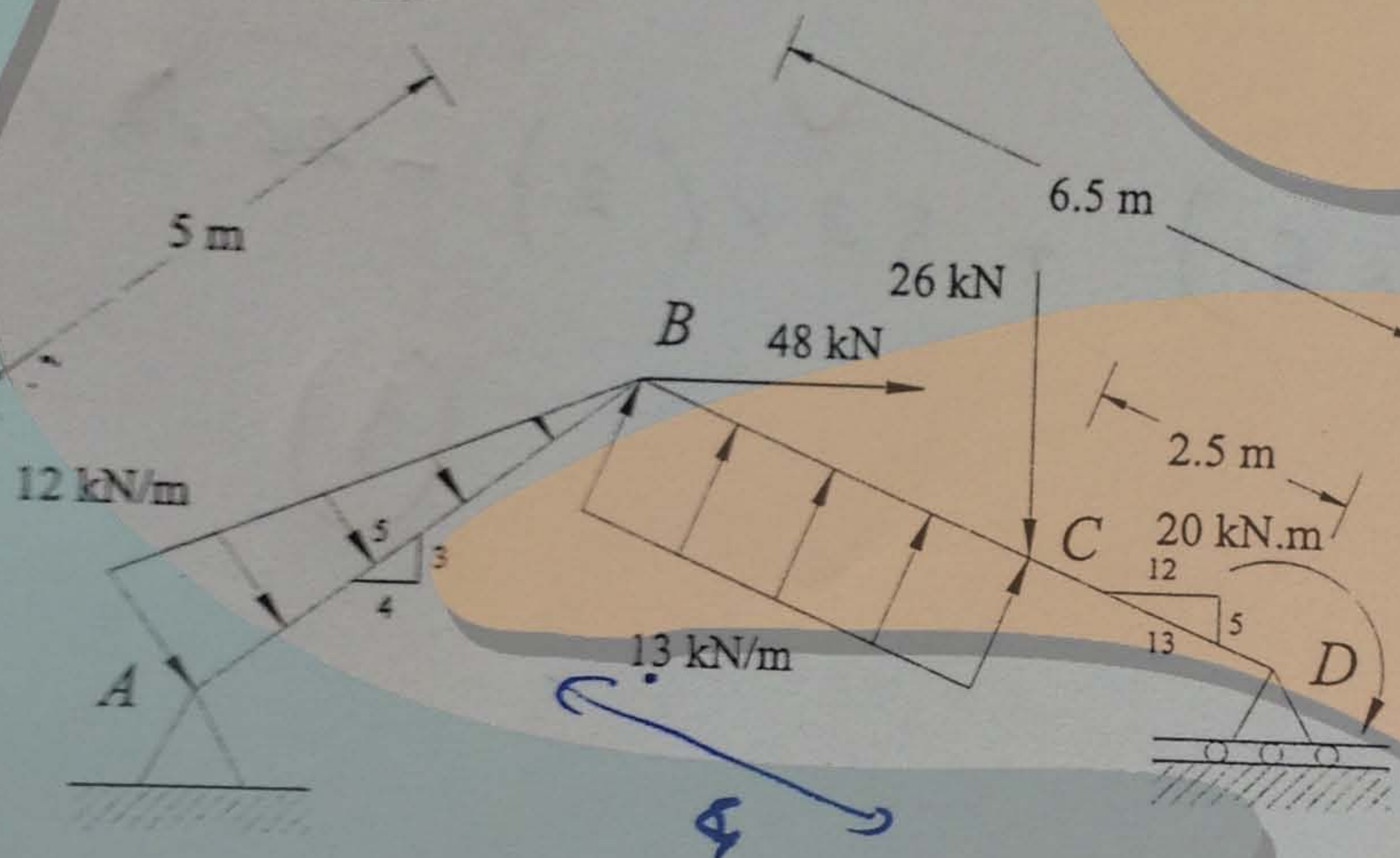


EM 1: (30 points)

Replace the force and couple system acting on the frame by an equivalent resultant force and specify the resultant's line of action intersects member BD , measured from B .

19.5



Load acting on AB : $\frac{12 \times 5}{2} = 30 \text{ kN}$ ✓ Let the force
 act with AB in H ; $AH = \frac{1}{3} AB$. ✓ (2)
 Load acting on $BC = 13 \times (6.5 - 2.5) = 52 \text{ kN}$. (1)

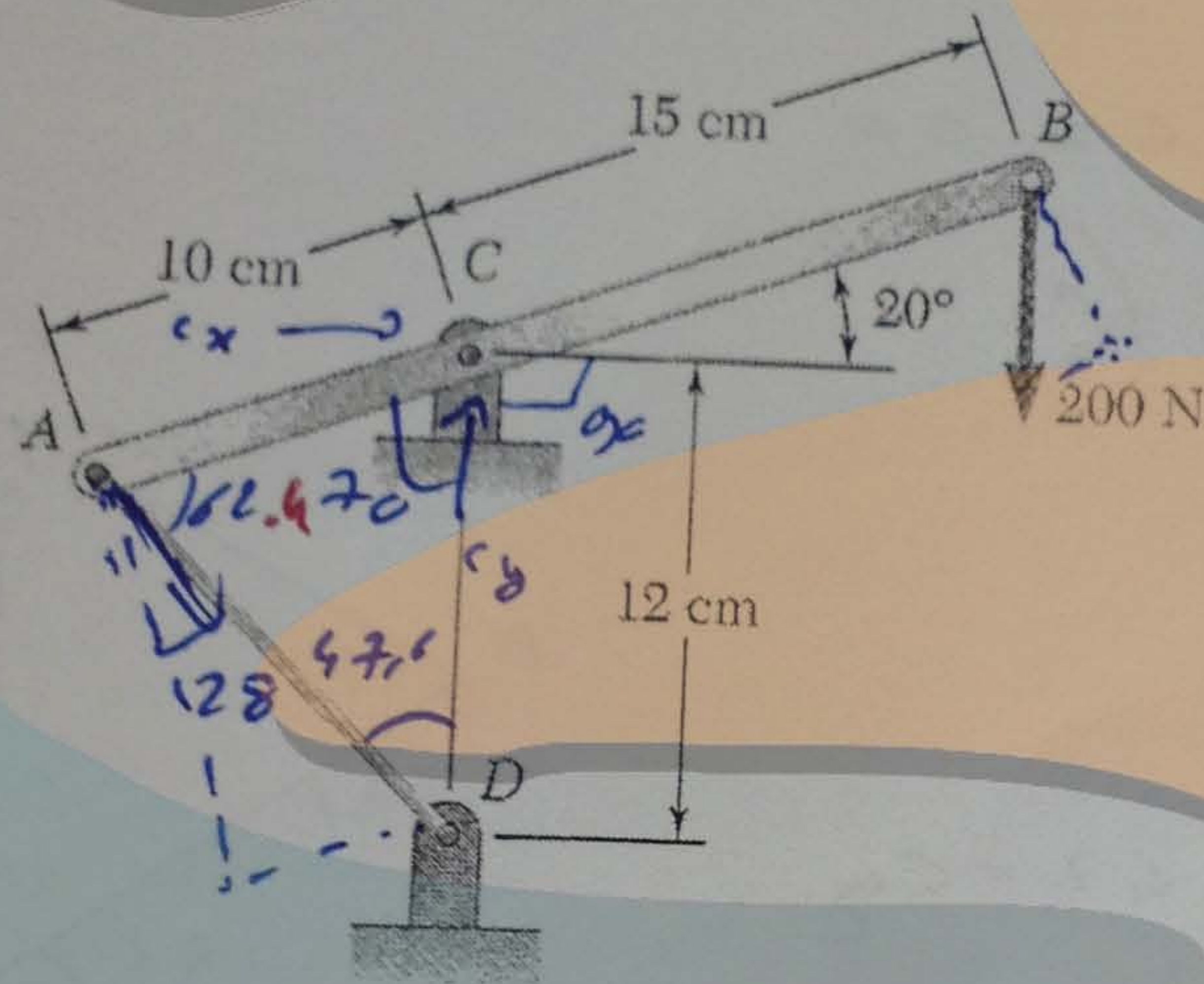
Club

PROBLEM 2: (30 points)

30

A lever AB is hinged at C and attached to a control cable at A . If the lever is subjected to a 200-N vertical force at B , determine:

- a) The tension in the cable,
- b) The reaction at C .



$$D = \sqrt{10^2 + 12^2 - 2 \times 10 \times 12 (\cos 70)} = 22,72 \quad (4)$$

$$\frac{12,72}{\sin 70} = \frac{10}{\sin \alpha} \Rightarrow \sin \alpha = \frac{10 \times \sin 70}{12,72} = 0,73 \Rightarrow \alpha =$$

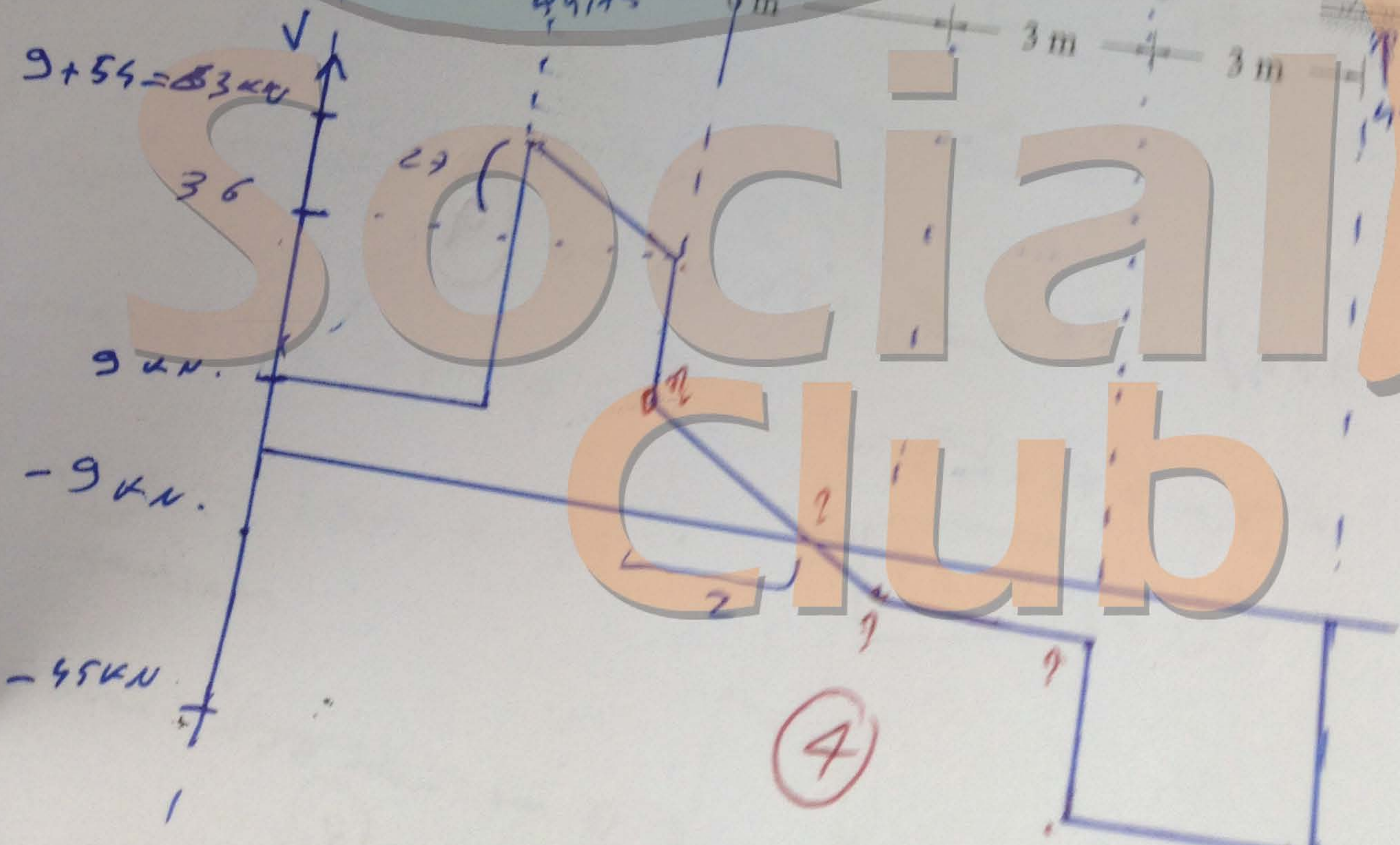
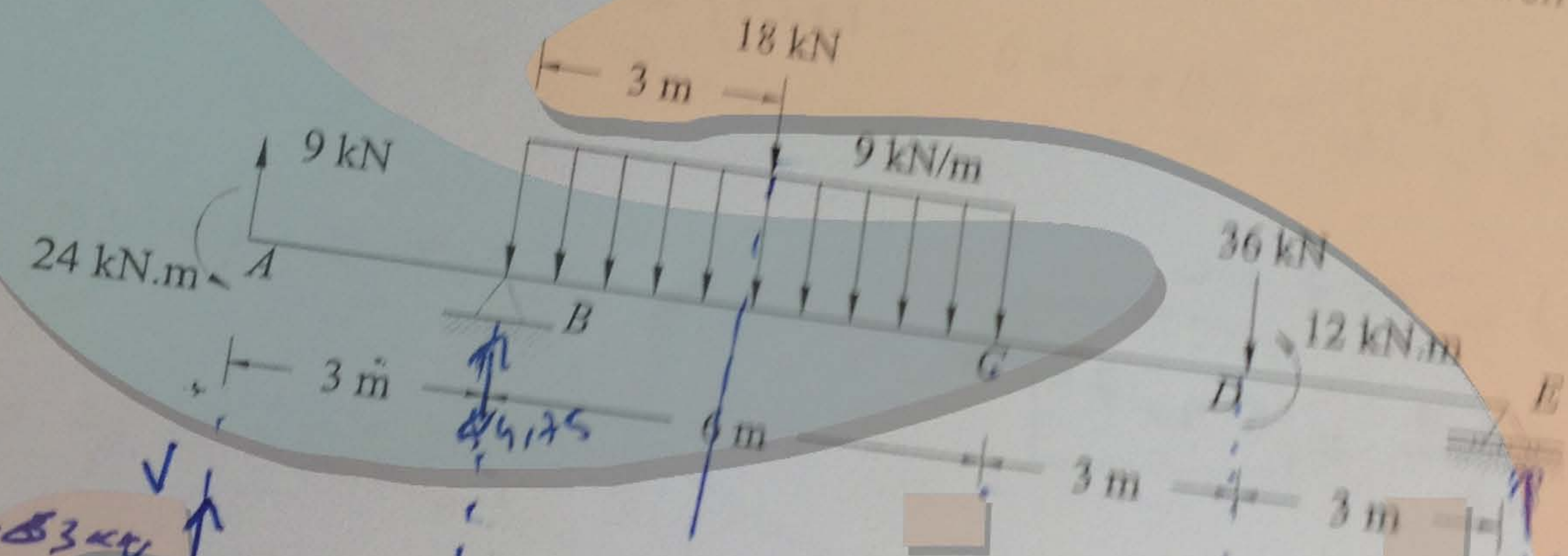
$$M_C = F_{AD} \cos 28 - 200 \cos 20$$

$$F_{AD} \cos 28 = 200 \cos 20$$

PROBLEM 3:
(40 points)

- a. Determine the reactions at **pin support B** and **roller support E** of the beam shown.
- b. Draw the diagrams of the shear force V , and moment M for the beam.

Show all details of calculation leading to drawing of the V and M diagrams, as well as all particular points.



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