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CBCS SCHEME

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BCIVC103/203

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026
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
Q.1	a.	State and explain basic idealization in mechanics.	8	L1	CO1
	b.	A dam is subjected to various loads as shown in Fig. Q1(b). Find the magnitude , direction and point of application of the resultant from O.	12	L3	CO1

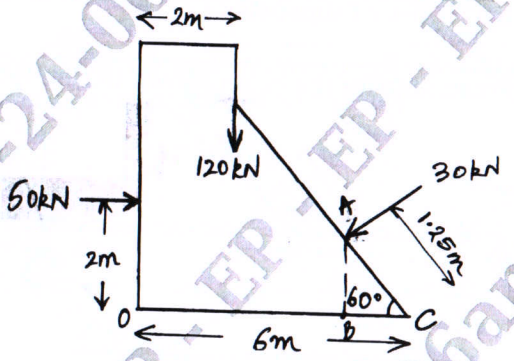

Fig. Q1(b)

OR

Q.2	a.	State and prove Varignon's Theorem of moments.	8	L2	CO1
	b.	Determine the magnitude and direction of "P" for the system shown in Fig. Q2(b). Three coplanar forces are acting at a point. One of the forces is unknown. The resultant has a magnitude of 500 N and is acting along x – axis.	12	L3	CO1

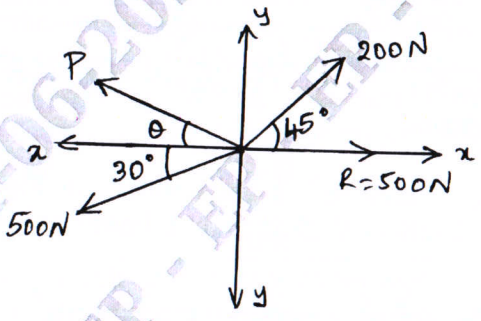

Fig. Q2(b)

		Module – 2			
Q.3	a.	State and prove Lami's Theorem.	6	L2	CO2

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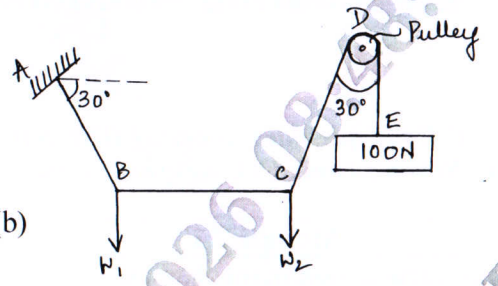
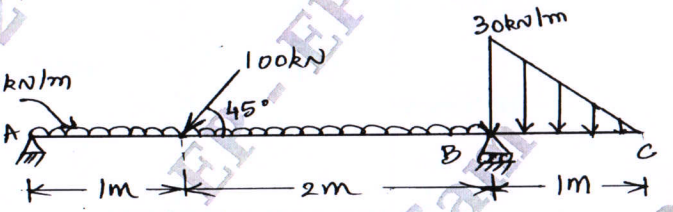
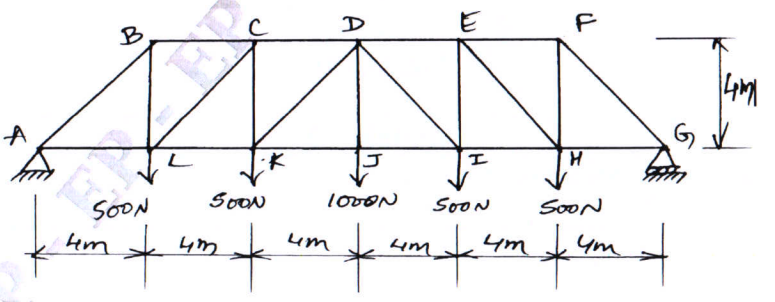
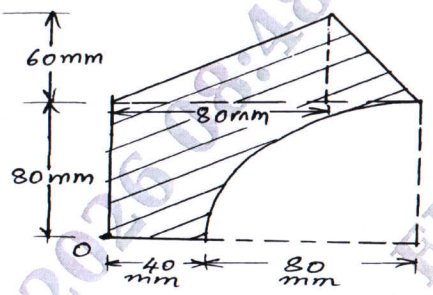
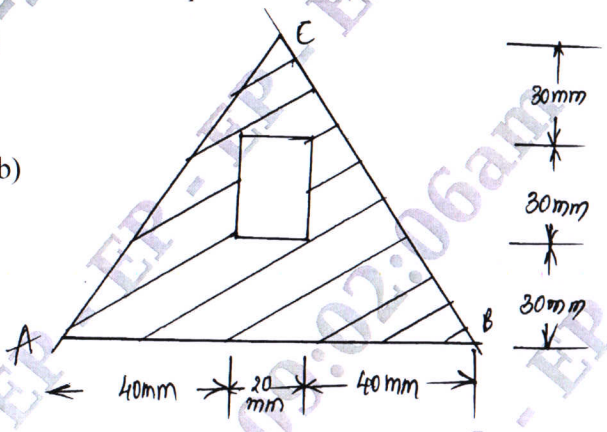
	b.	A light string ABCDE is fixed to weights W_1 and W_2 at B and C and a weight of 100 N at free end E. Portion BC of the string is horizontal and pulley is frictionless. Determine tensions in different segments of the string and also find weights W_1 and W_2 in Fig. Q3(b).  Fig. Q3(b)	14	L3	CO2
		OR			
Q.4	a.	Explain briefly with neat sketches : i) Types of loads ii) Types of supports.	6	L1	CO2
	b.	Determine the support reactions for the beam shown in Fig. Q4(b).  Fig. Q4(b)	14	L3	CO2
		Module – 3			
Q.5	a.	Describe step by step procedure for analyzing truss using method of joints.	6	L2	CO3
	b.	A ladder 4m long and weighing 200 N is placed against a vertical wall as shown. The coefficient of friction between ladder and floor is 0.3 and that between ladder and wall is 0.25. The ladder in addition to its own weight supports a person weighing 600 N at a distance of 3 m from the floor along the ladder. Calculate the minimum force 'P' to be applied horizontally at the floor level on the ladder to keep it in equilibrium.	14	L3	CO3
		OR			
Q.6	a.	Define : i) Angle of friction ii) Coefficient of friction iii) Cone of friction.	6	L1	CO3
	b.	Determine the member forces in the truss shown in Fig. Q6(b) in the following members : Member CD , KD , KJ , DJ and DI.  Fig. Q6(b)	14	L3	CO3

		Module – 4			
Q.7	**a.**	State and prove Parallel axis theorem.	**6**	**L2**	**CO4**
	b.	Determine the centroid of the shaded area of Fig. Q7(b) with respect to origin O.  Fig. Q7(b)	**14**	**L3**	**CO4**
		OR			
Q.8	**a.**	Derive the expression for centroid of semi – circle from first principles.	**6**	**L2**	**CO4**
	b.	Find the moment of inertia and radius of gyration of the area shown in Fig. Q8(b) about centroidal axis parallel to AB.  Fig. Q8(b)	**14**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	State D'Alembert's principle and write its significance.	**6**	**L2**	**CO5**
	b.	A cricket ball is thrown by a fielder in the ground from a height of 3m at an angle of 40° with horizontal. The velocity with which the ball is thrown is 30m/sec. The ball hits the wicket at a height of 0.3m from ground. Determine the distance of the fielder from the wicket when the ball is thrown.	**14**	**L3**	**CO5**
		OR			
Q.10	**a.**	Two Cars P and Q accelerates from a standing start. The acceleration of P is 1.3 m/sec^2 and that of Q is 1.6 m/sec^2. If Q was originally 6m behind P, how long does it take to overtake P?	**6**	**L3**	**CO5**
	b.	A stone 'A' is dropped from top of a tower of 50 m height. At the same time another stone 'B' is thrown up from the foot of the tower with a velocity of 25 m/s. At what distance from the top and after how much time the two stones will cross each other?	**14**	**L3**	**CO5**

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