U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

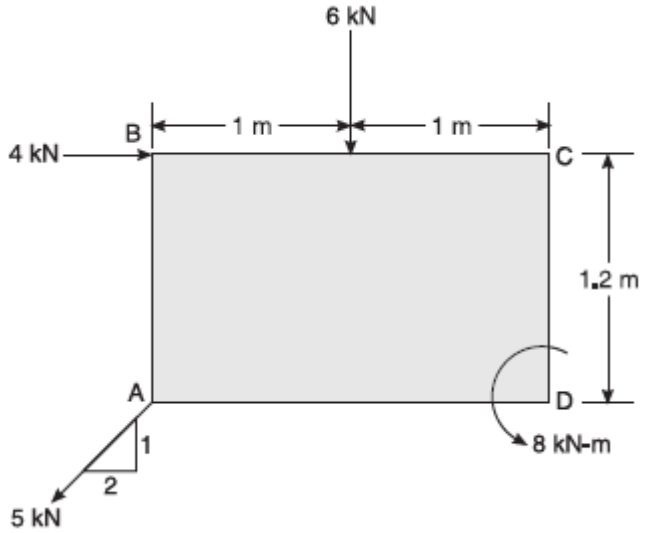
Autonomous Institute Affiliated to VTU

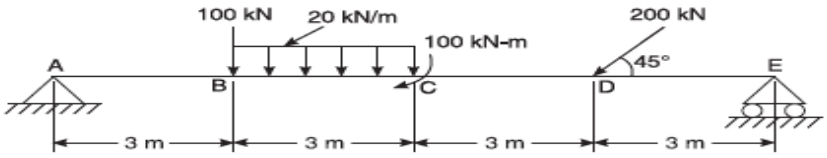
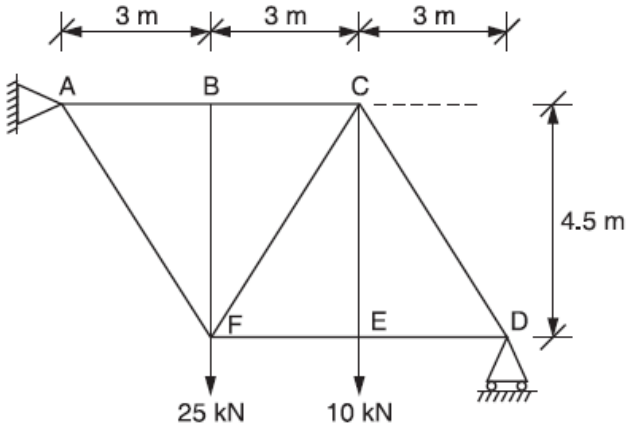
August 2024 Semester End Main Examinations

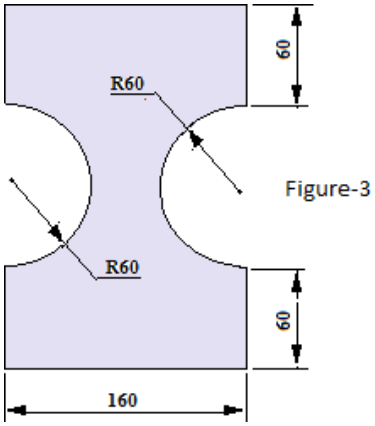
Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 18CV1ESENM / 18CV2ESENM **Max Marks: 100**
Course: Engineering Mechanics

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT – I	CO	PO	Marks
1	a)	The resultant of two forces when they act at an angle of 60° is 14N. If the same forces are acting at right angles, their resultant is √(136) N. Determine the magnitude of two forces.	CO 1	PO1	**6**
	b)	Distinguish between composition and resolution of forces with suitable example.	CO 1	PO1	**6**
	c)	Two arbitrary axes OA and OB are at an angle 105° with each other. A force of 500N is acting at 45° with axis OA. Find the components of given force along axes OA and OB.	CO 1	PO1	**8**
		OR			
2	a)	Determine the magnitude, direction of the resultant force for the force system shown in Fig 1. Locate the resultant force with respect to point 'D' and indicate the resultant in the figure.  Fig 1	CO 1	PO 2	**12**
	b)	State and prove Parallel axes theorem	CO 1	PO1	**8**
		UNIT – II			
3	a)	State and explain Varignon's theorem of moments	CO1	PO1	**04**

		b)	Determine the reactions at A and E for the beam shown in Fig.2  Fig 2	CO 1	PO2	**06**
		c)	Determine the forces in all members of the pin jointed truss as shown in Fig.3 by method of joints.  Fig.3	CO 2	PO2	**10**
			UNIT - III			
	4	a)	Explain Laws of Friction	CO 2	PO1	**6**
		b)	A uniform ladder of length 8m and weight 'W' is leaning against a wall. Ladder makes 45° with the horizontal. A man whose weight is 0.6 times that of ladder goes up the ladder. Determine the maximum distance he can climb along the ladder before the ladder slips. Assume coefficient of friction betweenthe ladder and wall as 0.25 and that between the ladder and floor to be 0.30. Also find the necessary horizontal push (in terms of W) to be applied at the bottom if the man is to reach the top of the ladder.	CO 2	PO2	**14**
			UNIT – IV			
	5	a)	Explain the term radius of gyration with sketch	CO2	PO1	**05**

		b)	Find second moment of area of cut section as shown in Fig.4 about its horizontal and vertical centroidal axes.  Figure-3 Fig.4 (All dimensions are in mm)	CO 1	PO1	**15**
			UNIT – V			
	6	a)	State D'Alembertz Principle.	CO 3	PO1	**05**
		b)	A lift has an upward acceleration of 1.2m/s^2. What force will a man weighing 750 N exert on the floor of the lift.	CO 3	PO2	**05**
		c)	A projectile is launched from a gun. After 3.783 seconds, the velocity of the projectile is observed to make an angle of 30^o with the horizontal, and at 4.79 seconds it reaches its maximum height. Calculate the initial velocity and angle of projection.	CO 3	PO 2	**10**
			OR			
	7	a)	Show that the path traced by a projectile is parabolic.	CO3	PO1	**06**
		b)	Explain Work - Energy principle.	CO 3	PO 1	**06**
		c)	A bullet is fired from a gun with an initial velocity of 250m/sec to hit a target at a horizontal distance of 3750m and 625m above the gun. Determine the minimum angle of projection so that the bullet will hit the target.	CO 3	PO1	**08**

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