

Code: EM1T5

I B.Tech-I Semester-Regular Examinations-February 2013

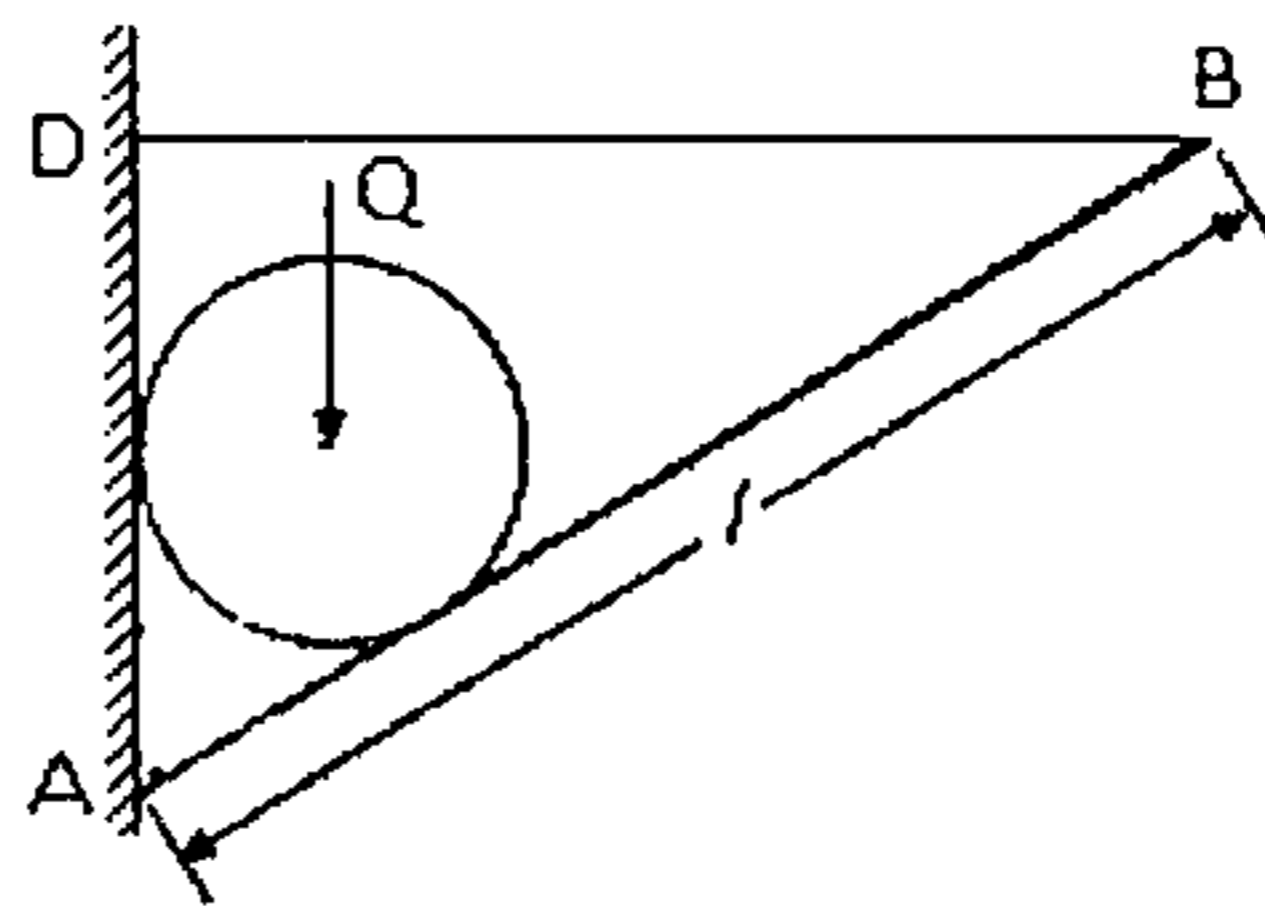
**ENGINEERING MECHANICS****(For Electronics and Computer Engineering)**

Duration: 3hours

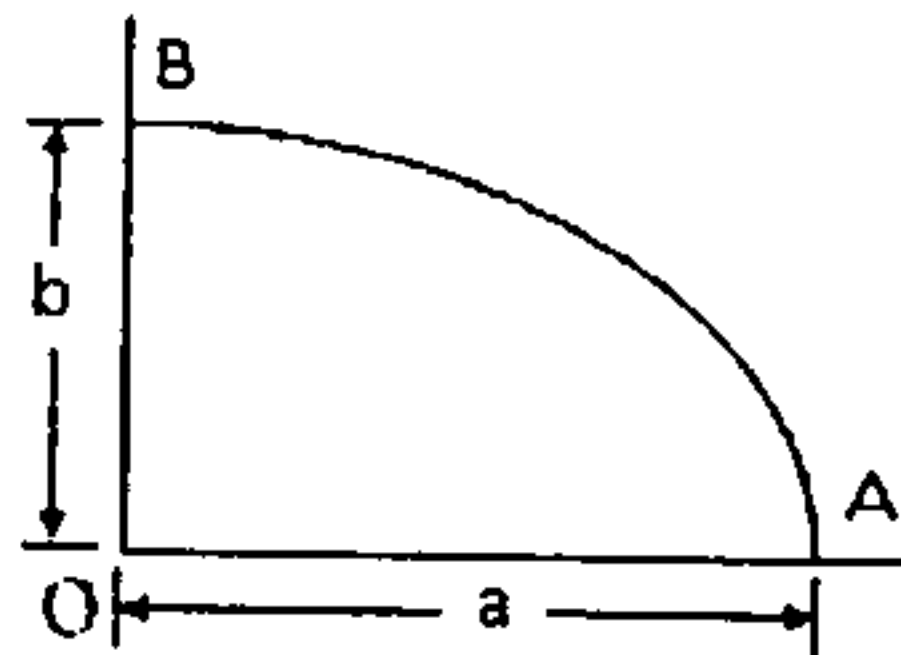
Marks:  $5 \times 14 = 70$ 

Answer any FIVE questions. All questions carry equal marks

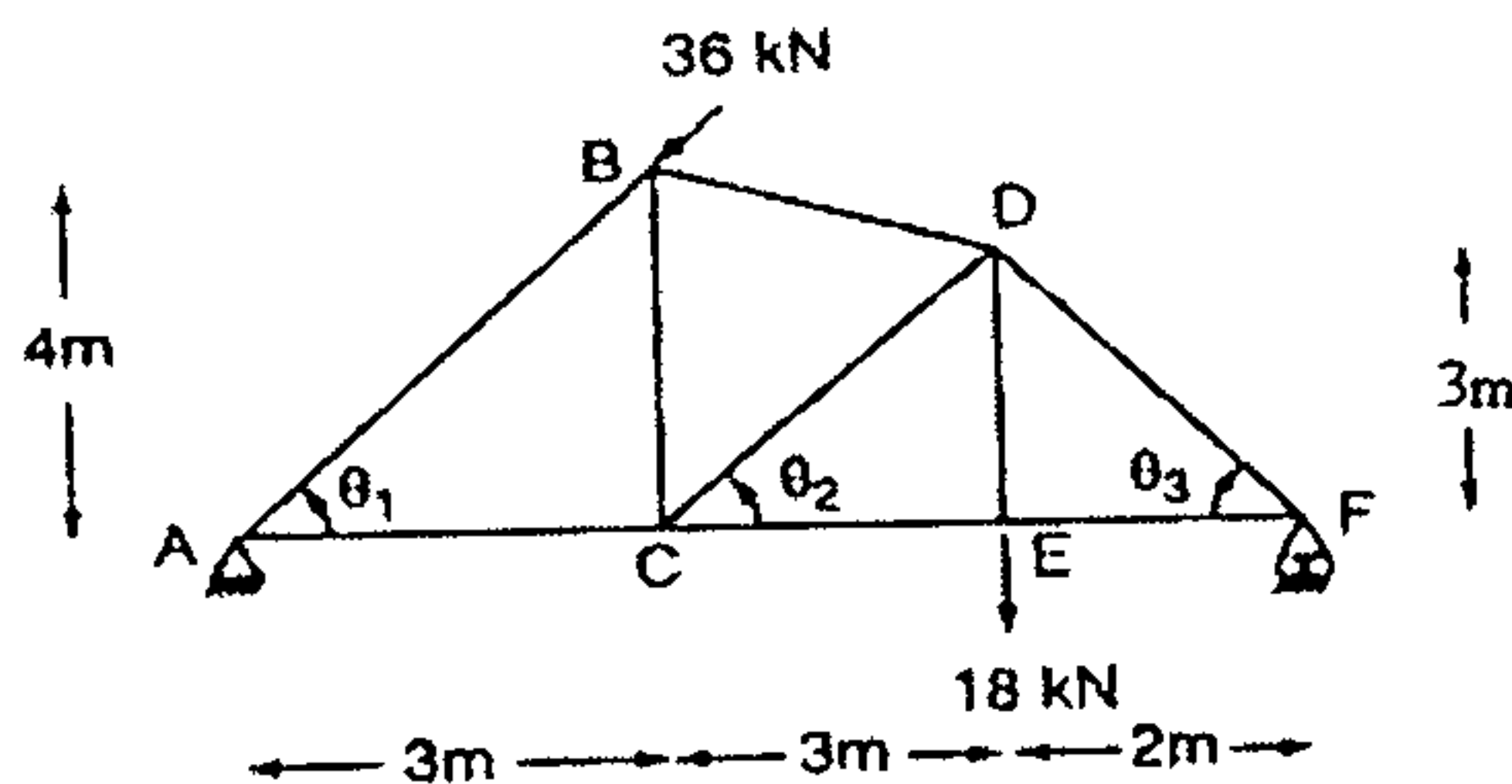
1. a) State and Prove method of projections. [7m]
- b).A Cylinder of weight  $Q$  and radius  $r$  is supported in a horizontal position against a vertical wall by a bar  $AB$  of negligible weight. The bar is hinged to the wall at  $A$  and supported at  $B$  by a horizontal rope  $BD$ . Find the value of the angle that the bar  $AB$  should make with the wall to attain a minimum tension in the cable  $BD$ . [7m]



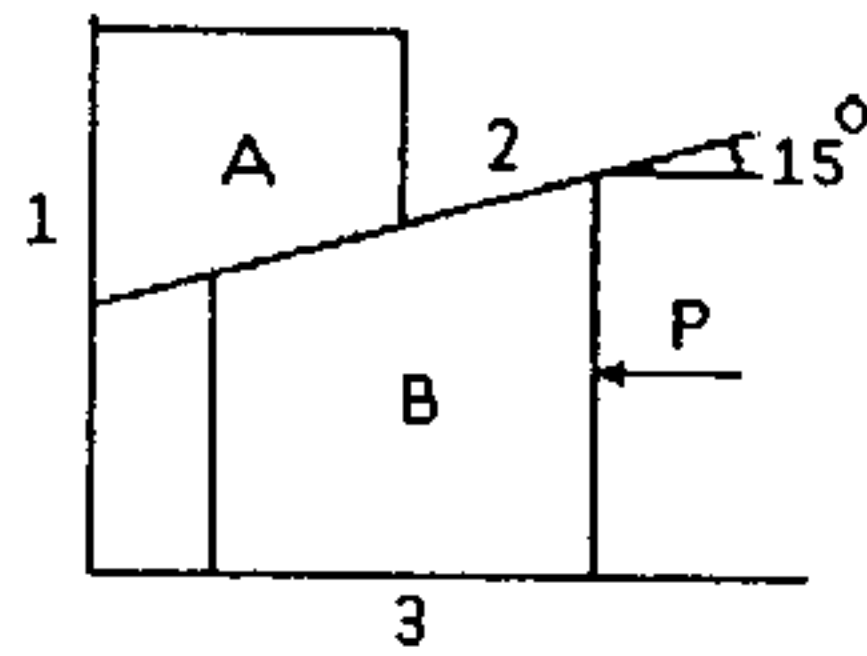
2. Determine the coordinates of the centroid of the area of one quadrant of an ellipse OAB with major and minor semi axes  $a$  and  $b$  respectively. [14m]



3. Find the forces in members of truss if a 36kN load is acting along the line of AB. [14m]

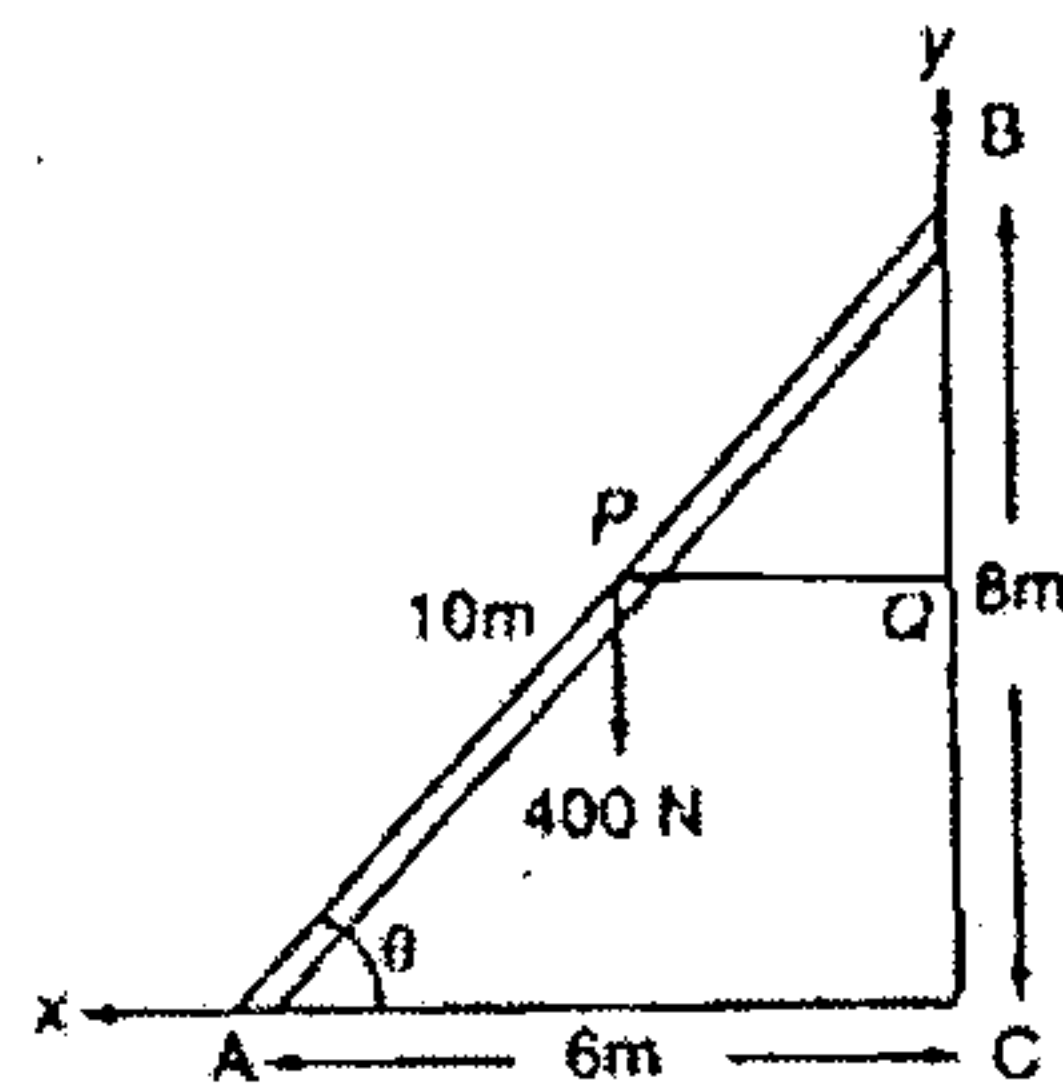


4. Determine the minimum horizontal force 'P' required to raise the block A of weight 4500 N by means of a  $15^\circ$  wedge 'B' which is of weight 2250 N if the coefficient of friction at surfaces is 0.2. [14m]



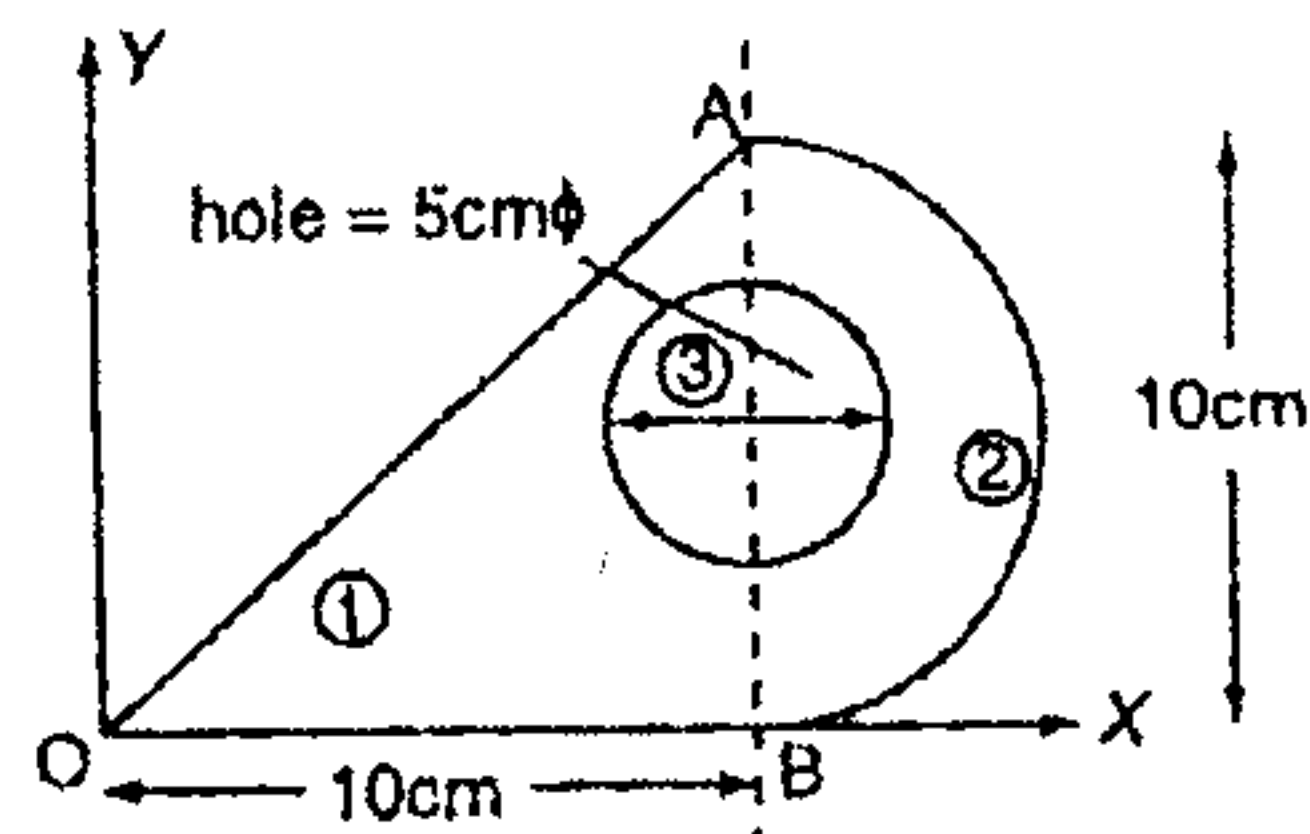
5. A uniform ladder 10 m long weighing 400 N rests on a smooth floor at A and against a smooth wall at B. A horizontal rope PQ prevents the ladder from slipping. Using the method of virtual work determine the tension in the rope.

[14m]



6. Determine the moment of inertia of the plane area about its centroidal axis.

[14m]



7. a) A stone dropped into well is heard to strike water after 4 sec. Find the depth of the well. The velocity of the sound is 350 m/s. [7m]
- b) A particle moves along a straight line with an acceleration  $a = 6(S)^{1/3}$ . when  $t = 3s$ ,  $S = 64$  m and its velocity is 48 m/s. Calculate velocity, acceleration when  $t = 2s$ . [7m]
8. Determine the tension in strings and acceleration of the weights for the system shown in figure. [14m]

