PVP 20

Code: 20BS1304

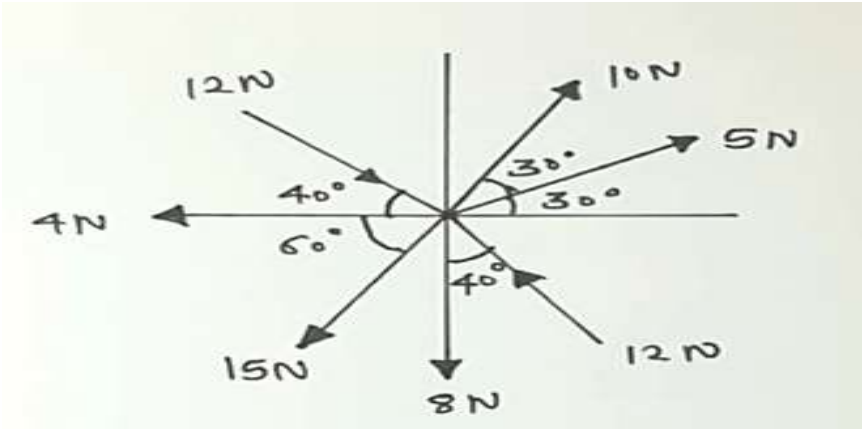
II B.Tech - I Semester – Regular / Supplementary Examinations
DECEMBER 2022

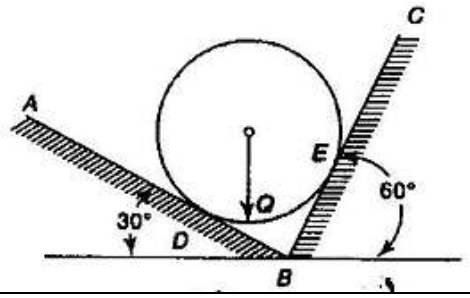
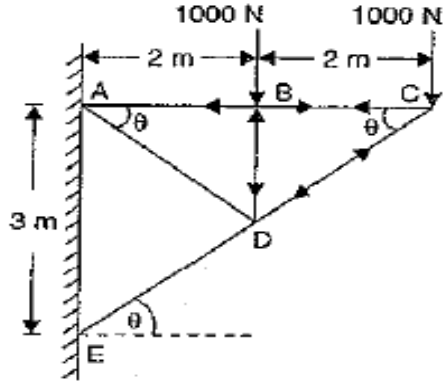
APPLIED MECHANICS
(CIVIL ENGINEERING)

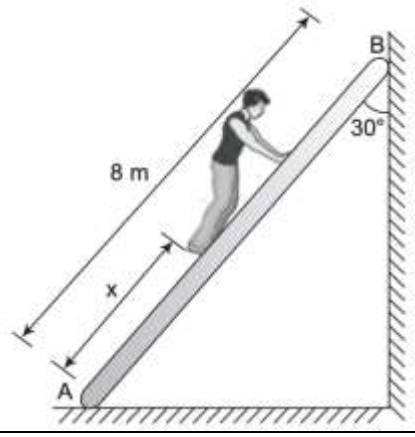
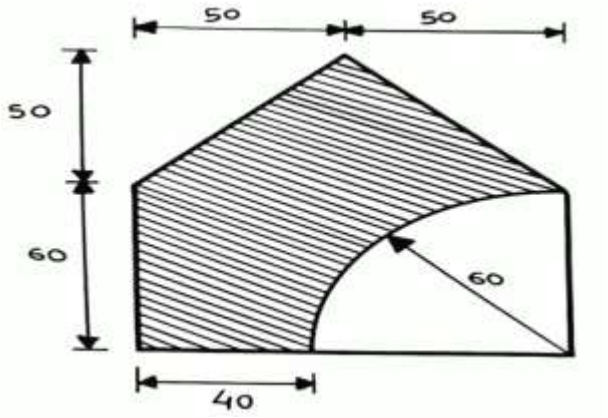
Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
		UNIT-I			
1		Find the resultant and its direction of the given force system as shown in the Figure. 	L3	CO1	14 M
		OR			
2		Classify the force system. State and derive the parallelogram's law of forces.	L2	CO1	14 M
		UNIT-II			
3		State and prove Lami's theorem.	L2	CO2	14 M
		OR			

4	A ball of weight Q=53.4 N rests in a right angled trough, as shown in figure. Determine the forces exerted on the sides of the trough at D and E if all surfaces are perfectly smooth.  	L3	CO2	14 M
	UNIT-III			
5	Determine the forces in all members of a cantilever truss as shown in figure.  	L3	CO3	14 M
	OR			
6	A 800 N man starts climbing a ladder that placed against a wall as shown in given figure. Neglecting the weight of the ladder, determine how far up the ladder the man can climb before the ladder starts slipping. Assume coefficient of static friction between the surfaces as 0.25.	L3	CO3	14 M

				
	UNIT-IV			
7	Find the centroid of the shaded portion about X and Y axis for the figure below. All dimensions are in mm. 	L3	CO4	14 M
	OR			
8	Derive the expression for centroid about x- and y-axes for a quarter circle of radius 'R'.	L3	CO4	14 M
	UNIT-V			
9	A particle starts moving from origin along a straight path with an initial velocity of 20 m/s. The particle experiences a constant acceleration of -2 m/s^2. (i) Determine velocity and position of particle at 6 seconds. (ii) How long does the particle move in the same	L3	CO5	14 M

	direction? Find its position at that time instant. (iii) What is the time required for the particle to come back to origin? Find its velocity at that time instant.			
	OR			
10	A projectile is fired with an initial velocity of 250m/s at a target located at a horizontal distance of 4km and vertical distance of 700 m above the gun. Determine the value of firing angle to hit the target. Neglect air resistance.	L3	CO5	14 M