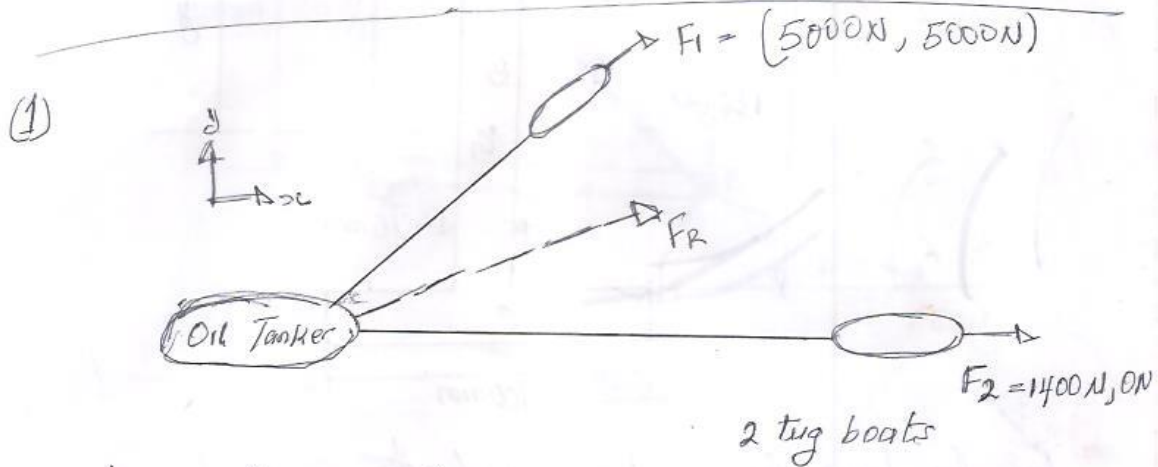
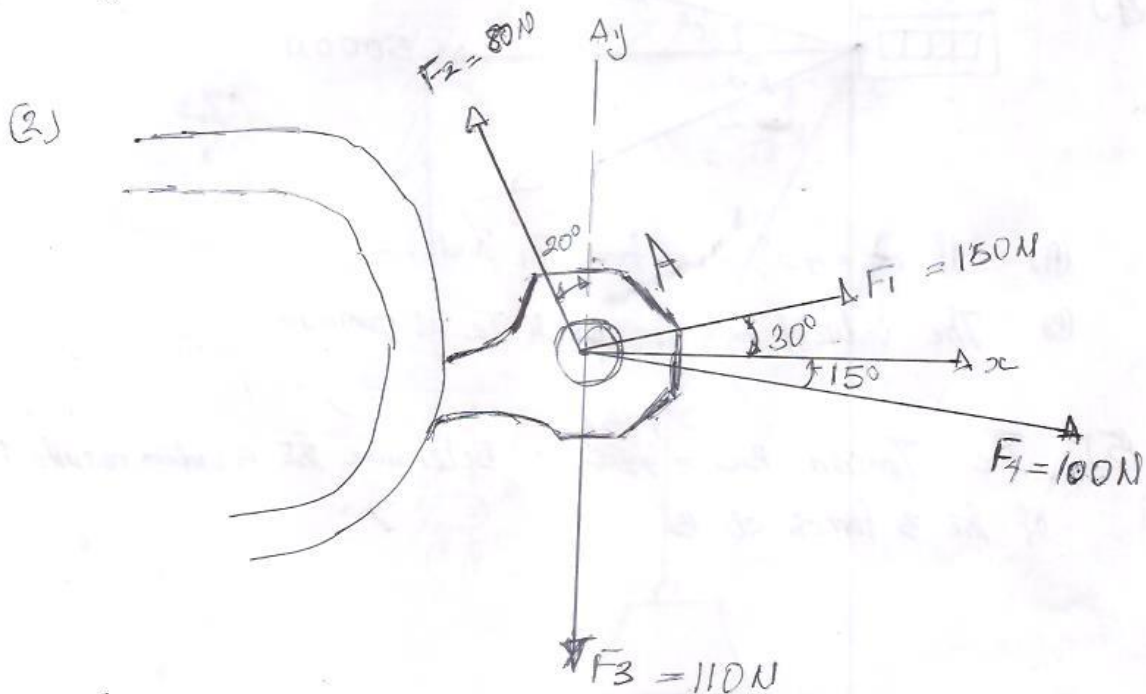


FEDERAL UNIVERSITY, OYE-EKITI
 MECHANICAL ENGINEERING DEPARTMENT
 MEE 203 - APPLIED MECHANICS ASSIGNMENT

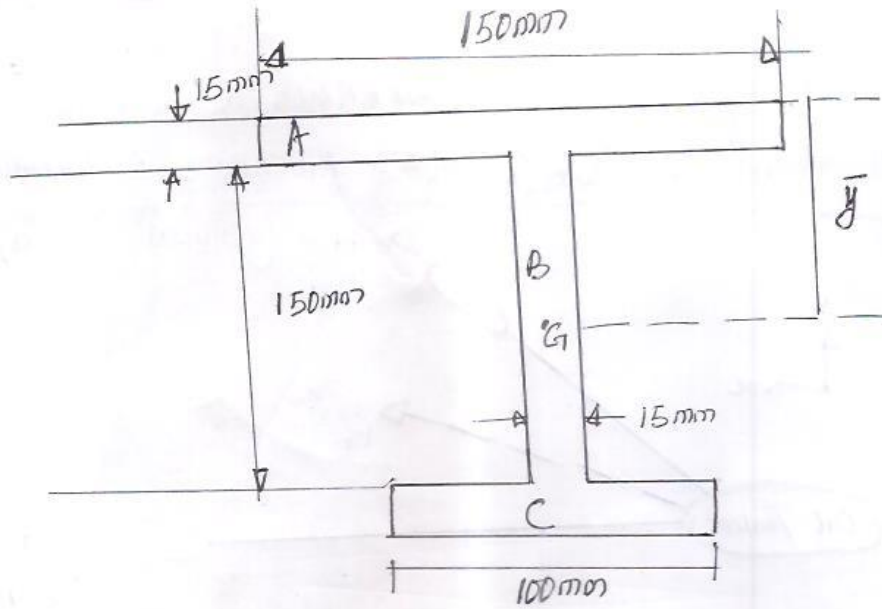


Draw the vector force triangle and find F_R in magnitude and direction.



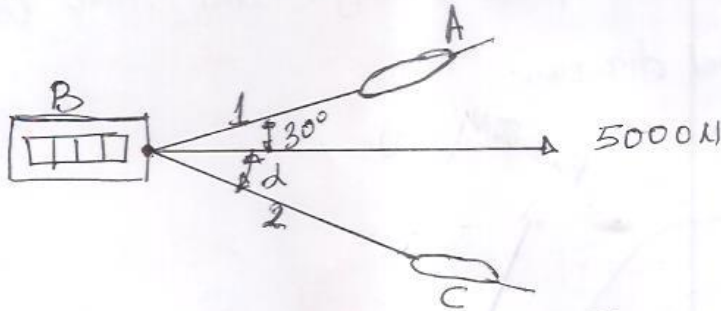
Four forces act on a bolt A as shown. Determine the resultant of the forces on the bolt.

(3)



For the beam cross-section, find the centroid.

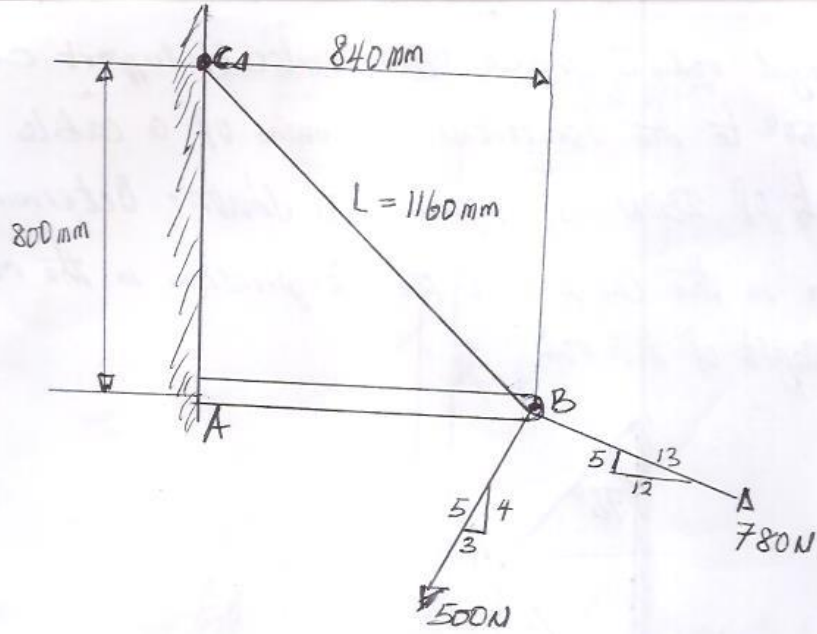
(4)



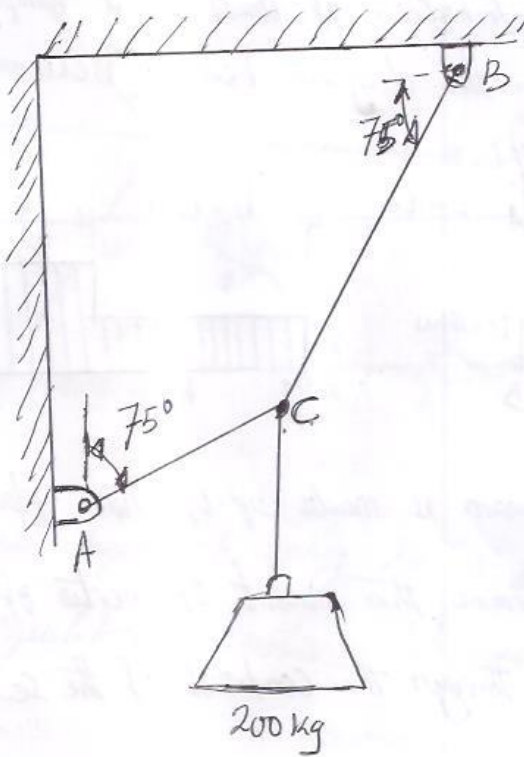
(A) If $\alpha = 45^\circ$, then find T_1 and T_2

(B) The value of α for which T_2 is minimum.

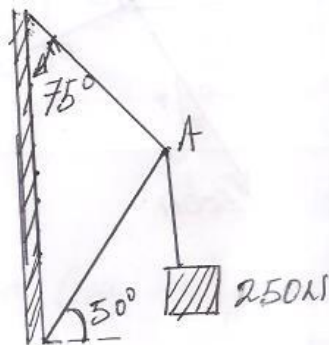
(5) The Tension $BC = 725\text{ N}$. Determine the resultant of the 3 forces at B.



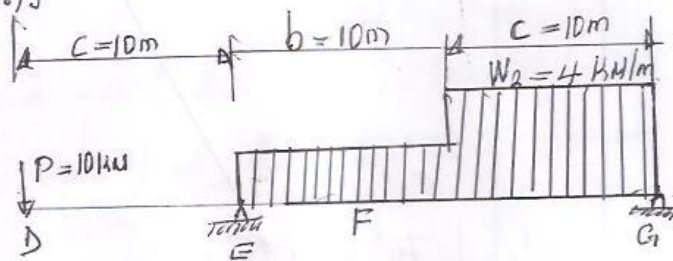
(6) Determine T_{AC} and T_{BC}



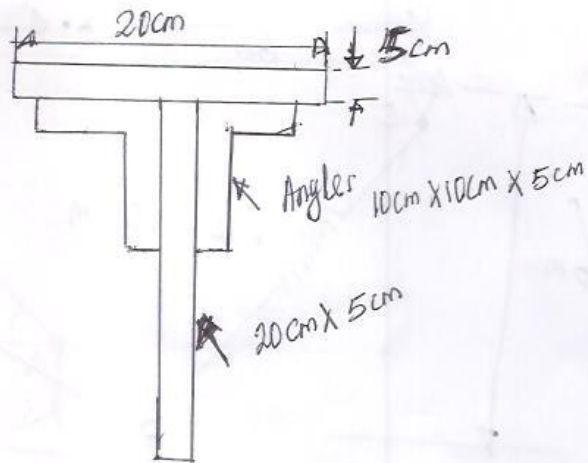
- (7) A rigid rod is hinged to a vertical support and held at 50° to the horizontal by means of a cable when a weight of 250N is suspended as shown. Determine the tension in the cable and the compression in the rod, ignoring the weight of the rod.



- (8) The distribution of loads in a simply supported beam is as given in the diagram below. Determine the reactions at the supports.

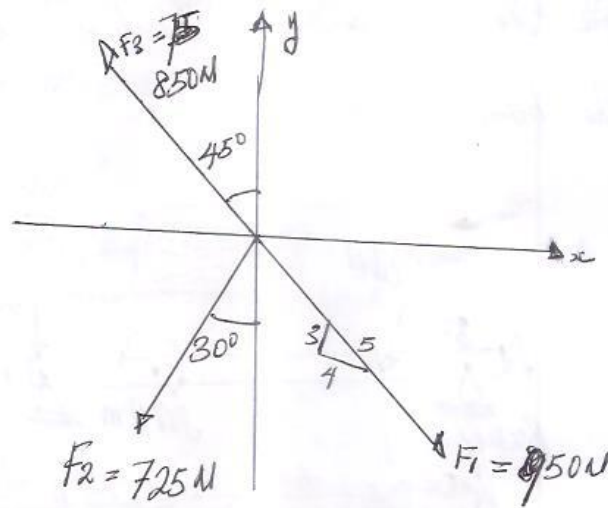


- (9) A T-beam is made up of two plates and two angles as shown. Determine the moment of inertia of T-section about an axis passing through the centroid of the section and parallel to the top plate.



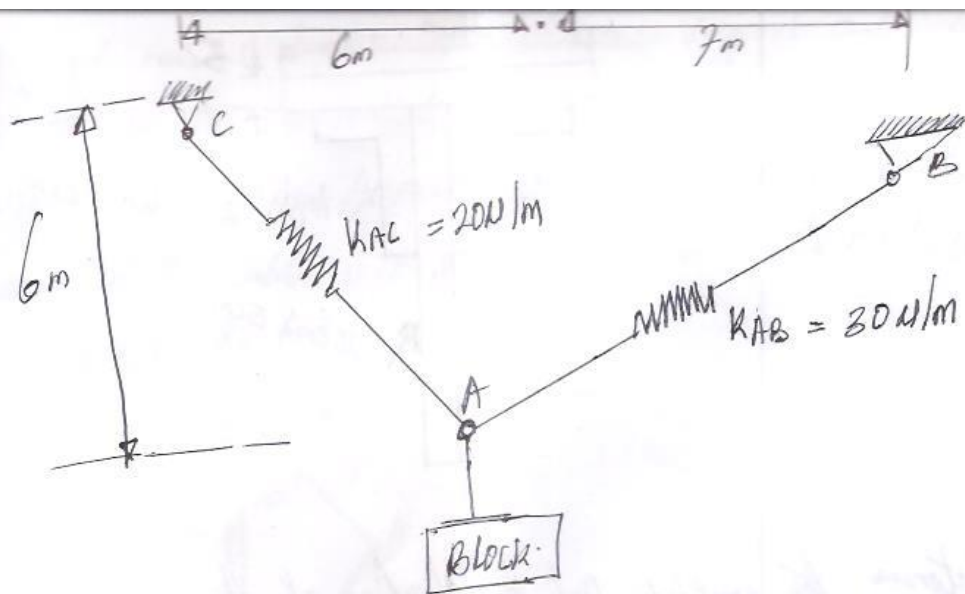
(10)

Determine the magnitude and the direction of the resultant force. Use the scalar notation and the Cartesian vector notation methods.

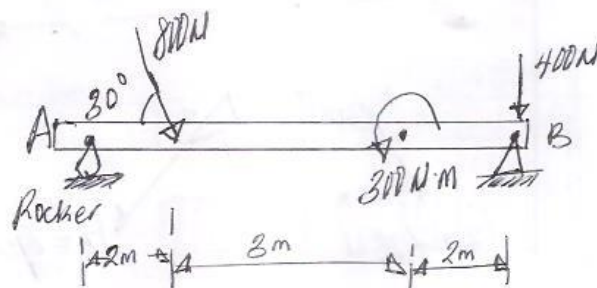


(11)

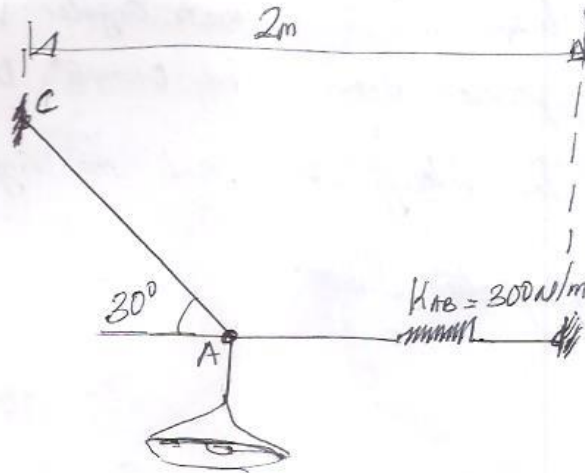
The unstretched length of spring AB is 2 m. If the block is held in equilibrium position, determine the mass of the block.



(12) Determine the reactions at A and B. Neglecting the weight of the beam

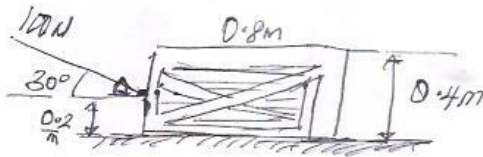


(13) Determine the required length of the cord AC so that the spring lamp is suspended. The undeformed length of the spring AB is $l_{AB} = 0.4 \text{ m}$, and the spring has a stiffness of $k_{AB} = 300 \text{ N/m}$.

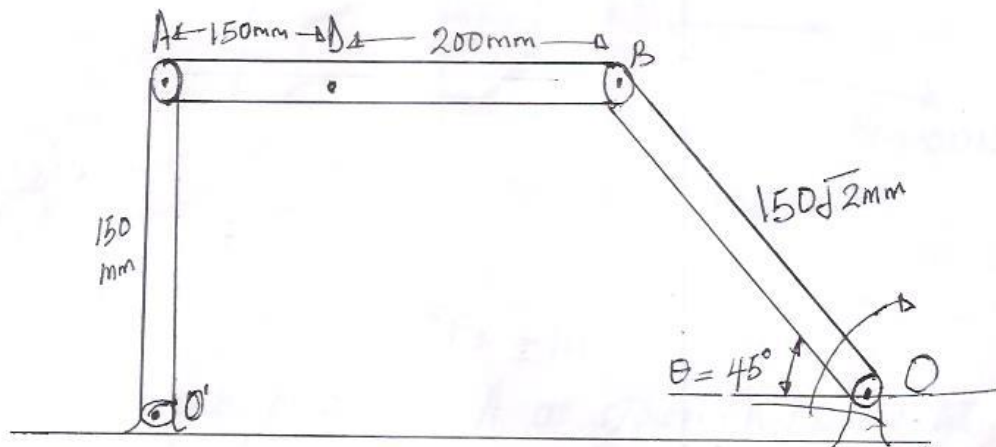


(14) ~~The block~~ A block has a weight of 30 kN

The cable has a mass of 30 kg . Determine if it remains in equilibrium. Use $\mu = 0.3$



(15)



Arm OB of the linkage has a clockwise angular velocity of 10 rad/sec in the position shown where $\theta = 45^\circ$. Determine the velocity of A, the velocity of D, and the angular velocity of link AB for the position shown.

