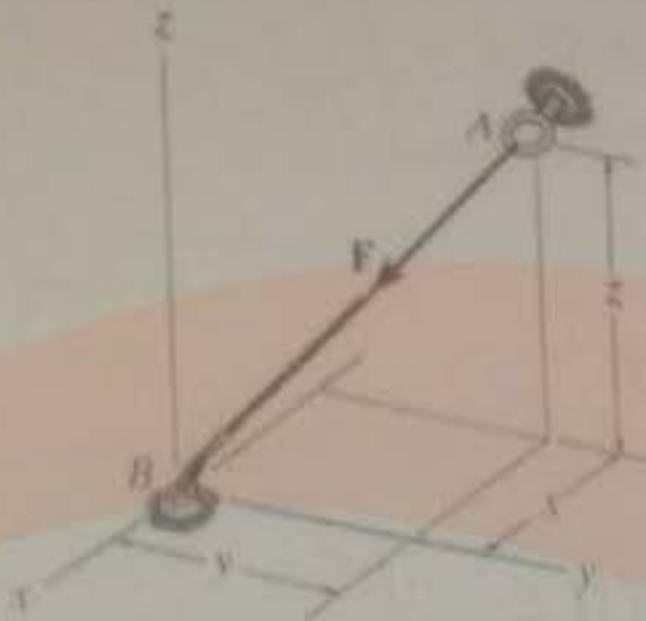


1. [30 pts] if the force $\vec{F} = [350\mathbf{i} - 250\mathbf{j} - 450\mathbf{k}]$ N and cable AB is 9 m long (magnitude). Determine the x, y, z coordinates of point A



Solution $B(0, 0, 0)$ $A(x, y, z)$

$$\vec{r}_{AB} = +x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$$

$$AB = |\vec{r}_{AB}| = 9 = \sqrt{x^2 + y^2 + z^2}$$

$$u_{AB} = \frac{+x}{9}\mathbf{i} + \frac{y}{9}\mathbf{j} + \frac{z}{9}\mathbf{k}$$

$$|\vec{F}| = \sqrt{350^2 + 250^2 + 450^2} = \sqrt{387500} = 622,49$$

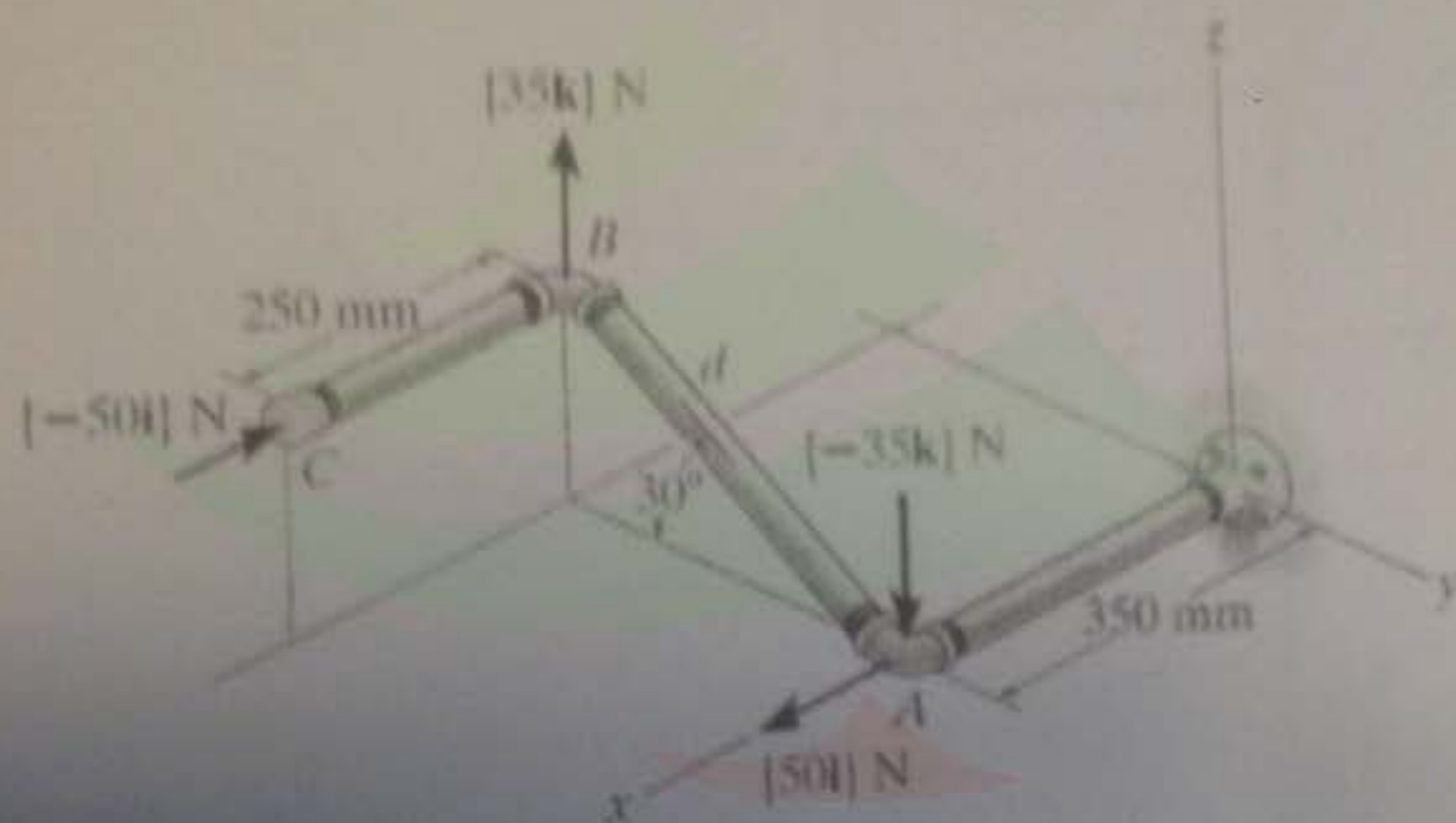
$$F = 622,49 \text{ N}$$

$$\vec{F} = |\vec{F}| \cdot \vec{u}$$

~~$$\vec{F} = 622,49 (0,76x\mathbf{i} + \dots)$$~~

$$\vec{F} = 622,49 (+x\mathbf{i} + y\mathbf{j} + z\mathbf{k})$$

2. [35 pts] Determine the distance d between A and B so that the resultant couple moment of the two acting couple moments (M_{C1} and M_{C2}) has a magnitude of $M_R = 20 \text{ N}\cdot\text{m}$



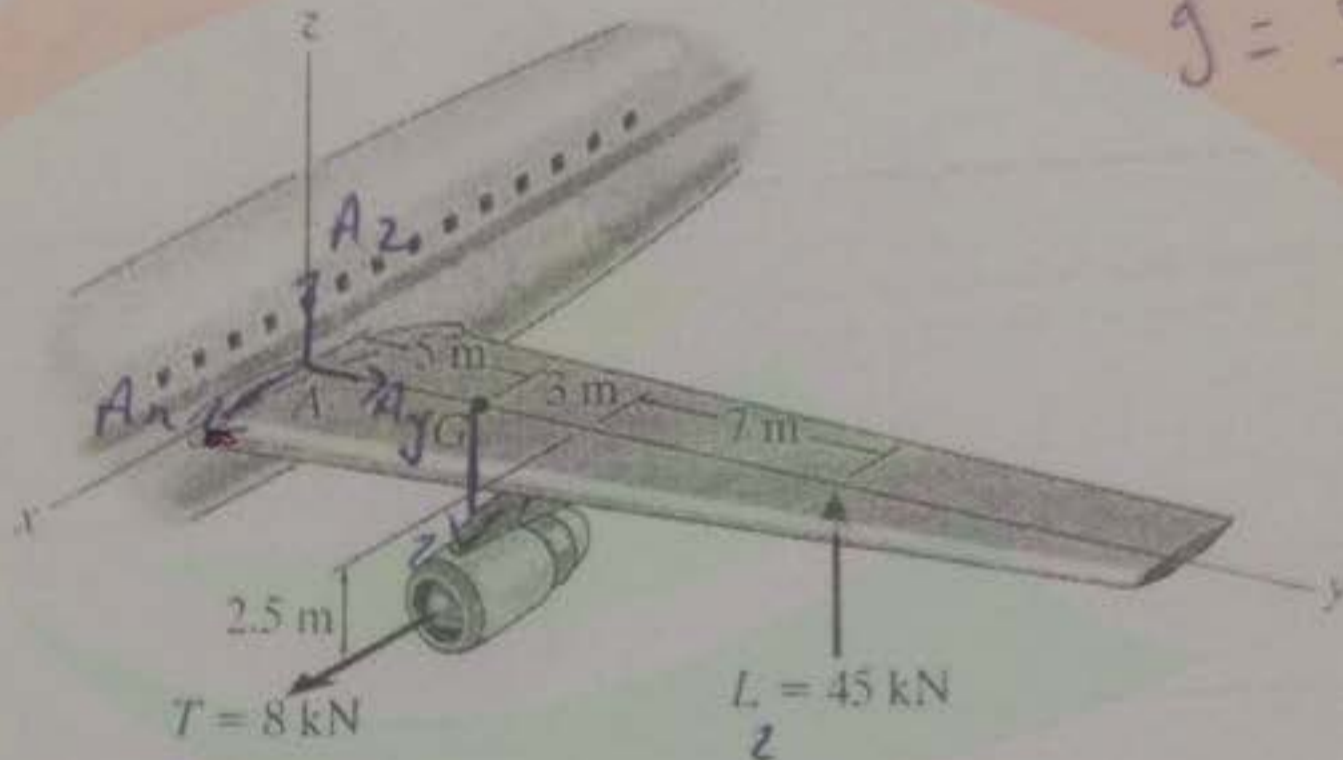
$$\vec{F}_1 = 35 \vec{k}$$

$$M_{C1} = r_{AB} \times \vec{F}_1$$

$$(x_B - x_A)\vec{i} - (y_B - y_A)\vec{j} + (z_B - z_A)\vec{k}$$

3. [35 pts] The Wing of the jet aircraft is subjected to a thrust of $T = 8 \text{ kN}$ from its engine and the resultant lift force $L = 45 \text{ kN}$. If the mass of the wing is 2.1 Mg and the mass center is at G.

Determine the x, y, z components of reaction where the wing is fixed to the fuselage at A.



$$g = 9,81 \text{ N/Kg}$$

$$\begin{matrix} 1 \text{ x} \\ 0 \text{ y} \\ 2 \text{ z} \end{matrix}$$

$$= 0$$

$$\sum \vec{F}_y = 0$$

$$+T = 0$$

$$= -8 \text{ kN}$$

$$A_y = 0$$

5

5

The Debate Club

$$= 0$$

$$P = 2.1 \times 10^3 \times 9.81$$