PVP 12

Code: **AE1T3,ME1T4**

I B.Tech-I Semester – Regular Examinations-February 2014

ENGINEERING MECHANICS-I

(Common for AE and Mechanical)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) State and prove lami's theorem. 6 M

b) Two spheres each of weight 1000N and radius 25 cm rest in a horizontal channel of Width 90 cm as shown in Figure1(b) .Find the reactions at the points of contact A, B, C and D. 8 M

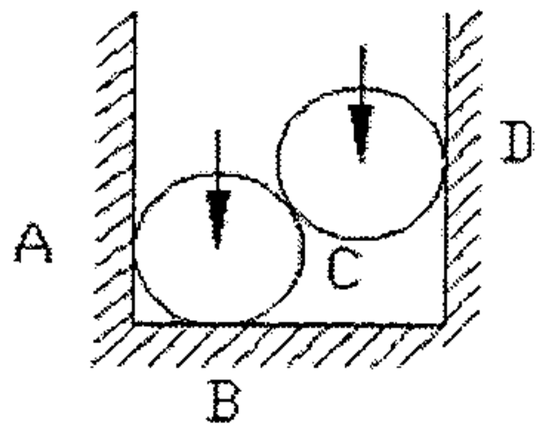

Figure 1(b)

2 a) A beam simply supported at both the ends carries load system as shown in Figure 2(a). Find the reactions at the two ends. 7 M

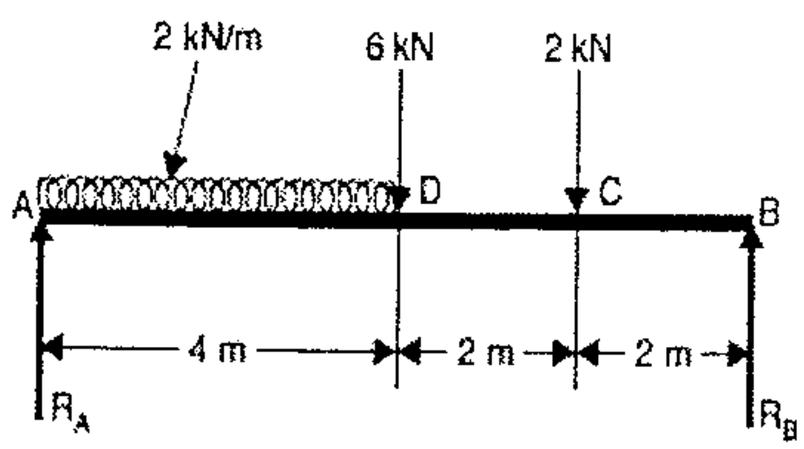

Figure 2 (a)

b) Find the reactions R_1, R_2, R_3 in the case of two beams placed one over the other and loaded as shown in Figure 2 (b). 7 M

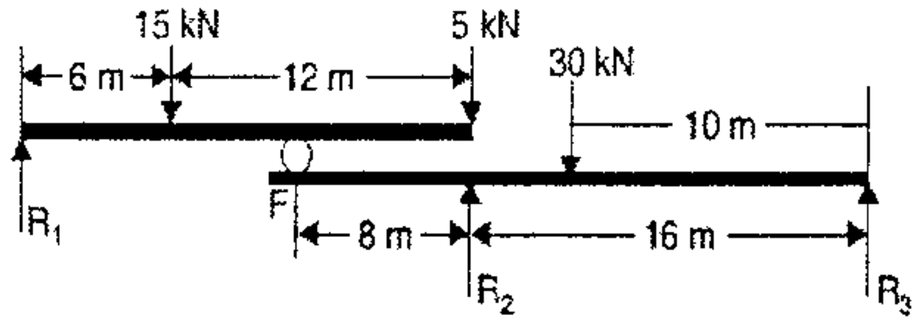

Figure 2 (b)

3 a) Determine the Resultant of the concurrent force system acting at a point O as shown in Figure 3(a). 6 M

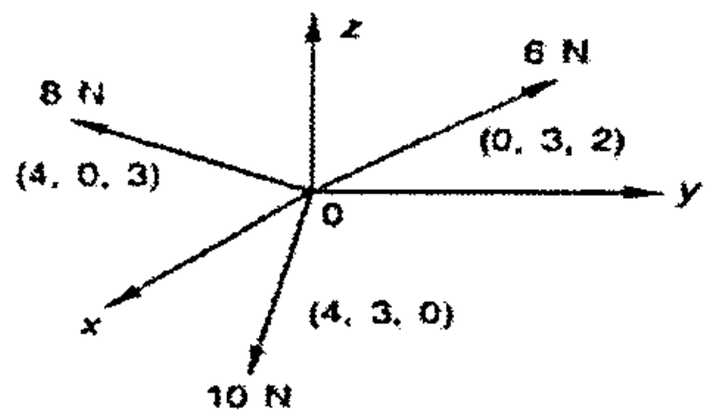

Figure 3 (a)

b) In the system shown in figure 3(b) it is found that the force multiplier of force F acting from B to D is F_m =225 N/m and that of force P acting from A to E is P_m = 150 N/m.
Find: (i) The component of each force. 8 M
(ii) What angle does each force make with AC?

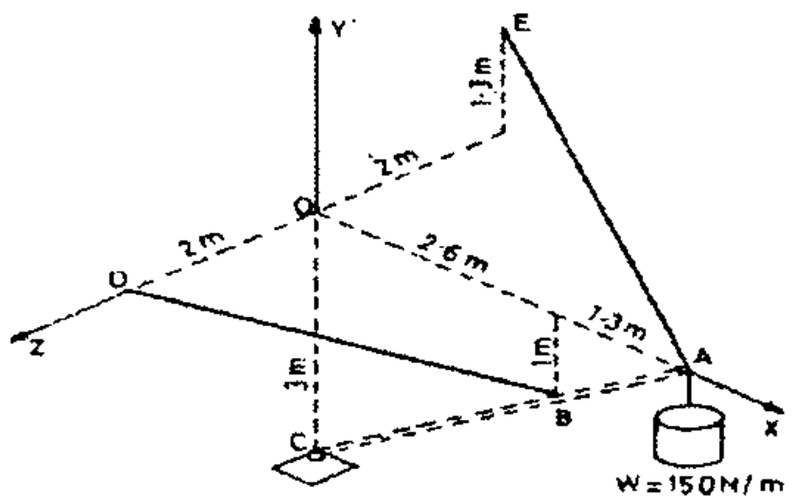

Figure 3 (b)

4 a) Explain pappus theorem. 4 M

b) A body consists of a right circular solid cone of height 18 cm and radius 15 cm placed on a solid hemisphere of radius 15 cm of the same material. Find the position of C.G 10 M

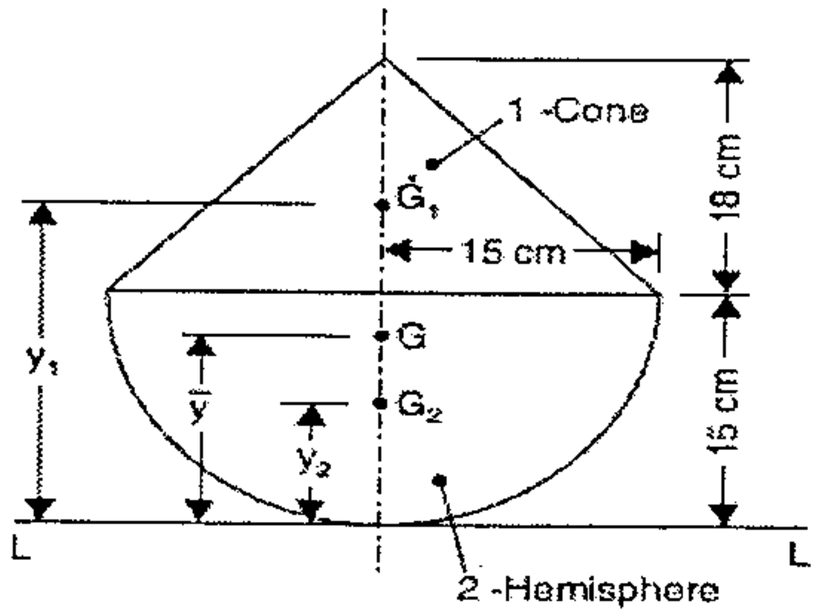

Figure 4 (b)

5 a) Define moment of inertia, polar moment of inertia and radius of gyration. 6 M

b) Determine the moment of inertia of the area about the horizontal axis passing through the centroid. 8 M

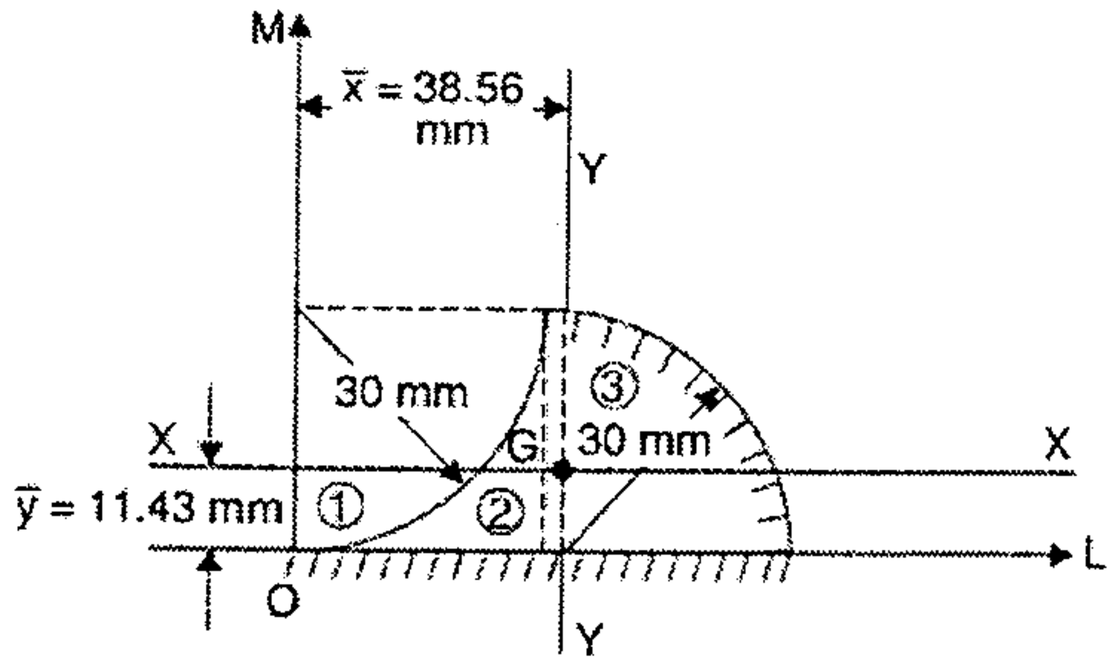

Figure 5(b)

6 a) State the assumptions in the analysis of plane truss. 4 M

b) The simple triangular truss supports two loads as shown in figure 6(b). Determine the forces in each member. 10M

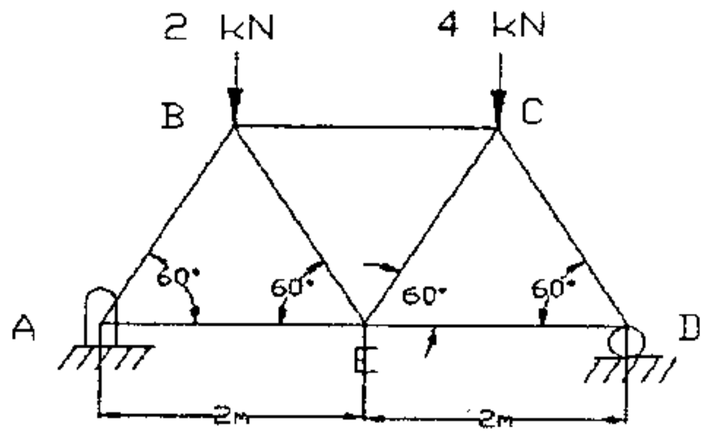

Figure 6 (b)

7 a) Define cone of friction, angle of repose. 4 M

b) A block A weighing W Newtons is placed on a rough Inclined plane having $\mu = 0.2$ and is held in position by means of a horizontal rod hinged to the block B which presses against a rough vertical wall having $\mu = 0.4$ as shown in figure 7(b). If the block B weighs 500 N, find the minimum value of W consistent with equilibrium. **10 M**

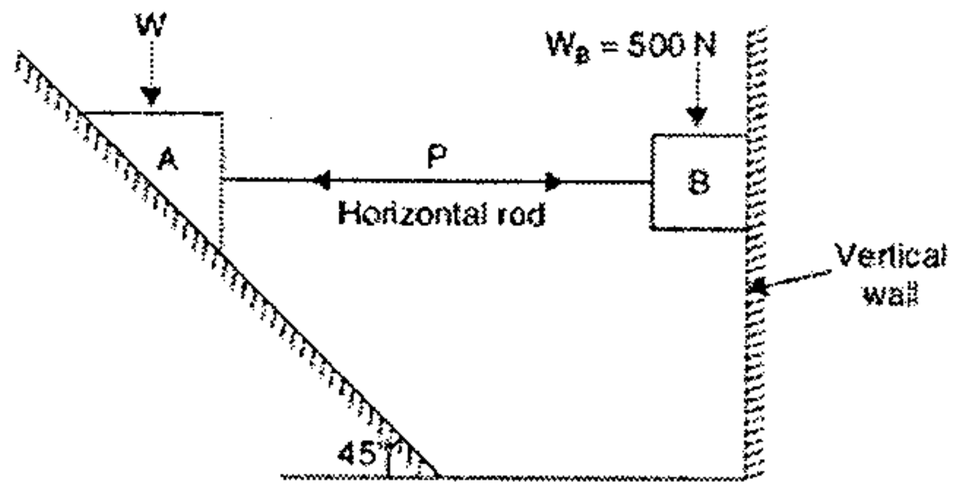

Figure 7 (b)

8 a) State and prove principle of virtual work. 10 M

b) A weight W=300 N is to be lifted by means of a force P applied to the system of two equal pulleys shown in the figure 8(b) . using method of virtual work find the force P, which can hold the weight in equilibrium. 4 M

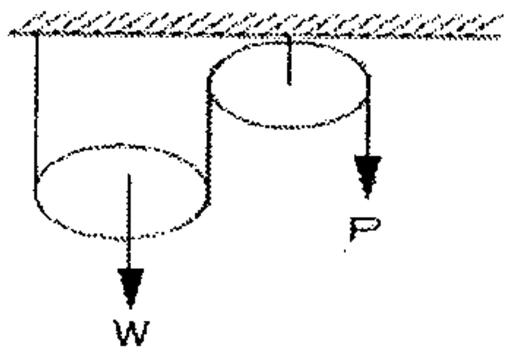

Figure 8(b)