Model Question Paper

ELEMENTS OF CIVIL ENGINEERING AND ENGINEERING MECHANICS

(14CIV13/14CIV23)

Time: 3 hrs.		Max. Marks: 100

Note: Answer any FIVE full questions, choosing one full question from each module.

		MODULE 1	
1)	a.	Briefly explain the scope of any four fields of civil engineering.	(10 Marks)
	b.	Resolve 400 N force acting on a block as shown in fig 1(b) i) into horizontal and vertical components ii) Along the inclined plane and right angles to the plane.	(10 Marks)
		OR	
2)	a.	Write shorts on : i) Shoulders ii) Kerbs iii) Traffic separators iv) Subgrade	(10 Marks)
	b.	Explain different type of force systems?	(10 Marks)
		MODULE 2	
3)	a.	Two forces of 800 N and 600 N act at a point as shown in fig 3(a). The resultant of the two forces is 1200 N. Determine the angle between the forces and the direction of the resultant.	(10 Marks)
	b.	Determine the resultant of the forces acting on a body as shown in fig 3(b).	(10 Marks)
		OR	
4)	a.	26kN force is the resultant of the two forces, one of which is as shown in fig 4(a). Determine the other force.	(10 Marks)
	b.	State and prove Varignon's theorem of moments.	(10 Marks)
		MODULE 3	
5)	a.	State and prove Lami's theorem.	(8 Marks)

	b.	Find the forces in all the members of the truss loaded as shown in fig 5(b). Tabulate the results.	(12 Marks)
		OR	
6)	a.	Determine the reactions at contact points for the spheres A,B and C as shown in Fig 6(a). It is given that WA = WB, WC = 6kN, dA = dB = 500 mm, dC = 800 mm.	(10 Marks)
	b.	What is the Value of 'P' in the system shown in fig 6(b) to cause the motion to impend to the left? Assume the pulley is smooth and co-efficient of friction between the other contact surfaces is 0.20.	(10 Marks)
		MODULE 4	
7)	a.	Determine the centroid of a semi-circular lamina of Radius "R" by the method of integration.	(8 Marks)
	b.	Calculate the polar moment of inertia of the shaded area as shown in Fig 7(b).	(12 Marks)
		OR	
8)	a.	Determine the centroid of the section of the concrete dam as shown in fig 8(a).	(8 Marks)
	b.	Determine the moment of inertia of a triangle of base width 'b' and height 'h' about its base. Also determine the moment of inertia about the centroidal axis parallel to the base.	(12 Marks)
		MODULE 5	
9)	a.	What is a Projectile? Define the following terms briefly: (*i*) Angle of projection, (*ii*) Horizontal Range, (*iii*) Vertical Height and (*iv*) Time of flight.	(10 Marks)
	b.	A Burglar's car starts an acceleration of 2 m/s^2. A police vigilant party came after 5 s and continued to chase the Burglar's car with a uniform velocity of 20 m/s. Find the time taken in which the police van will overtake the car.	(10 Marks)
		OR	
10)	a.	What is a Centrifugal Force? What is Super elevation?	(4 Marks)

	b.	Determine the position at which the ball is thrown up the plane will strike the inclined plane as shown in Figure 10(b). The initial velocity is 30 m/s and angle of projection is $\tan^{-1}(4/3)$ with horizontal.	(8 Marks)
	c.	A stone is dropped from the top of the tower 50 m high. At the same time another stone 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 cross each other.	(8 Marks)

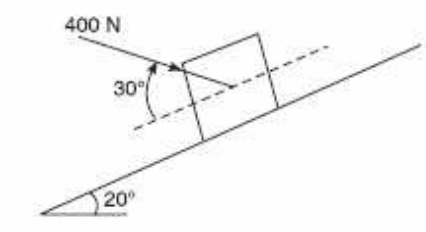

Figure 1(b)

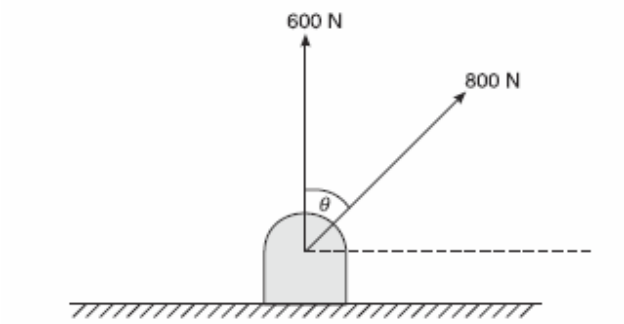

Figure 3(a)

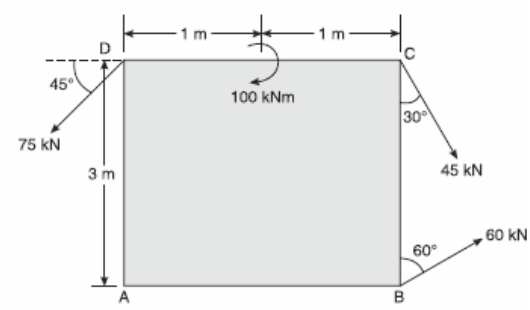

Figure 3(b)

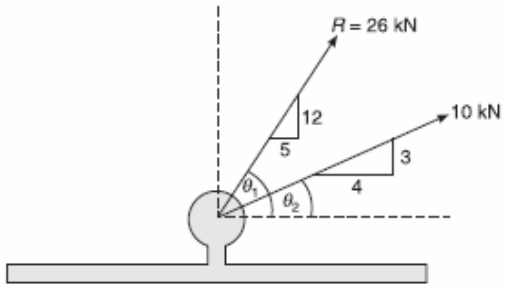

Figure 4(a)

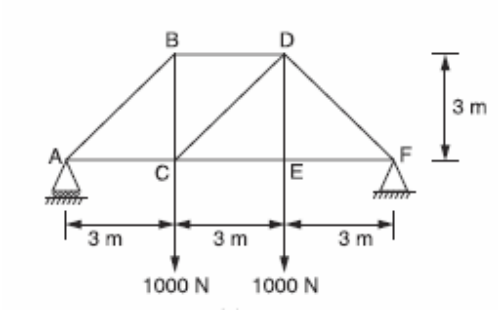

Fig**5**(b)

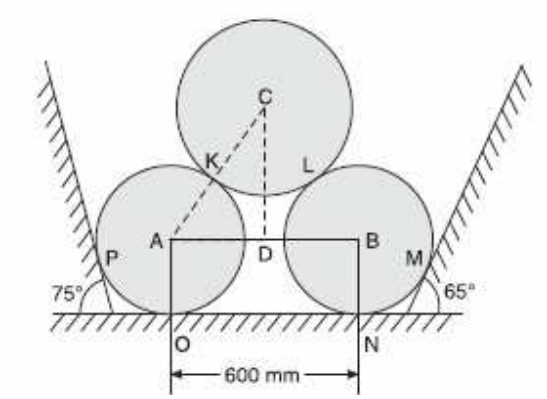

Fig6(a)

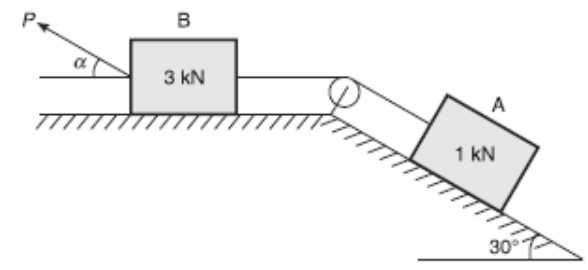

Fig6(b)

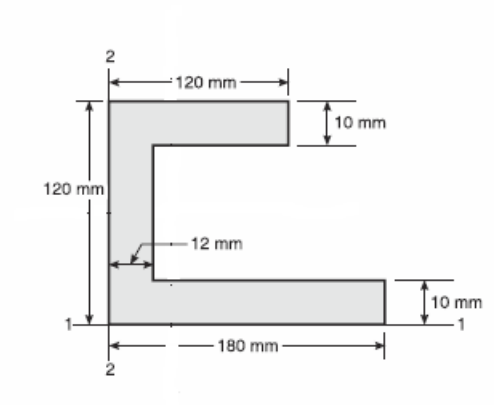

Fig7(b)

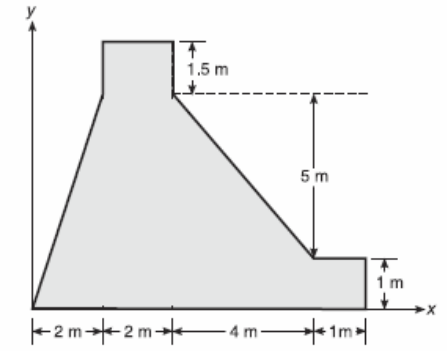

Fig 8(a)

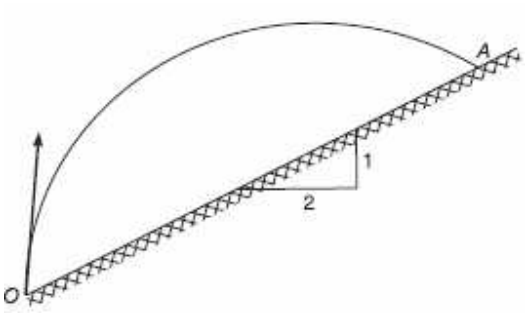

Fig 10(b)