Model Question Paper- I

CBCS SCHEME

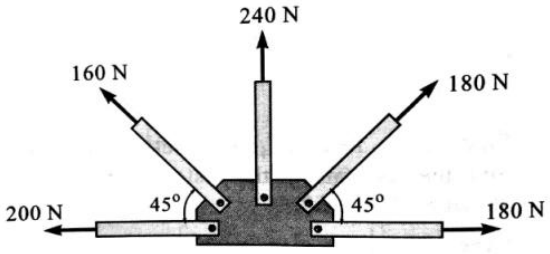
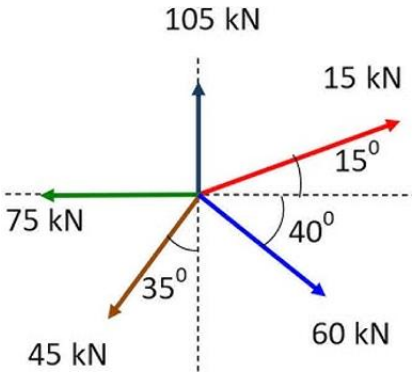
First/ Second Semester B.E Degree Examination,

ENGINEERING MECHANICS (1BCIV105/205)

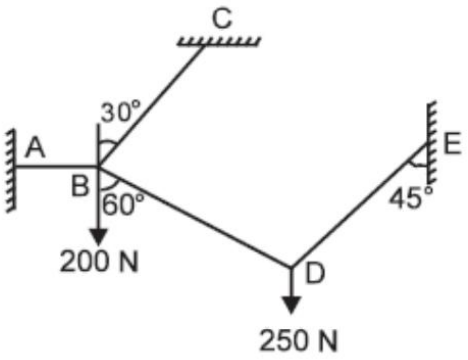
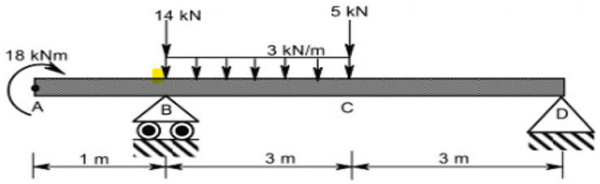
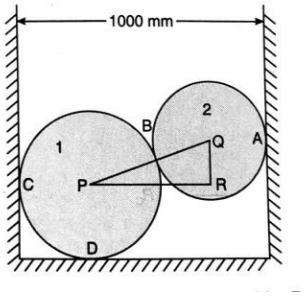
MAX TIME: 03 Hours **Max.Marks:100**

Note:

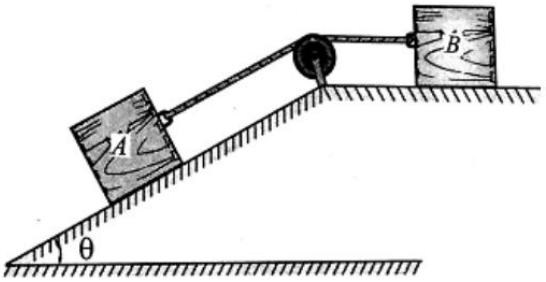
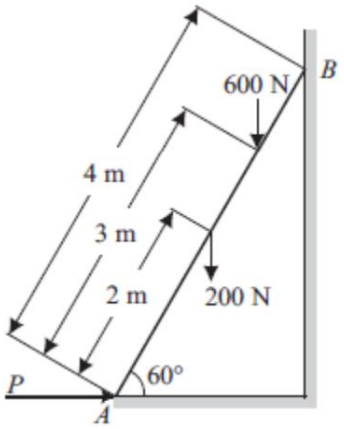
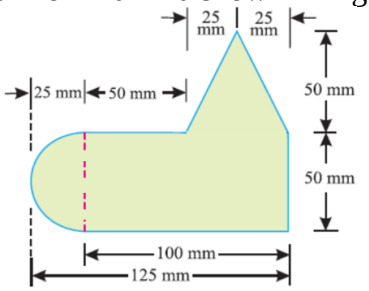
1. *Answer any FIVE full questions, choosing at least ONE question from each MODULE.*
2. *M: Marks, L: Bloom's level, C: Course outcomes.*
3. *Assume the missing data, if any and indicate clearly.*

		Module – 1	M	L	C
Q.1	a	Explain the principle of transmissibility of a force with neat sketch.	8	2	1
	b	The resultant of the two forces, when they act at an angle of 60^o is 14N. If the same forces are acting at right angles, their resultant is $\sqrt{137}$ N. Determine the magnitude of the two forces.	7	3	2
	c	How do you classify the force system? Discuss with neat sketches.	5	2	1
		OR			
Q.2	a	A gusset plate of a roof truss is subjected to forces as shown in Fig.2(a). Determine the resultant force.  Fig.2(a)	8	3	2
	b	Identify the system of force from Fig.2(b) and find the resultant of force system.  Fig. 2(b)	7	3	2
	c	Discuss the basic idealizations in engineering mechanics.	5	2	1
		Module – 2			

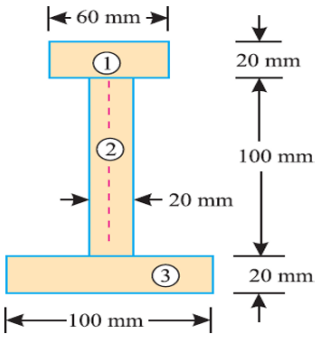
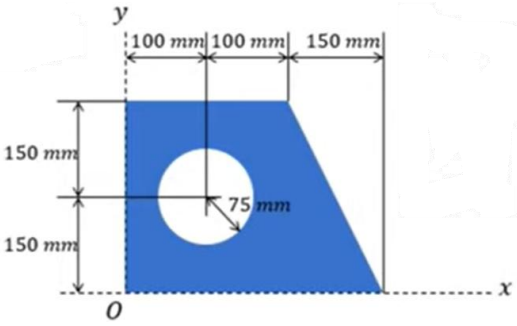
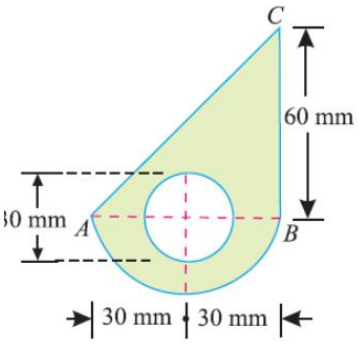
Model Question Paper- I

Q.3	a	Explain the importance of free body diagram in engineering mechanics.	08	2	1
	b	A system of connected flexible cables shown in Fig.3(b) is subjected to two vertical forces 200 N and 250 N at points B and D. Determine the forces in various segments of the cable.  Fig.3(b)	12	3	2
		OR			
Q.4	a	A beam ABCD is supported by a roller at B and hinged at D, loaded as shown in Fig.4(a). Compute the reactions at B and D.  Fig.4(a).	08	3	2
	b	A horizontal shaft with inner clearance of 1000 mm carries two spheres of radius 350 mm and 250 mm, weighing 600N and 500N respectively are shown in the Fig. 4(b). Determine the reaction at all the points of contact.  Fig.4(b)	12	3	2
		Module – 3			
Q.5	a	Explain the following with sketches. (a) Limiting force of friction (b) Kinetic friction (c) Coefficient of friction (d) Angle of friction (e) Angle of repose	10	2	1
	b	A body, resting on a rough horizontal plane, required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction.	10	3	3
		OR			

Model Question Paper- I

Q. 6	a	Find the value of 'Θ' if the blocks 'A' and 'B' shown in Fig.6(a) have impending motion up and down the plane. Given the weights of block A = 20 kg and block B = 20 kg. Assume that $\mu_A = \mu_B = 0.25$.  Fig.6(a)	8	3	3
	b	A ladder of length 4 m, weighing 200 N is placed against a vertical wall as shown in Fig.6(b). The coefficient of friction between the wall and the ladder is 0.2 and that between floor and the ladder is 0.3. The ladder, in addition to its own weight, has to support a man weighing 600 N at an inclined distance of 3 m from A. Calculate the minimum horizontal force to be applied at A to prevent slipping.  Fig.6(b)	7	3	3
Module – 4					
Q.7	a	Establish a relation for the position of centroid in terms of radius R for a semi-circular lamina by the method of integration.	10	2	4
	b	Locate the centroid of a uniform lamina shown in Fig.7(b).  Fig.7(b)	10	3	4
OR					
Q.8	a	An I-section is made up of three rectangles as shown in Fig.8(a). Find the Second moment of area of the section about the horizontal axis passing through the center of gravity of the section.	10	2	4

Model Question Paper- I

		 Fig.8(a)			
	b	Locate the position of centroid of the lamina with circular cutout as shown in Fig. 8(b).  Fig. 8(b)	10	3	4
		Module – 5			
Q.9	a	Establish a relation for moment of inertia of quarter of a circle of radius R about centroidal axes.	10	2	4
	b	Find the moment of inertia of the lamina with a circular cut out of 30 mm diameter about the axis AB as shown in Fig.9(b).  Fig.9(b)	10	3	4
		OR			
Q.10	a	Discuss the applications of perpendicular axes theorem and radius of gyration.	10	2	4
	b	A rectangular hole is made in a triangular section as shown in Fig.10(b). Determine the moment of inertia of the section about X-X axis passing through its center of gravity and the base BC.	10	3	4

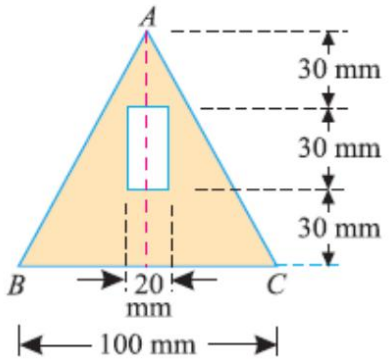


Fig.10(b)

* * *