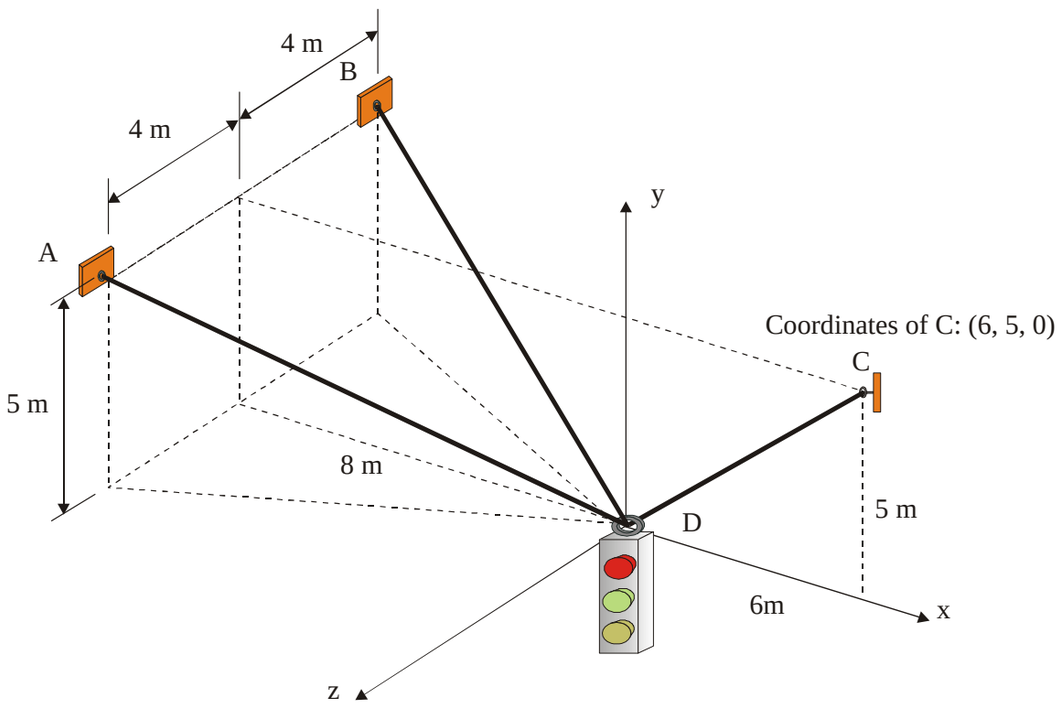
Question 1

A traffic light that weighs *800 N* is suspended by means of three *(3)* cables as shown in the figure below. Draw an appropriate FBD and determine the tension in cables *DA*, *DB* and *DC*.



Question 2

A satellite dish that weighs *100 kN* is attached to a beam that is supported by a simple truss by a pin support at *E* and a roller support at *C* as shown in Figure (a). The reactions to the beam supporting the satellite dish at joints *E* and *C* of the truss **<u>are given</u>** in Figure (b) below (in *kN*).

a) Determine the truss support reactions at *A* and *B*.
b) Determine the force in each member of the truss and state whether it is in tension or compression. Show your results on Figure (c).

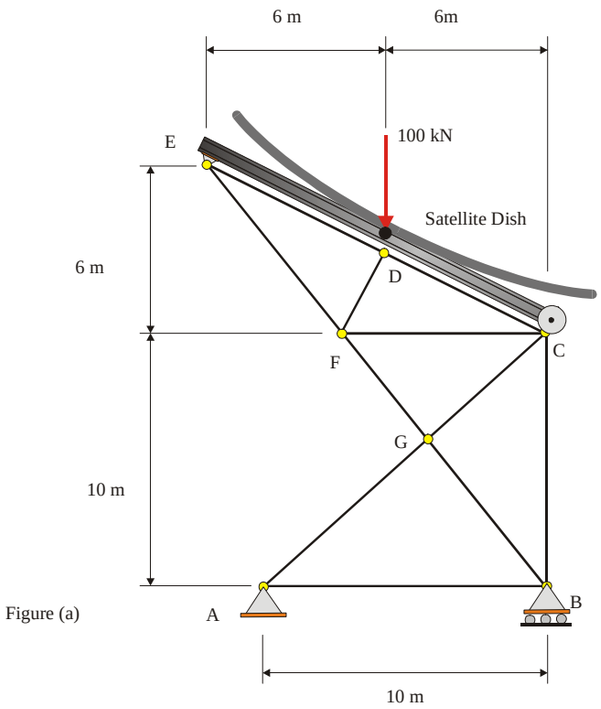


Figure (a)

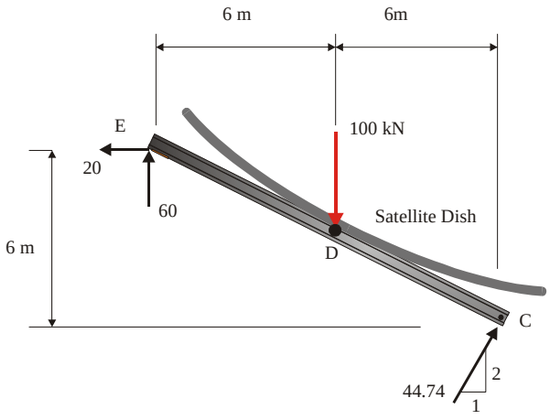
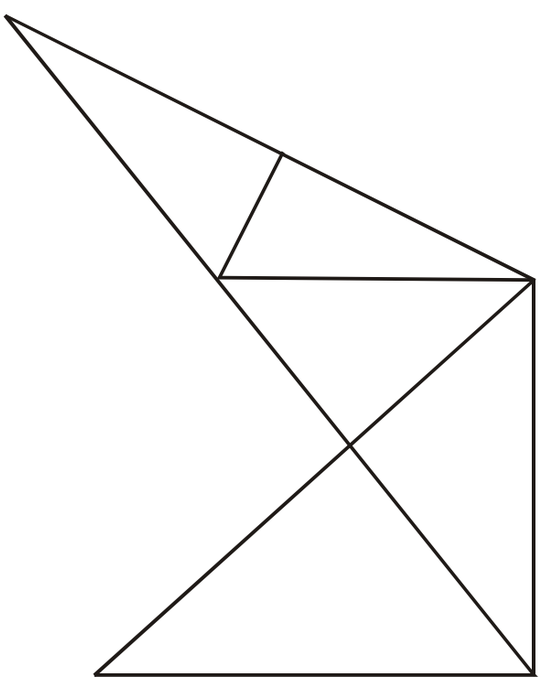


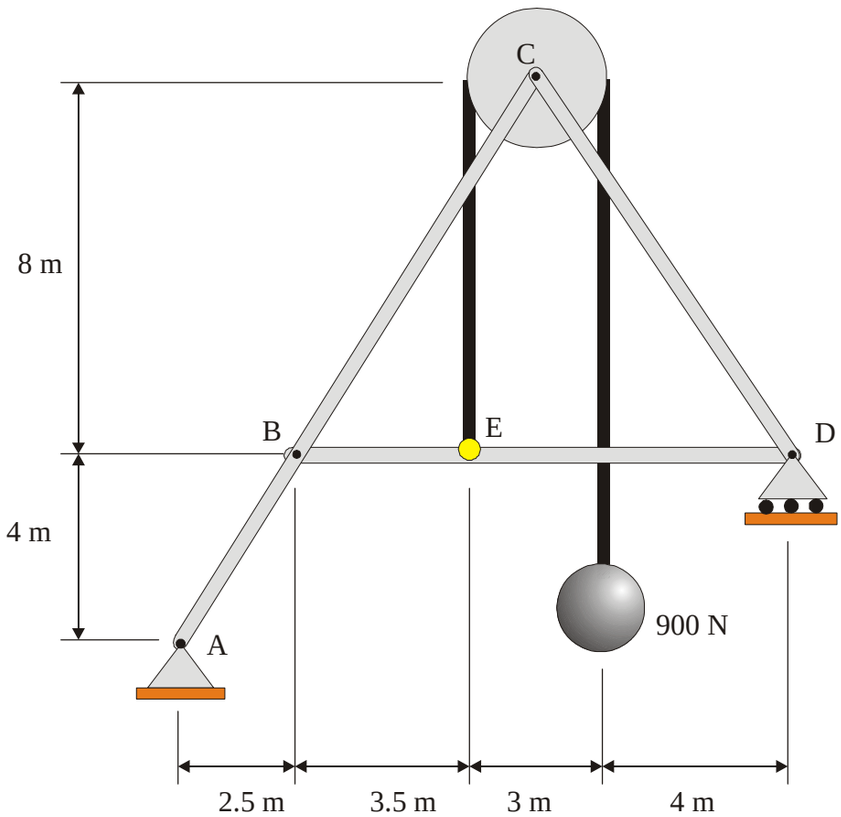
Figure (b)



Question 3

A *900 N* weight is suspended from a cable that passes over a frictionless pulley of radius *1.5 m* and is attached back to a frame at *E*. The frame has a pin support at *A* and a roller support at *D*.

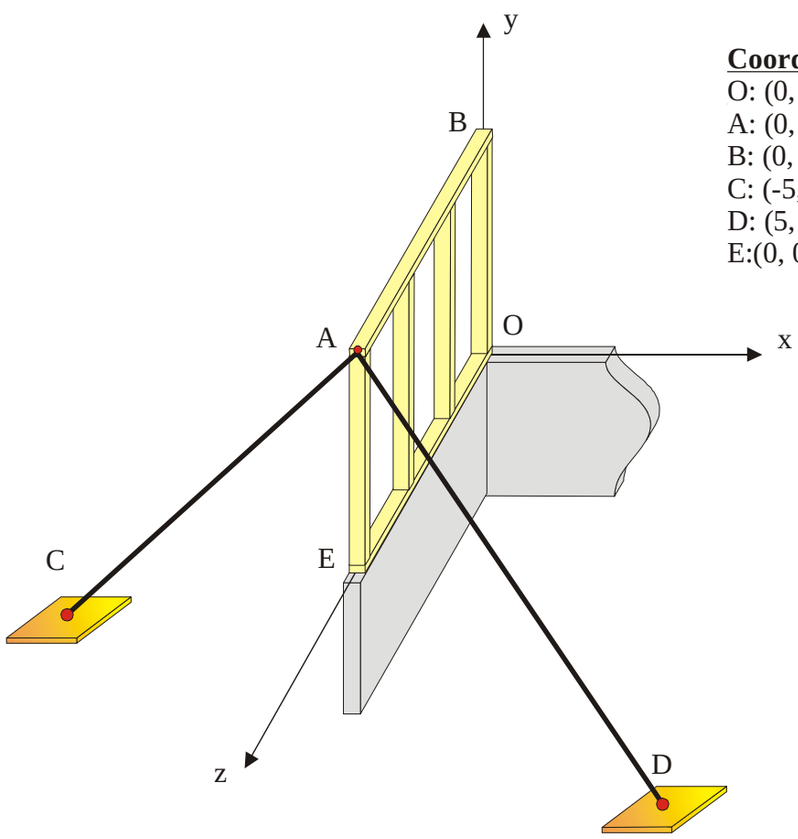
a. Determine the reactions at supports *A* and *D*.
b. Determine all forces exerted on members *ABC*, *BED* and *CD*.



Question 4

A *3 m x 4 m* wood stud wall sits on top of a concrete foundation wall as shown in the figure. The stud wall is bolted to the foundation wall and is supported by two cables *AC* and *AD* attached to the wall at point *A*. The tension in cable *AC* is *1.2 kN*. Determine:

(a) The angle between cable *AC* and cable *AD*,
(b) The moment of the *1.2 kN* force applied at *A* by cable *AC* about the line *EO*,
(c) The moment of the *1.2 kN* force applied at *A* about the line *CD* and



Coordinates (metres)
O: (0, 0, 0)
A: (0, 3, 4)
B: (0, 3, 0)
C: (-5, -1, 5)
D: (5, -3, 7)
E:(0, 0, 4)