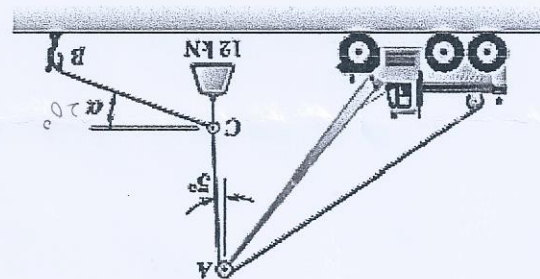


1. (10pts) Knowing that  $\alpha = 20^\circ$  in Fig. 1, determine the tension (a) in cable AC, (b) in rope BC.



2. (20pts) Knowing that the tension in cable AB and 510 N in cable AC in Fig. 2, determine the magnitude and direction of the resultant of the forces exerted at A by the two cables.

3. (20pts) A crate of mass 80 kg is held in the position shown in Fig. 3. Determine (a) the moment produced by the weight  $W$  of the crate about E, (b) the smallest force applied at B that creates a moment of equal magnitude and opposite sense about E.

4. (15pts) A farmer uses cables and winch pullers (絞盤) B and E to plumb (使垂直) one side of a small barn (穀倉) shown in Fig. 4. If it is known that the sum of the moments about the x axis of the forces exerted by the cables on the barn at points A and D is equal to 7.6 kN·m, determine the magnitude of  $T_{DE}$  when  $T_{AB} = 1.02$  kN.

5. (15pts) Four forces act on a  $700 \times 375$ -mm plate shown in Fig. 5. (a) Find the resultant of these forces. (b) Locate the two points where the line of action of the resultant intersects the edge of the plate.

6. (20pts) Three children are standing on a  $5 \times 5$ -m raft shown in Fig. 6. If the weights of the children at points A, B, and C are 375 N, 260 N, and 400 N, respectively, determine the magnitude and the point of application of the resultant of the three weights

- Fig. 1

- Fig. 2

- Fig. 3

- Fig. 4

- Fig. 5

- Fig. 6