & leaning against a smooth wall. Determine the horizontal force required to prevent it from slipping when man a weighing 700 N is at a height 2m above the floor level  Fig.Q6(b)	10	L3	CO3

Module – 4

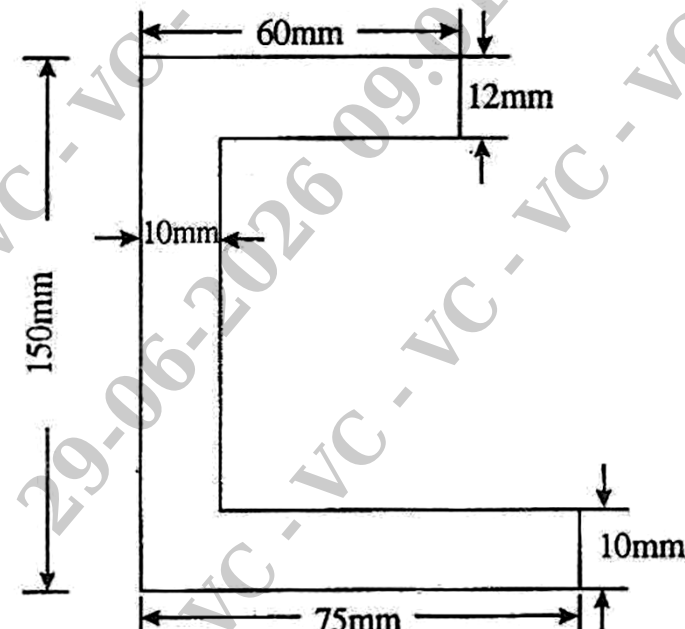
Q.7	a.	Determine the centroid of a semi circular lamina of radius 'R' by the method of integration.	8	L3	CO4
	b.	Determine the centroid of a shaded area of composite section as shown in Fig. Q7(b). 	12	L3	CO4

Fig. Q7(b)

OR

Q.8	a.	Explain the terms with sketch: i) centroid ii) centre of gravity iii) axis of symmetry.	8	L3	CO4
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Q.8	b. Find the centroid of the shaded composite area with respect to the given axis as shown in Fig.Q8(b).	12	L3	CO4
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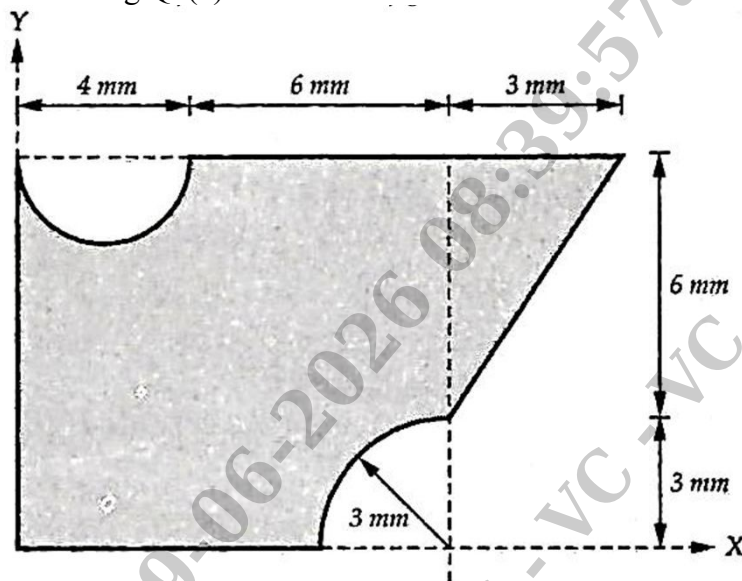


Fig.Q8(b)

Module – 5

Q.9	a. State and prove perpendicular axes theorem.	8	L3	CO4
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	b. Determine the moment of inertia along the horizontal axis passing through the centroid of the section shown in Fig.Q9(b).	12	L3	CO4
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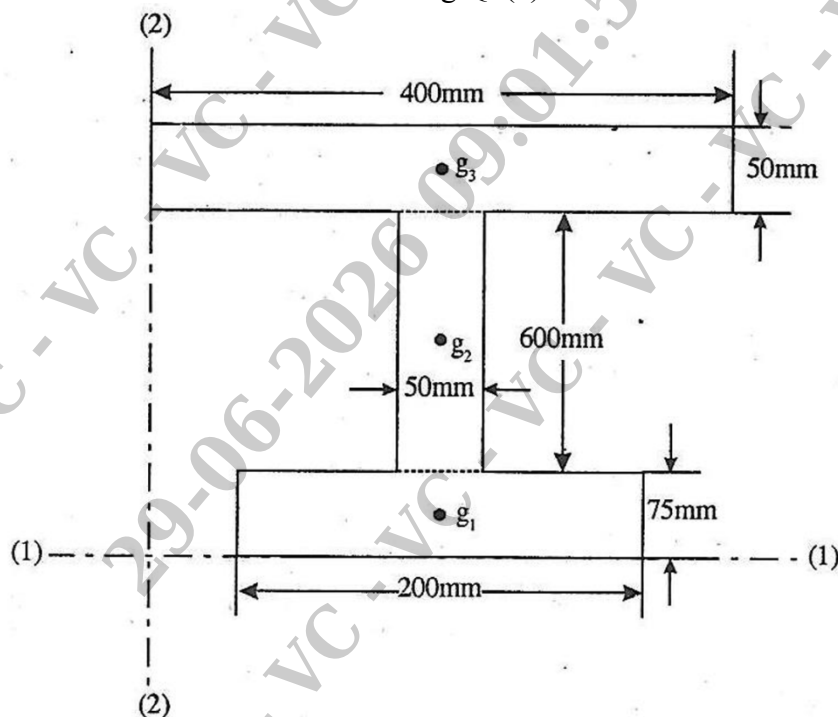
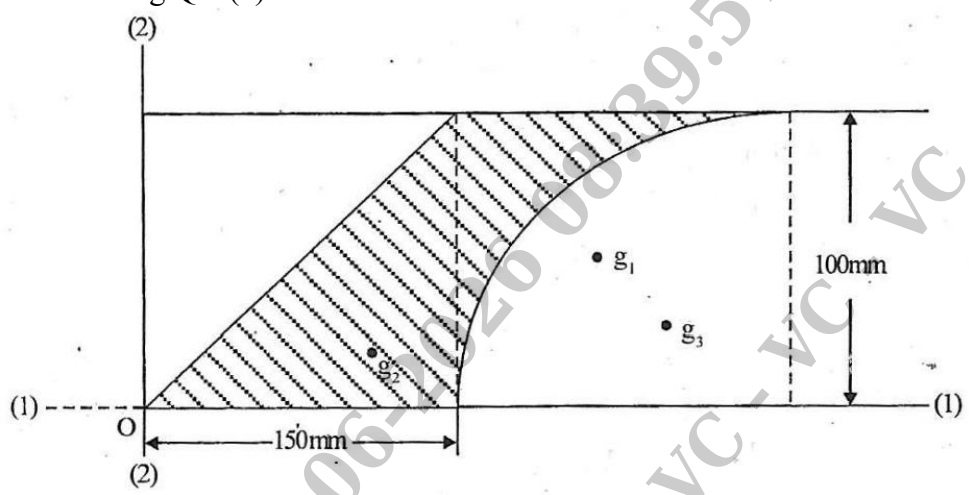


Fig.Q9(b)

OR

Q.10	a. Derive the expression for the moment of inertia of a triangular section about its base. Hence, arrive at the expression about its parallel centroidal axis.	8	L3	CO4
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Q.10	b. Determine the radius of gyration about the horizontal axis of the section shown in Fig.Q10(b).  Fig.Q10(b)	12	L3	CO4
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