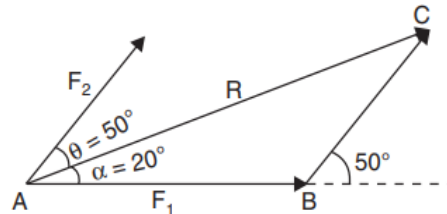Gautam Buddha University
Assignment No. 1
Engineering Mechanics (ME- 101)

Q1. Two forces F1 and F2 are acting at point A as shown in Figure. The angle between the two forces is 50°. It is found that the resultant R is 500 N and makes angles 20° with the force F1 as shown in the figure. Determine the forces F1 and F2.


Q2. The resultant of two forces F1 = 400 N and F2 = 260 N acting at point A is 520 N. Determine the angle between the two forces and the angle between the resultant and force F1.
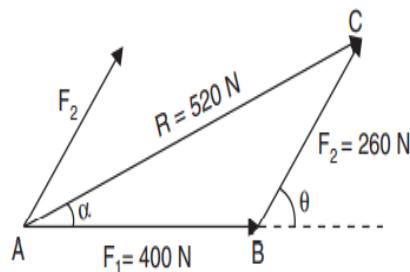
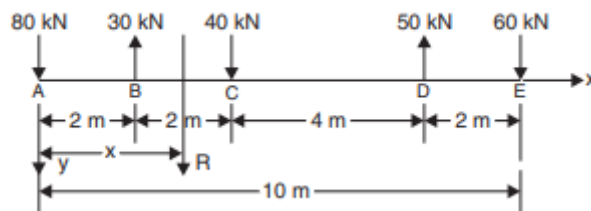Q3. A system of four forces acting on a body is as shown in Fig. Determine the resultant.

(a)
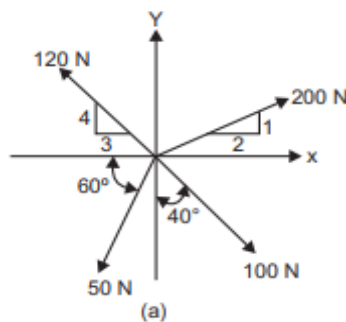
Q4. Forces 2, $\sqrt{3}$, 5, $\sqrt{3}$ and 2 kN respectively act at one of the angular points of a regular hexagon towards five other angular points. Determine the magnitude and direction of the resultant force.
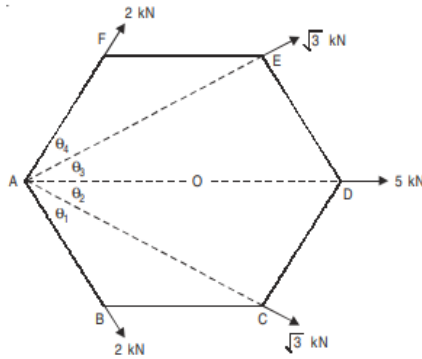
Q5. Determine the resultant of system of parallel forces acting on a beam as shown in figure.


Q6. Find the resultant of the force system shown in Figure (a) acting on a lamina of equilateral triangular shape.


(a)
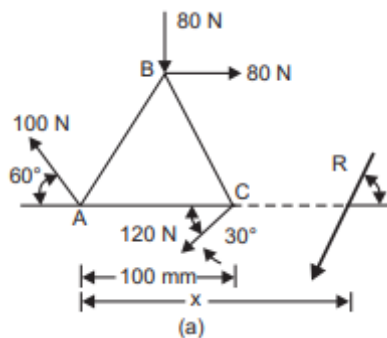
Q7. A roller of radius r = 300 mm and weight 2000 N is to be pulled over a curb of height 150 mm [Figure (a)] by a horizontal force P applied to the end of a string wound tightly around the circumference of the roller. Find the magnitude of P required to start the roller move over the curb. What is the least pull P through the centre of the wheel to just turn the roller over the curb?

(a)
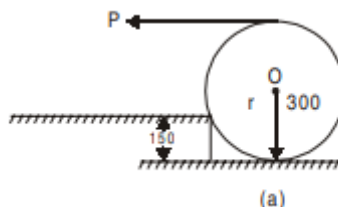
Q8. A wire is fixed at two points A and D as shown in Figure (a). Two weights 20 kN and 25 kN are supported at B and C, respectively. When equilibrium is reached it is found that inclination of AB is 30° and that of CD is 60° to the vertical. Determine the tension in the segments AB, BC and CD of the rope and also the inclination of BC to the vertical.

(a)
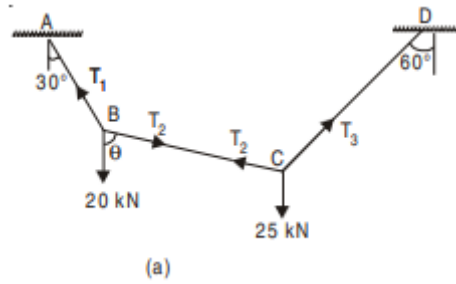
Q9. . Two cylinders, A of weight 4000 N and B of weight 2000 N rest on smooth inclines as shown in Figure (a). They are connected by a bar of negligible weight hinged to each cylinder at its geometric centre by smooth pins. Find the force P to be applied as shown in the figure such that it will hold the system in the given position.

(a)
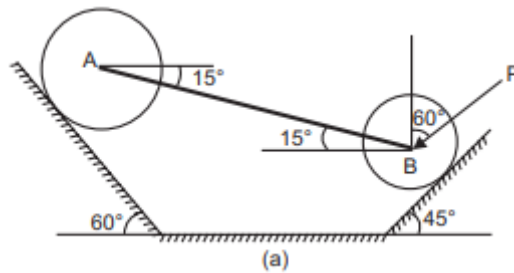
Q10. Two smooth spheres each of radius 100 mm and weight 100 N, rest in a horizontal channel having vertical walls, the distance between which is 360 mm. Find the reactions at the points of contacts A, B, C and D shown in Fig.