CBCS SCHEME

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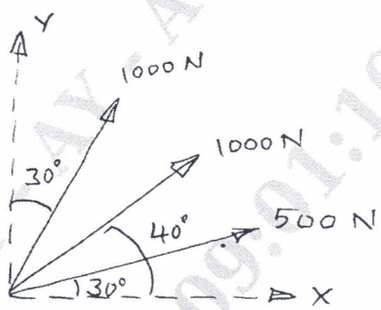
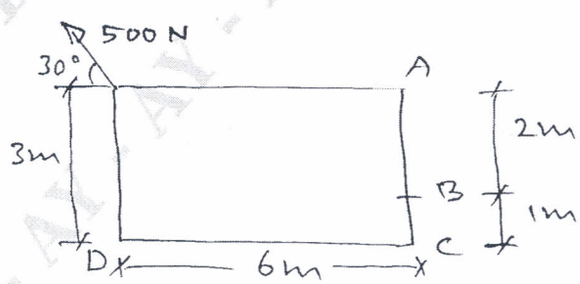
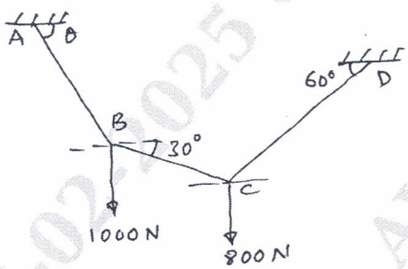
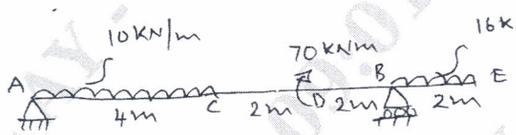
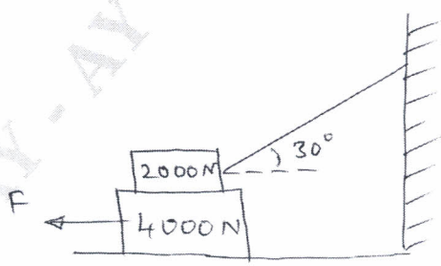
BCIVC103/203

First/Second Semester B.E/B.Tech. Degree Examination, Dec.2024/Jan.2025
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
1	a.	Write a note on principle of transmissibility of forces and its limitations.	6	L1	CO1
	b.	What is a force? What are its characteristics?	6	L1	CO1
	c.	Two forces acting on a body are 500 N and 1000 N as shown in Fig.Q1(c). Determine the third force F such that the resultant of all the three forces is 1000 N, directed at 40° to the x-axis.  Fig.Q1(c)	8	L3	CO1
		OR			
2	a.	What is a couple? List its characteristics.	6	L1	CO1
	b.	State and prove Varignon's theorem.	6	L2	CO1
	c.	Find the moment of 500 N force about the points A, B, C and D as shown in Fig.Q2(c).  Fig.Q2(c)	8	L3	CO1

		Module – 2			
3	a.	Explain with a neat sketch, the different types of supports.	**6**	**L2**	**CO2**
	b.	State and prove Lami's theorem.	**6**	**L2**	**CO2**
	c.	Calculate the tension in the strings. Also calculate 'θ' in Fig.Q3(c).  Fig.Q3(c)	**8**	**L3**	**CO2**
		OR			
4	a.	Explain the types of loading on the beams.	**6**	**L2**	**CO2**
	b.	Write short notes on the following with examples : i) Determinate beams ii) Indeterminate beams.	**6**	**L1**	**CO2**
	c.	Find support reactions for the beam shown in Fig.Q4(c).  Fig.Q4(c)	**8**	**L3**	**CO2**
		Module – 3			
5	a.	What are the assumptions made in the analysis of trusses?	**4**	**L1**	**CO3**
	b.	State the laws of static friction.	**4**	**L2**	**CO3**
	c.	A block weighting 4000 N is resting on horizontal surface supports another block of 2000 N as shown in Fig.Q5(c). Find the horizontal force F just to move the block to the left. Take coefficient of friction for all surfaces of contact to be 0.2.  Fig.Q5(c)	**12**	**L3**	**CO3**

		OR			
6	a.	Explain different types of trusses.	4	L2	CO3
	b.	Explain : i) Angle of friction ii) Cone of friction.	4	L2	CO3
	c.	Analyse the frame and tabulate the member forces for the frame shown in Fig.Q6(c).	12	L3	CO3

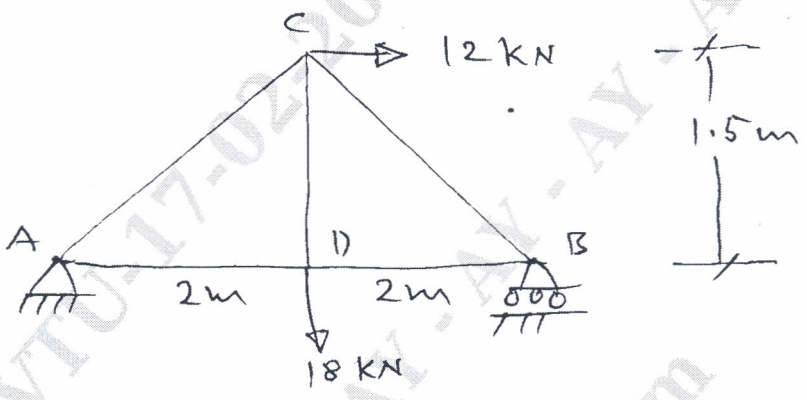


Fig.Q6(c)

Module – 4

7	a.	State and prove parallel axis theorem.	8	L2	CO4
	b.	Locate centriod of the shaded area shown in the Fig.Q7(b).	12	L3	CO4

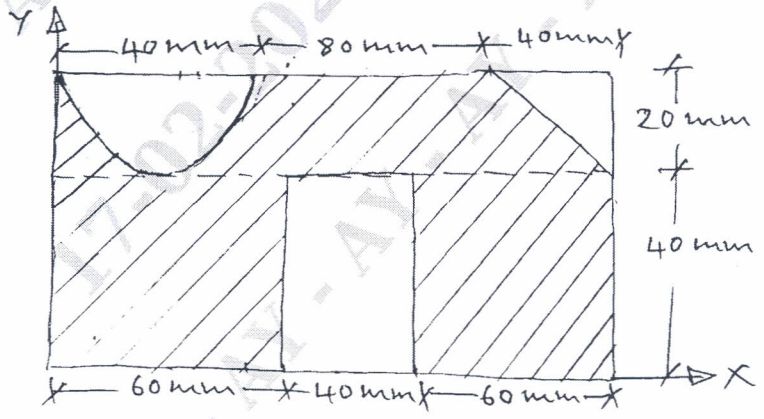
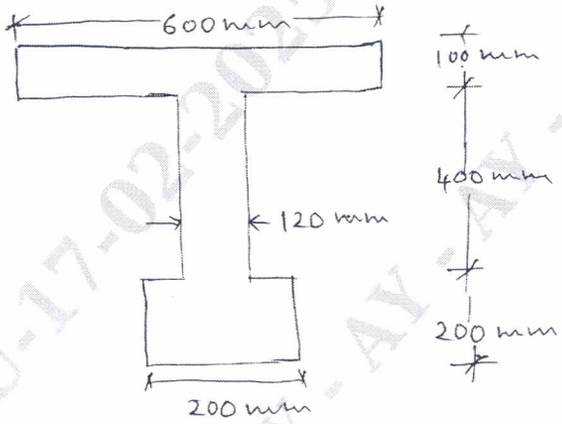


Fig.Q7(b)

		OR			
8	a.	Determine the centriod of a semi circular lamina of radius 'R' by the method of integration.	**8**	**L3**	**CO4**
	b.	Determine the moment of inertia of a pre-stressed concrete beam section shown in Fig.Q8(b), about horizontal and vertical axis passing through centriod.  Fig.Q8(b)	**12**	**L3**	**CO4**
		Module – 5			
9	a.	Derive the equations of motion.	**6**	**L2**	**CO5**
	b.	What is super elevation? Why is it necessary?	**4**	**L1**	**CO5**
	c.	A ball is dropped from the top of a tower 30 high. At the same instant another ball is thrown upward from the ground with an initial velocity of 15 m/s. When and where do they cross?	**10**	**L3**	**CO5**
		OR			
10	a.	State and explain D'Alembert's principle.	**4**	**L2**	**CO5**
	b.	Define the following with a neat sketch : i) Angle of projection ii) Horizontal range iii) Time of flight.	**4**	**L1**	**CO5**
	c.	A cricket ball is thrown by a player from a height of 2 m above the ground at an angle of 30° to the horizontal with a velocity 20 m/s is caught by another fieldsman at a height of 1 m from the ground. Find the distance between the two players.	**12**	**L3**	**CO5**

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