CBCS SCHEME

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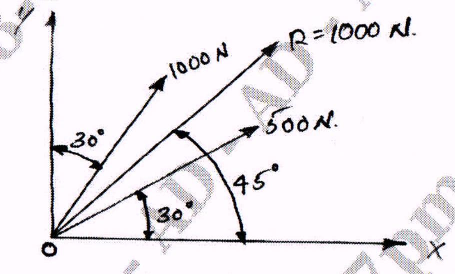
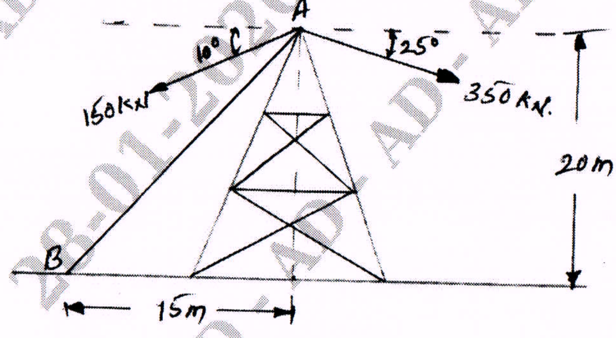
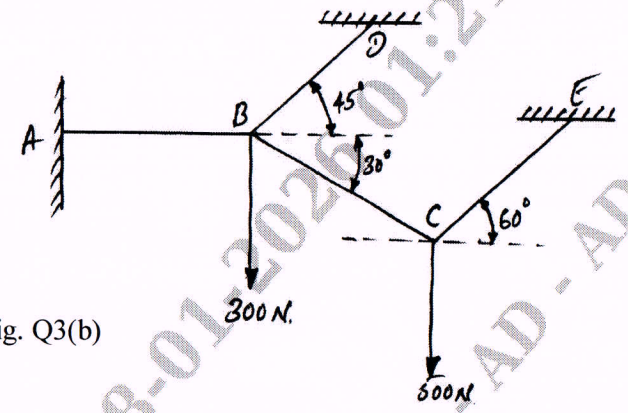
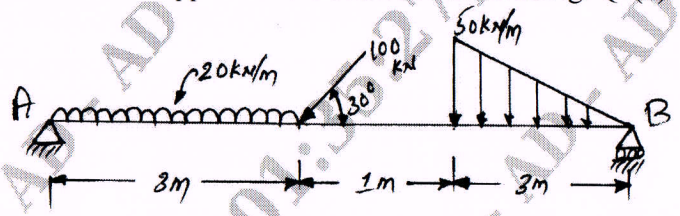
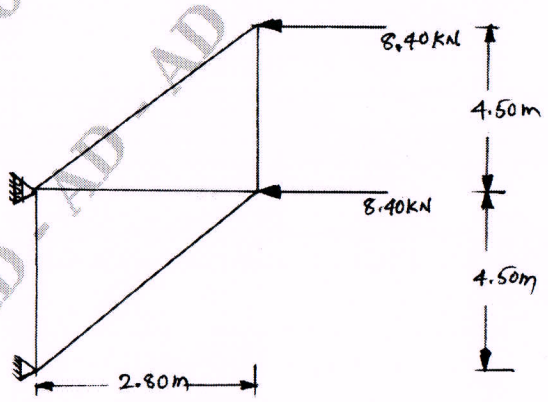
BCIVC103/203

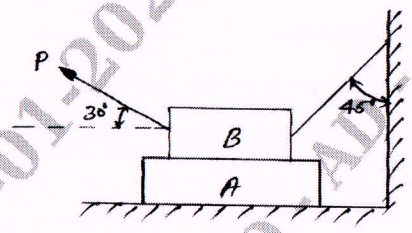
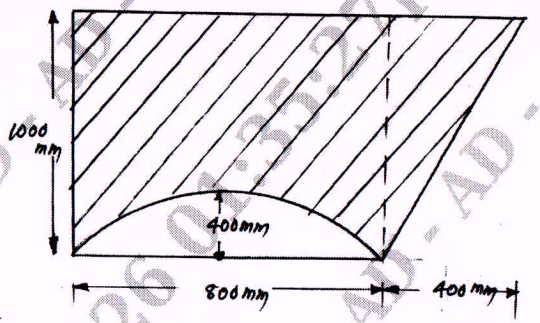
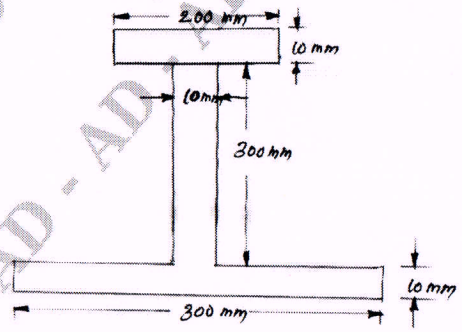
First/Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Engineering Mechanics

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 different types of force systems along with neat sketch.	10	L2	CO1
	b.	Two forces acting on a body are 500N and 1000N as shown in Fig. Q1(b). Determine the third force F such that resultant of all the three forces is 1000N directed at 45° to the x – axis.  Fig. Q1(b)	10	L3	CO1
		OR			
Q.2	a.	State and prove Varignon's theorem of moments.	10	L2	CO1
	b.	Two cables attached at the top of tower carries a guy cable AB. Determine the tension in the guy cable such that the resultant of the forces in all three cables acts vertically down. Also find the resultant force. Refer Fig. Q2(b).  Fig. Q2(b)	10	L3	CO1
		Module – 2			
Q.3	a.	With neat sketch, explain different types of beams and different types of supports.	10	L2	CO2

	b.	A system of cable in equilibrium condition under two vertical loads of 300N and 500N as shown in Fig. Q3(b). Determine the forces developed in each segments of the strings.  Fig. Q3(b)	10	L3	CO2
		OR			
Q.4	a.	State and prove Lami's theorem with neat sketch also mention the equation of equilibrium for the coplanar concurrent and coplanar Non – concurrent force system.	10	L2	CO2
	b.	Determine the reaction at the support for the beam as shown in Fig. Q4(b).  Fig. Q4(b)	10	L3	CO2
		Module – 3			
Q.5	a.	Explain the procedure to find forces in members by the method of joint and by the method of section.	10	L3	CO3
	b.	Determine the forces in each members of the truss shown in Fig. Q5(b) , using method of joints.  Fig. Q5(b)	10	L3	CO3

		OR			
Q.6	**a.**	Explain the terms : i) Angle of friction ii) Cone of friction iii) Coefficient of friction iv) Angle of repose v) Static friction	**10**	**L2**	**CO3**
	b.	Block A weighing 1.5 kN rests on a horizontal plane and supports another block weighing 500 N on top of it as shown in Fig. Q6(b). The block B is attached to a vertical wall by an inclined string, which makes an angle of 45° with the vertical. What should be the value of the force "P" acting at an angle of 30° to the horizontal to cause the motion of the lower block to impend? Take $\mu = 0.28$ for all the surface.  Fig. Q6(b)	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Determine the centroid of the triangular area of base "b" and height "h" from the first principle.	**10**	**L3**	**CO4**
	b.	Locate the centroid of a shaded area as shown in Fig. Q7(b).  Fig. Q7(b)	**10**	**L4**	**CO4**
		OR			
Q.8	**a.**	State and prove Parallel Axis theorem.	**10**	**L3**	**CO4**
	b.	Determine the moment of inertia of the section about its centroidal axes (x – x and y – y) as shown in Fig. Q8(b).  Fig. Q8(b)	**10**	**L4**	**CO4**

		Module – 5			
Q.9	a.	Define the following : i) Time of flight ii) Velocity iii) Acceleration iv) Displacement v) Acceleration due to gravity.	10	L2	CO5
	b.	A stone is dropped in to a well. After 4 seconds the sound of splash is heard. If the velocity of sound is 330 m/sec, find the depth of the well upto the water surface.	10	L3	CO5
		OR			
Q.10	a.	State and explain D – Alembert's principle.	8	L2	CO5
	b.	A car starts from the rest and accelerates uniformly to a speed of 75 kmph over the distance of 1000 m. Find the acceleration of the car and time taken to attain this speed. If a further acceleration rises to the speed of 100 kmph in 10 seconds, find the new acceleration and further distance involved.	12	L3	CO5

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