CBCS SCHEME

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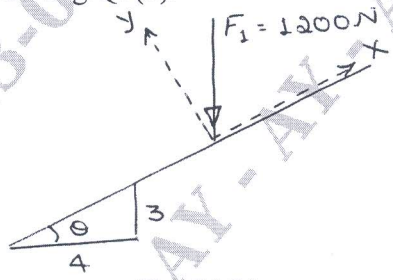
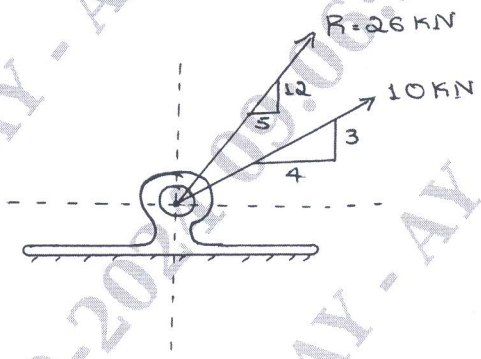
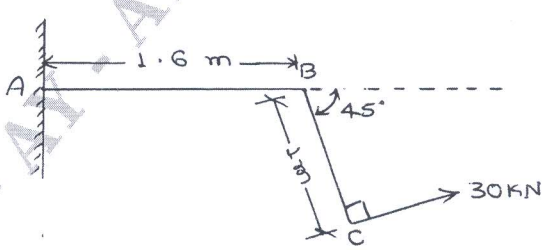
BCIVC103/203

First/Second Semester B.E./B.Tech Degree Supplementary Examination, June/July 2024

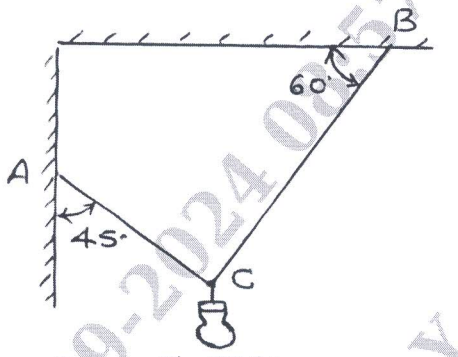
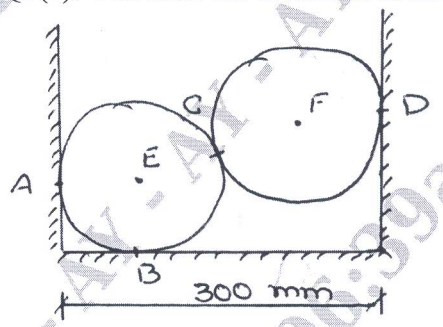
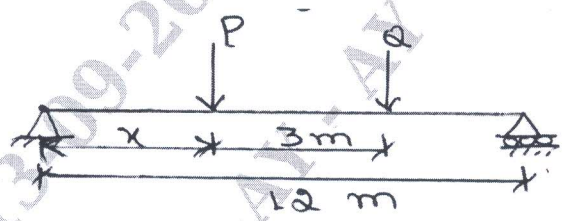
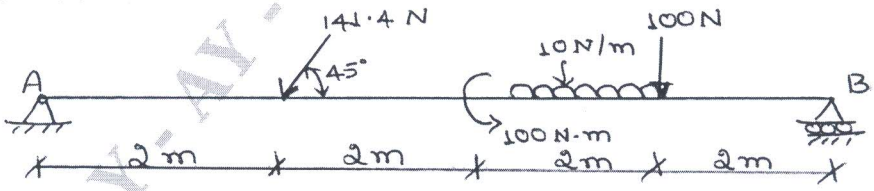
Engineering Mechanics

Time: 3 hrs. Max. Marks: 100

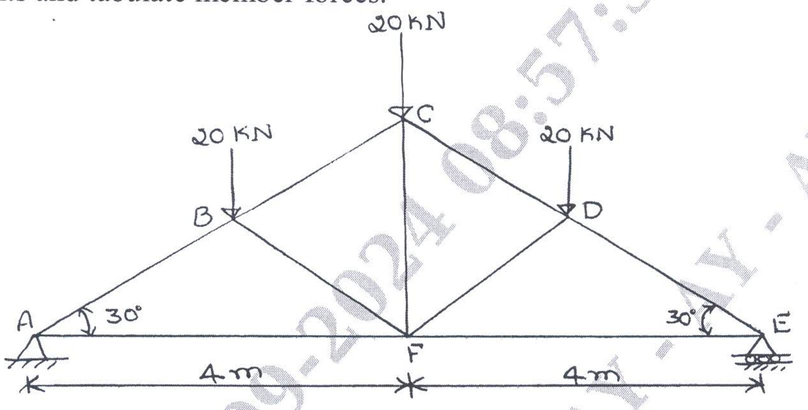
Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Missing data, if any, may be suitably assumed.

		Module – 1	M	L	C
Q.1	a.	Elaborate the concept of idealization.	6	L1	CO1
	b.	A force F_1 = 1200N is acting vertically on an incline. Find is components along x and y axes. Refer Fig.Q1(b).  Fig.Q1(b)	6	L3	CO1
	c.	The 26kN force is the resultant of two forces. One of which is as shown in Fig.Q1(c). Determine the other force.  Fig.Q1(c)	8	L3	CO1
		OR			
Q.2	a.	Explain briefly: i) Principle of transmissibility ii) Resolution of composition of forces	6	L2	CO1
	b.	Find moment of force about A and B for the 30kN force shown in Fig.Q2(b).  Fig.2(b)	6	L3	CO1
	c.	State and prove Varignon's theorem and its application.	8	L2	CO2

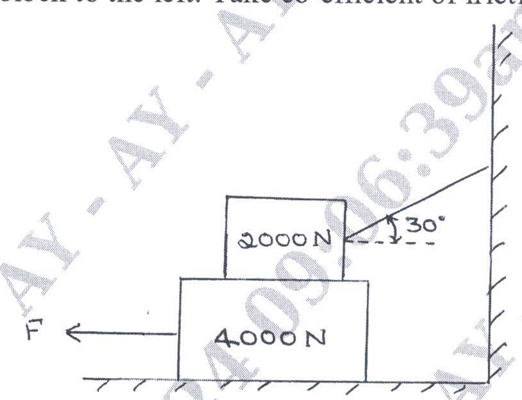
Module – 2

Q.3	**a.**	State and prove Lami's theorem.	**6**	**L2**	**CO2**
	b.	An electric bulb weighing 150N is suspended between wall and roof by two wires as shown in Fig.Q3(b). Determine the tension in the wires using Lami's theorem.  Fig.Q3(b)	**6**	**L3**	**CO2**
	c.	Two spheres each of radius 100mm and weight 5kN are in a rectangular box as shown in Fig.Q3(c). Calculate the reactions at all points of contact.  Fig.Q3(c)	**8**	**L3**	**CO2**
		OR			
Q.4	**a.**	Explain types of loads and supports.	**6**	**L1**	**CO2**
	b.	Determine the distance 'x' of the load 'P' from the support A, if the reaction R_A is twice as great as reaction R_B. Take P = 2 kN, Q = 1 kN. Refer Fig.Q4(b).  Fig.Q4(b)	**6**	**L3**	**CO2**
	c.	Determine the reactions at 'A' and 'B' for the loaded beam shown in Fig.Q4(c).  Fig.Q4(c)	**8**	**L3**	**CO2**

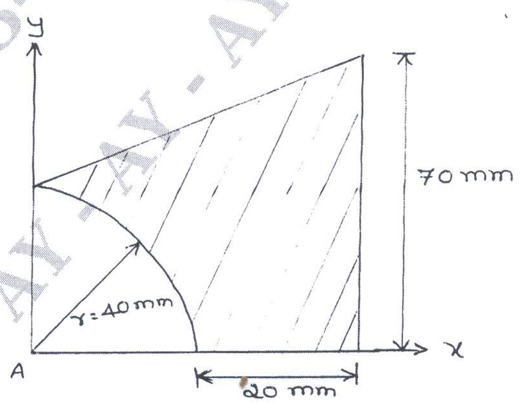
Module – 3

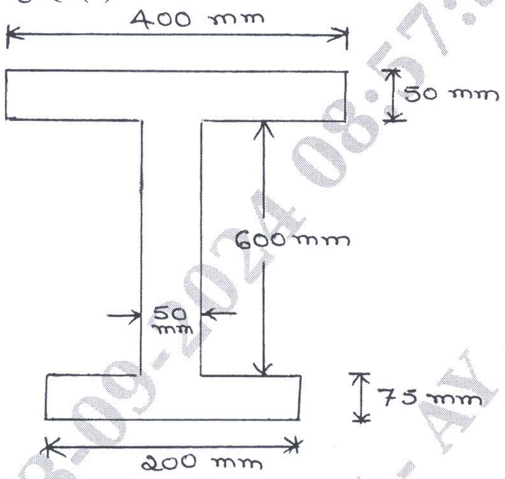
Q.5	**a.**	Explain different types of Trusses.	6	L1	CO3
	b.	Find forces in members of king post truss shown in Fig.Q5(b) using method of joints and tabulate member forces.  Fig.Q5(b)	14	L3	CO3

OR

Q.6	**a.**	State Laws of Friction.	6	L1	CO3
	b.	A block weighting 4000N is resting on a horizontal surface, it supports another block of 2000N as shown in Fig.Q6(b). Find the horizontal force F just to move the block to the left. Take co-efficient of friction as 0.2.  Fig.Q6(b)	14	L3	CO3

Module – 4

Q.7	**a.**	Derive the expression for Centroid of a semicircle from first principle.	8	L3	CO4
	b.	Locate the Centriod of lamina shown in Fig.Q7(b), with respect to point 'A'.  Fig.Q7(b)	12	L3	CO4

		OR			
Q.8	**a.**	State and prove parallel axes theorem.	**8**	**L3**	**CO4**
	b.	Find the M.I. along the horizontal axis passing through the centriod of the section shown in Fig.Q8(b).  Fig.(b)	**12**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	A stone is thrown vertically upwards and returns to the earth in 10 secs. What was its initial velocity and how high did it go?	**10**	**L3**	**CO5**
	b.	Two cars P and Q accelerater from a standing start. The acceleration of 'P' is 1.3m/sec^2 and that of 'Q' is 1.6m/sec^2. If 'Q' was originally 6m behind 'P', how long it takes to overtake 'P'?	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	State and explain D'Alembert's principle and its applications.	**8**	**L2**	**CO5**
	b.	A car travelling at a speed of 75 kmph applier brake and comes to a half after skidding 60m. Determine : i) The deceleration ii) Time to stop the car iii) Co-efficient of friction between road and tyres.	**12**	**L3**	**CO5**

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