

- c In the Fig. Q. 3 (c). The portion BC of the string is horizontal and pulley is frictionless. Determine tension in different parts of the string. Also find W_1 and W_2 . 8m

OR

- 4a Explain briefly: 1) angle of repose 2) Cone of friction. 4m
- b What is the value of 'P' in the system shown in Fig. Q.4 (b) to cause the motion to impend? Assume the Pulley is smooth and the coefficient of friction between the other contact surfaces is 0.2. 8m

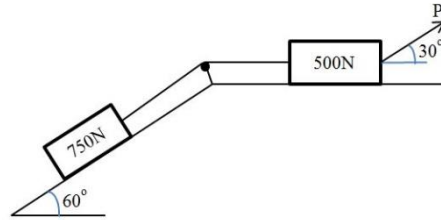


Fig. Q.4 (b)

- c A uniform ladder of length 20m rests against a vertical wall with which it makes an angle of 45° , the coefficient of friction between the ladder and the wall and ground respectively being $1/3$ and $1/2$. If a man, whose weight is one half that of the ladder ascends the ladder, how high will he be, when the ladder slips? 8m

Module –3

- 5a With sketch explain different types of supports and mark reaction line. 6m
- b A simply supported beam AB of length 10m carries the uniformly distributed load of intensity 20 kN/m over a length of 4m at a distance 2m from left support and two point loads 50kN and 60kN a distance 2m and 6m from left support respectively calculate the reaction R_A and R_B . 14m

OR

- 6a List the steps followed in the analysis of truss by method of sections. 6m
- b Find the support reactions and member forces for pin jointed plane truss shown in Fig. Q. 6 (b). By method of joints. 14m

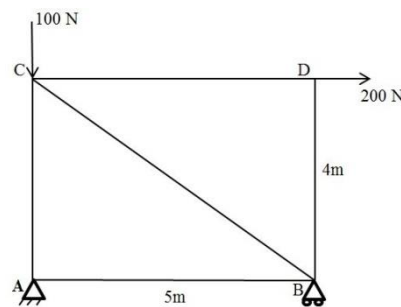


Fig. Q. 6 (b).

Module –4

- 7a Derivation of expression for centroid of Rectangle. 6m
- b Locate the centroid of the shaded area shown in the Fig.Q.7 (b). with respect to OX and OY 14m

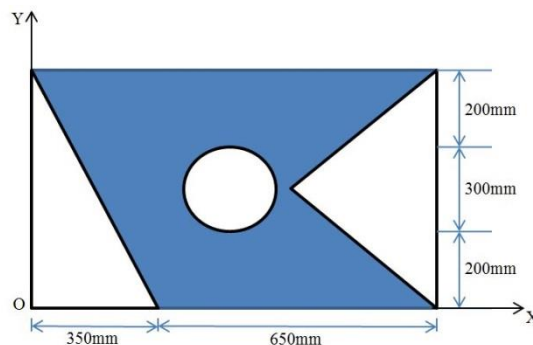
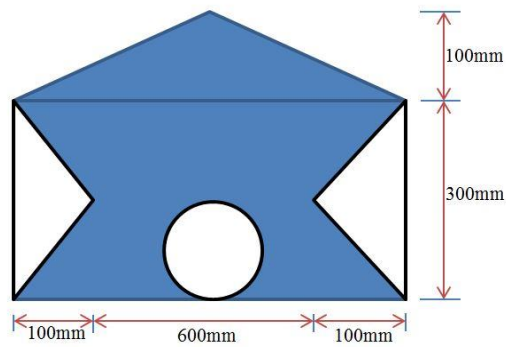


Fig.Q.7 (b).

OR

- 8a State and prove Parallel axis theorem 6m

- b Determine the second moment of the area about the horizontal centroidal axis as shown in Fig. Q. 8. (b). Also find radius of gyration.



14m

Fig. Q. 8. (b)

Module -5

- 9a Define Acceleration, Uniform acceleration, Variable acceleration and Acceleration due to gravity 4 m
- b A particle, starting from rest, moves in a straight line, whose equation of motion is given by $s=5t^3-3t^2+6$. Find the displacement, velocity and acceleration of the particle after 5 seconds. 8m
- c A stone is dropped into well and the splash of sound is heard after 9 seconds. Determine the height of drop from the water surface. Assume velocity of sound to be 330m/sec. 8m

OR

- 10a Explain briefly Rectilinear motion and Curvilinear motion. 4m
- b State D'Alembert's principle and mention its applications in Plane Motion. 8m
- c A particle is projected with a velocity of 20m/s in air at angle 'a' with the horizontal. The x and y co-ordinates of a point lying on the trajectory of the particle with respect to point of projection are 20m and 8m respectively. Find the angle of projection of the particle. 8m