

I B. Tech I Semester Regular Examinations, January, 2015
Engineering Mechanics
(Common to ME and CE)

Time: 3 hours

Max Marks: 70

PART – A

Answer ALL questions. All questions carry equal marks

2 * 10 = 20 Marks

- 1). a What is meant by Free Body Diagram? What are its advantages? [2]
- b State Laws of Static Friction. [2]
- c Describe the various methods of finding out the centre of gravity of a body. [2]
- d Where does the centre of gravity of the following section lies? [2]
 (i). Semicircle, (ii) Trapezium, (iii) Hemisphere and (iv) Right Circular Solid Cone
- e Define the terms: moment of inertia and radius of gyration. [2]
- f Explain the parallel axis theorem, as applied to moment of inertia. [2]
- g Write an expression for the moment of inertia of a circular ring of uniform cross section of radius 'R' about its diametrical axis [2]
- h Define angle repose and Show that the angle of repose is equal to the angle of friction. [2]
- i What is the Truss? State the difference between a perfect and an imperfect Trusses. [2]
- j What are the applications of the principle of virtual work. [2]

PART – B

Answer any FIVE questions. All questions carry equal marks

10 * 5 = 50 Marks

2. a). Two spheres, of each of weight 1000 N and radius of 25 cm rest in horizontal channel of width 90 cm as shown in fig 1. Find the reactions on the points of contact A, B and D [8]

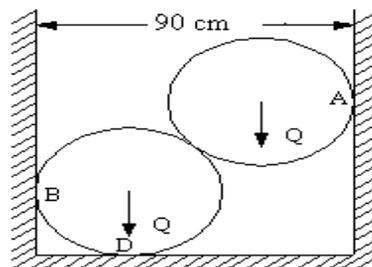


Fig:1

- b). State and explain the theorem of Varignon. [2]

3. Find the centroid of the shaded figure shown in Fig:2 [10]

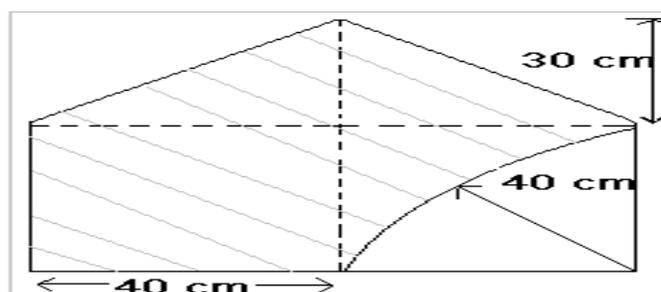


Fig:2

4. Find the moment inertia of the section shown in fig.3 about the centroidal axis perpendicular to the web [10]

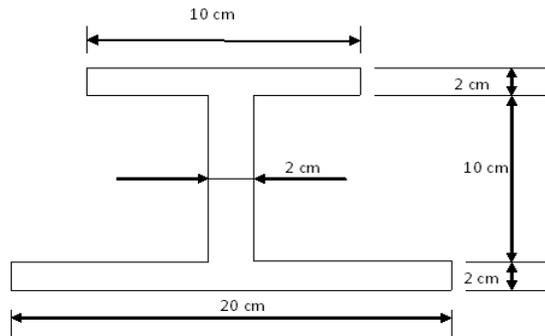


Fig:3

5. a).Find the Mass moment of inertia of a circular plate of radius “R” and thickness ‘t’ about its centroidal axis. [5]
 b).Find the Mass moment of inertia of a rectangular plate of size **a x b** and thickness ‘t’ about its centroidal axis. [5]
6. A truss of span 9 m is loaded as shown in fig 4. Find the reactions and forces in the members of the truss. [10]

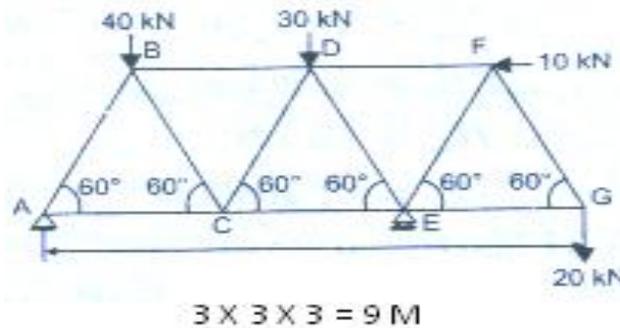


Fig:4

7. Determine the vertical reaction developed at a supports A & B in the beam as shown fig.5 [7]

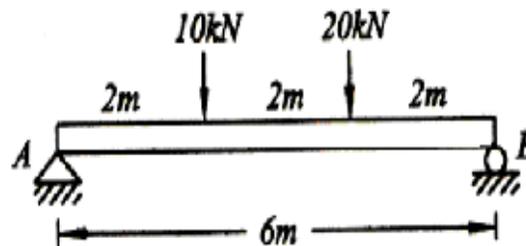


Fig:5

- b). State the principle of virtual work and explain how it can be used in solving the problems. [3]
8. a). Explain the following terms: [4]
 (i) Angle of Friction, (ii) Co-efficient of Friction and (iii) Cone Friction
- b). Find the force required to drag a body of weight W, placed on a rough inclined plane having inclination ‘ α ’ to the horizontal. The force P is applied to the body horizontally and the body is (a) on the point of motion up the plane, and (b) on the point of motion down the plane. [6]