Code No: P18EST04 R18

HALL TICKET NUMBER

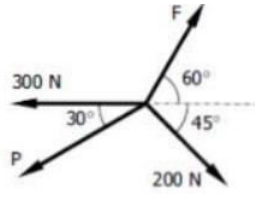
PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END REGULAR/SUPPLEMENTARY EXAMINATIONS, JAN - 2023
ENGINEERING MECHANICS
(Common to ME,AME Branches)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

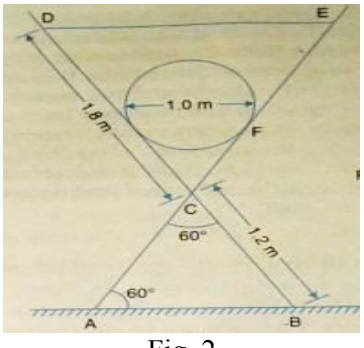
PART-A

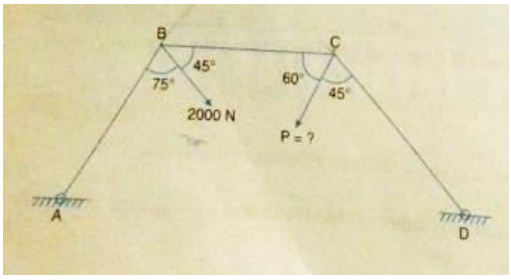
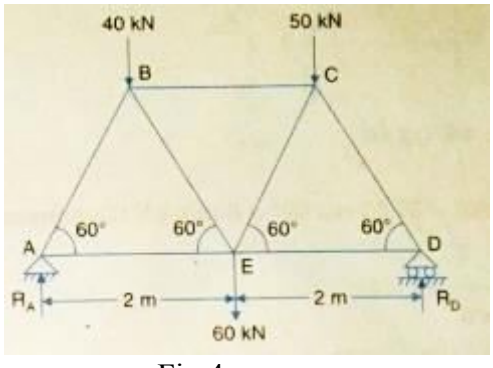
Answer all the questions in Part-A (5X2=10M)

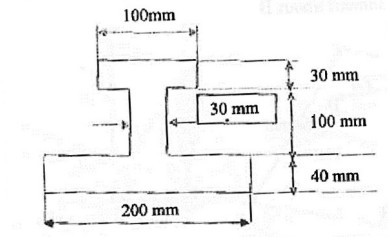
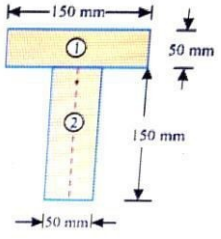
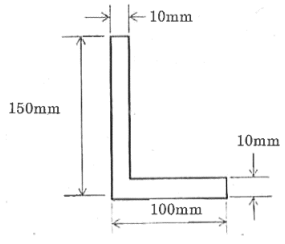
Q.No.		Questions	Marks	CO	KL
1	a)	Determine the magnitude of P and F necessary to keep the concurrent force system in Fig. 1 in equilibrium  Fig. 1	[2M]	1	
	b)	Discuss laws of friction.	[2M]	2	
	c)	Explain radius of gyration.	[2M]	3	
	d)	State the assumptions made in analysis of simple truss	[2M]	4	
	e)	Define energy and power.	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	State and prove Lami's theorem.	[5M]	1	
	b)	A 500 N cylinder of 1 m diameter is loaded between the cross pieces which makes and angle of 60 degrees with each other and pinned at C. Determine the tension in the horizontal rope DE, assuming floor (Refer Fig. 2)  Fig. 2	[5M]	1	
		OR			
3.	a)	Differentiate coplanar and non-coplanar force systems.	[5M]	1	

	b)	Write a C++ Program Three bars, hinged at A and D and pinned at B and C shown in below fig 3 form a four linked mecahnism. Determine the value of P that will prevent movement of the bars. 	[5M]	1	
		UNIT-II			
4.		Determine the forces in all the members of the truss shown in below fig 4 and it indicates the magnitude and nature of the forces on the diagram of the truss. All inclined members are at 60 degrees to the horizontal and length of each member is 2m.  Fig 4	[10M]	2	
		OR			
5.	a)	Write a short note on Wedge friction. State its uses and the method of solving the problems on Wedge friction.	[5M]	2	
	b)	A uniform ladder of length 8m and weight W is leaning against a wall. It 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 before the ladder slips. Assume coefficient of friction between the ladder and wall to 0.25 and that between the ladder and floor to be 0.3	[5M]	2	
		UNIT-III			
6.		Explain Theorems of Pappus and mention its applications.	[10M]	3	
		OR			
7.	a)	Explain the significance of centroid and center of gravity	[5M]	3	

	b)	Determine the center of gravity of the following unsymmetrical I section in fig 5  Fig 5	[5M]	3	
		UNIT-IV			
8.		Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the center of gravity of the section shown in below fig 6.  fig 6	[10M]	4	
		OR			
9.	a)	Derive the expression for mass moment of inertia of sphere of radius R about Y axis	[5M]	4	
	b)	Calculate the moment of inertia of the section shown below fig 7 about 'x' and 'y' axes through the centroid  fig 7	[5M]	4	
		UNIT-V			
10.	a)	Discuss the relation between kinetics of linear motion and kinetics of motion of rotation.	[5M]	5	
	b)	State the Newtons Law of motion of Rotation	[5M]	5	
		OR			
11.	a)	Briefly discuss D'Alembert principle.	[5M]	5	
	b)	Derive the impulse-Momentum equation of a body in motion.	[5M]	5	

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