

Code: CE2T5

I B.Tech-II Semester-Regular Examinations - July 2013

ENGINEERING MECHANICS
(For Civil Engineering)

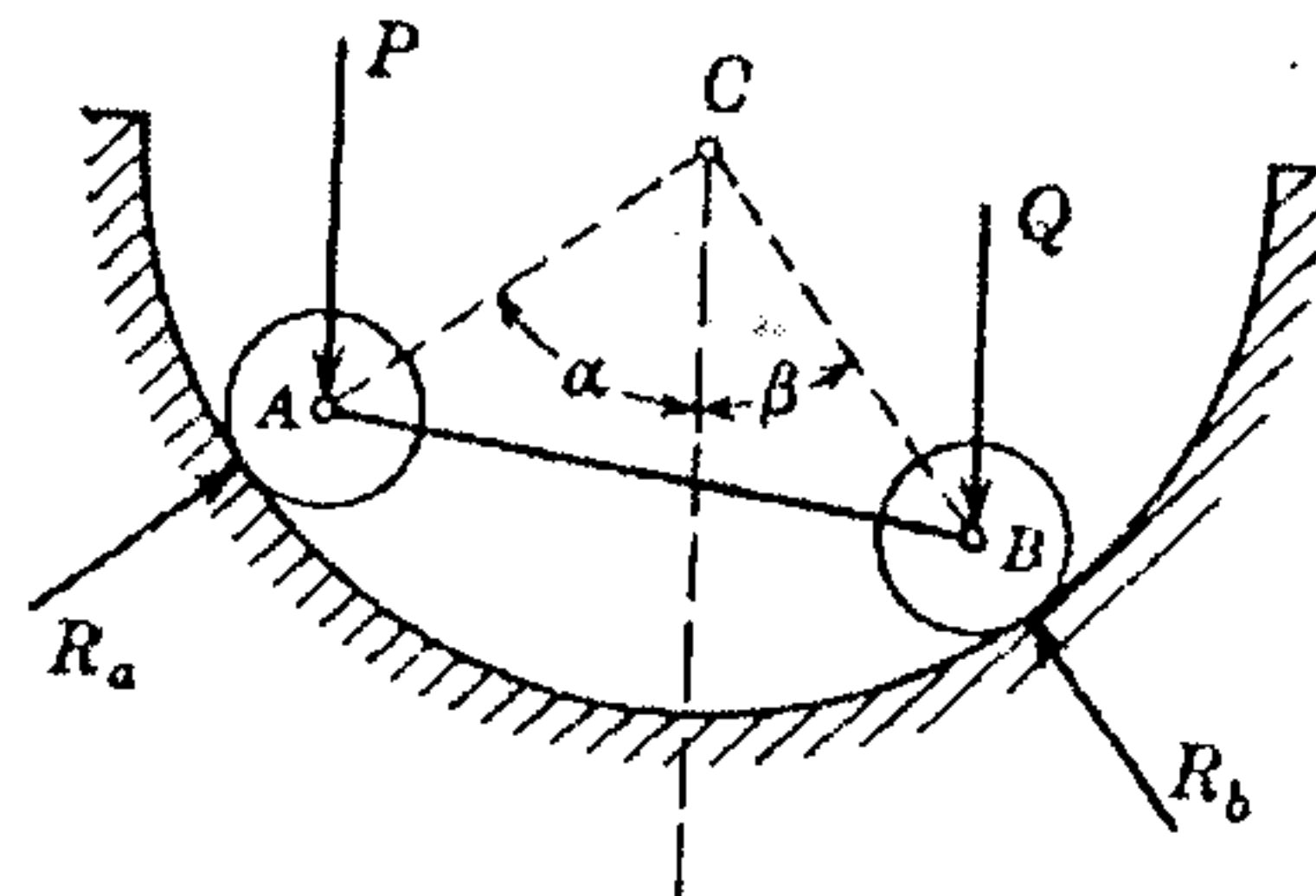
Duration: 3 hours

Marks: 5x14=70

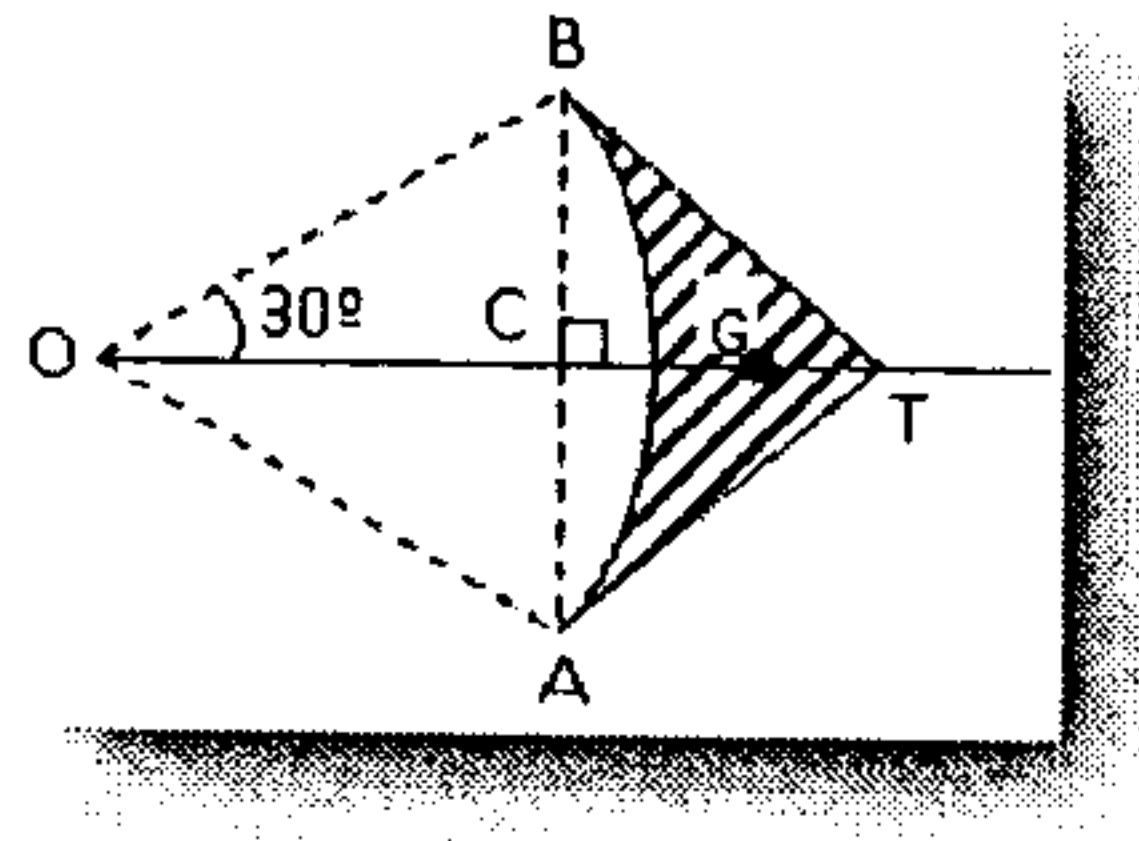
Answer any FIVE questions. All questions carry equal marks

- 1) A rigid bar AB with rollers of weights $P=50\text{ N}$ and $Q = 100\text{ N}$ at its ends is supported inside a circular ring in a vertical plane as shown in fig. The radius of the ring and the length AB are such that the radii AC and BC form a right angle at C. that is $\alpha + \beta = 90^\circ$. Neglecting friction and the weight of the bar AB find the configuration of equilibrium as defined by the angle $(\alpha - \beta) / 2$ that AB makes with the horizontal. Find also the reactions R_a and R_b and the compressive force S in the bar AB.

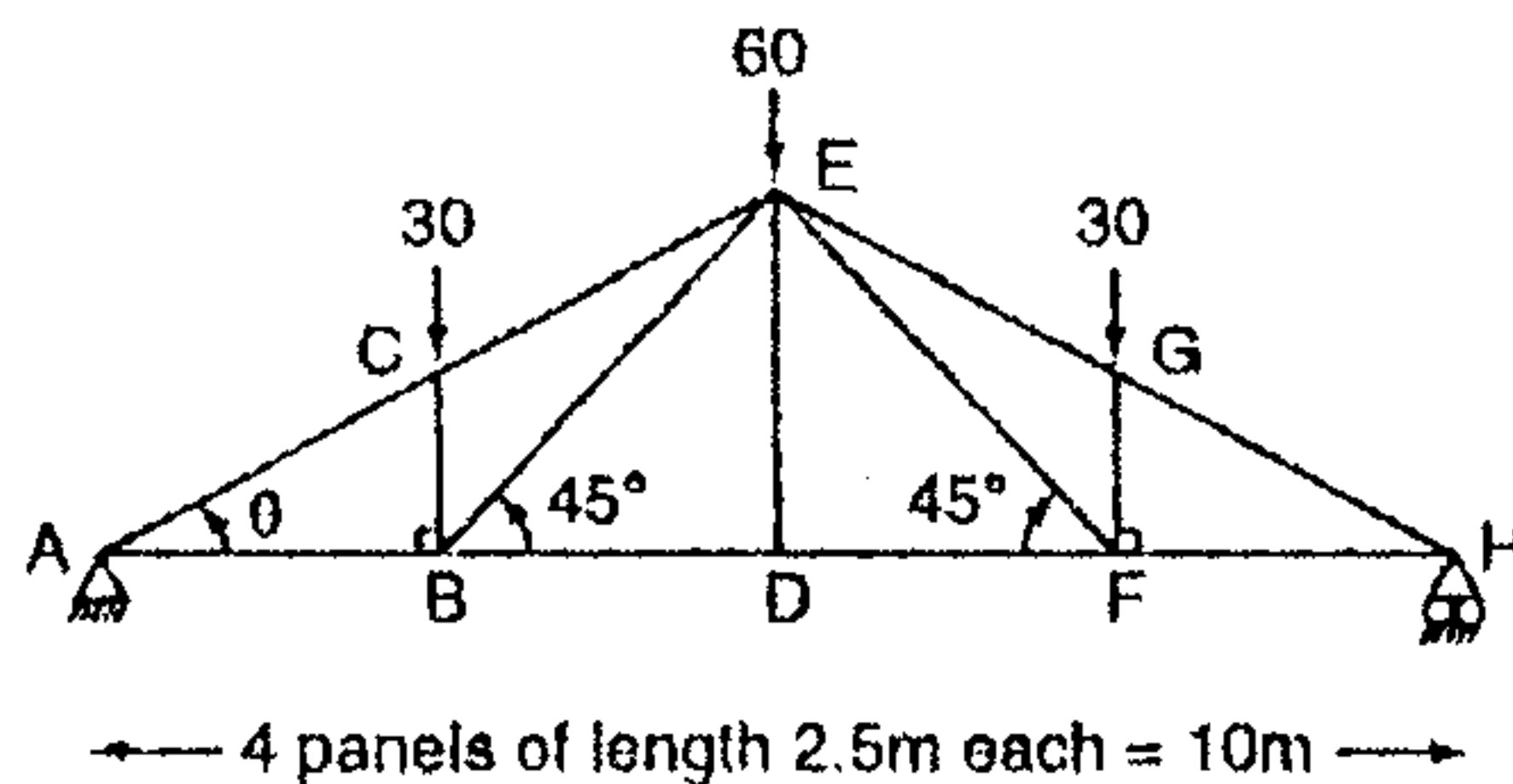
14 M



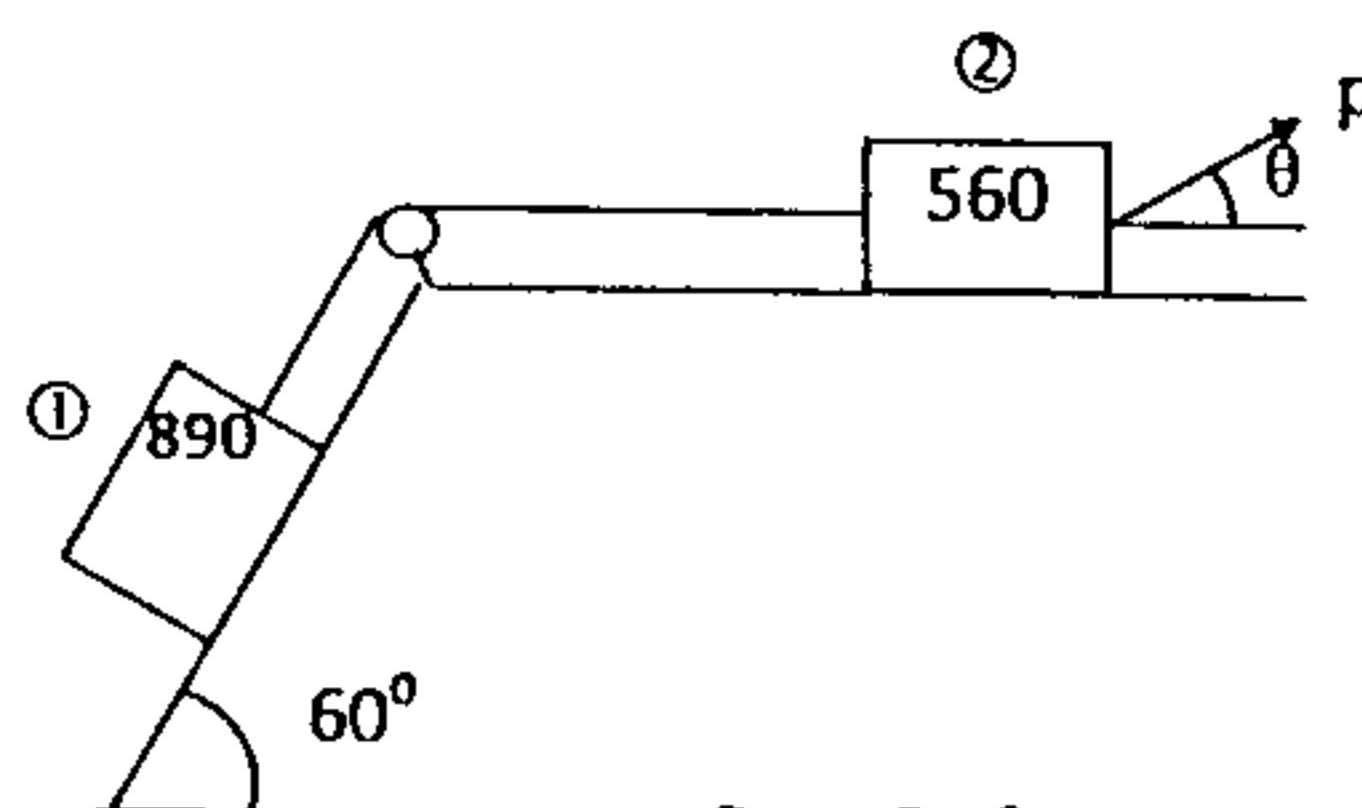
- 2) Two tangents are drawn to a circular arc of radius 100 mm subtending an angle of 60° at the center. Locate the center of gravity of the area bounded by the tangents and the arc between them. 14 M



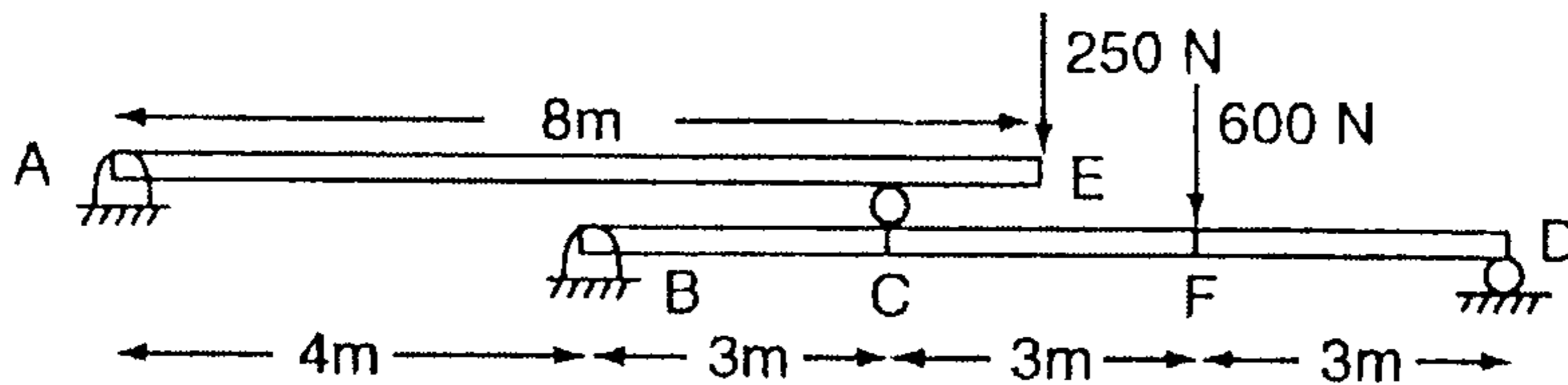
- 3) Find the forces in members for the truss shown in fig using method of joints. 14 M



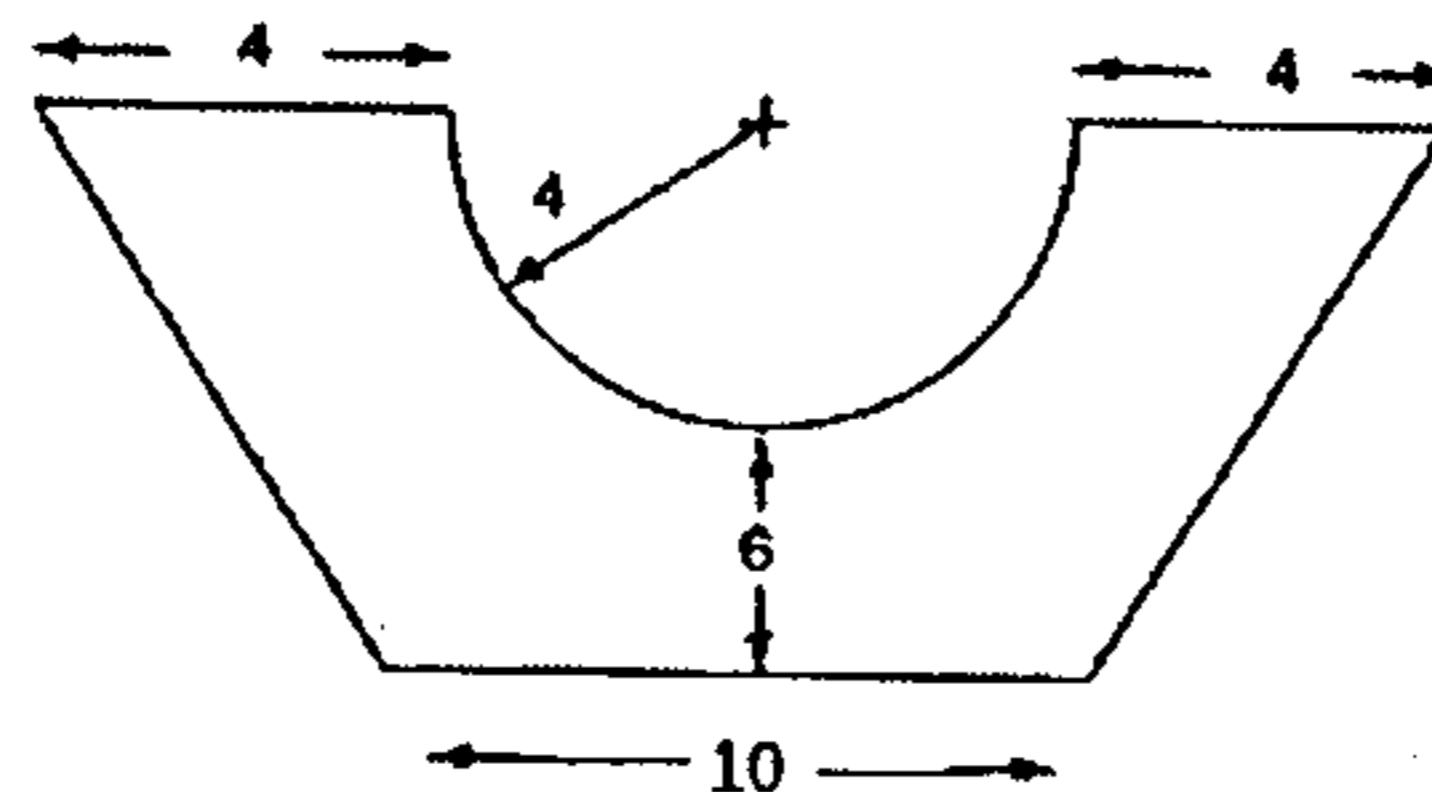
- 4) Two blocks of weight 890N and 560N are connected by a string passing over a frictionless pulley rest on rough surfaces. By assuming coefficient of friction on all contact surfaces as 0.2, Find the minimum value of force P, both in magnitude and direction, for the motion to impend. 14 M



- 5) Two beams AE and BD are supported by roller at C and D as shown in fig. Determine the reactions at the points B and D using the method of virtual work. 14 M



- 6) Find the moment of inertia of the plane area about its centroidal axis. 14 M



- 7 a) The acceleration of a particle moving along a straight line is $a = 3(V)^{2/3}$ when $t = 3s$, its displacement $S = 37.516 m$ and $V = 42.87 m/s$. Determine the displacement, velocity, acceleration when $t = 5s$. 7 M
- b) A body is dropped from an unknown height. The ratio of distances covered by the falling body in the last and penultimate second of its fall is $4/3$. Determine (1) height of the body which it is dropped, (2) the velocity with which the body will reach the ground. 7 M

8. Determine the tension in strings and acceleration of the weights for the system shown in figure.

14M

