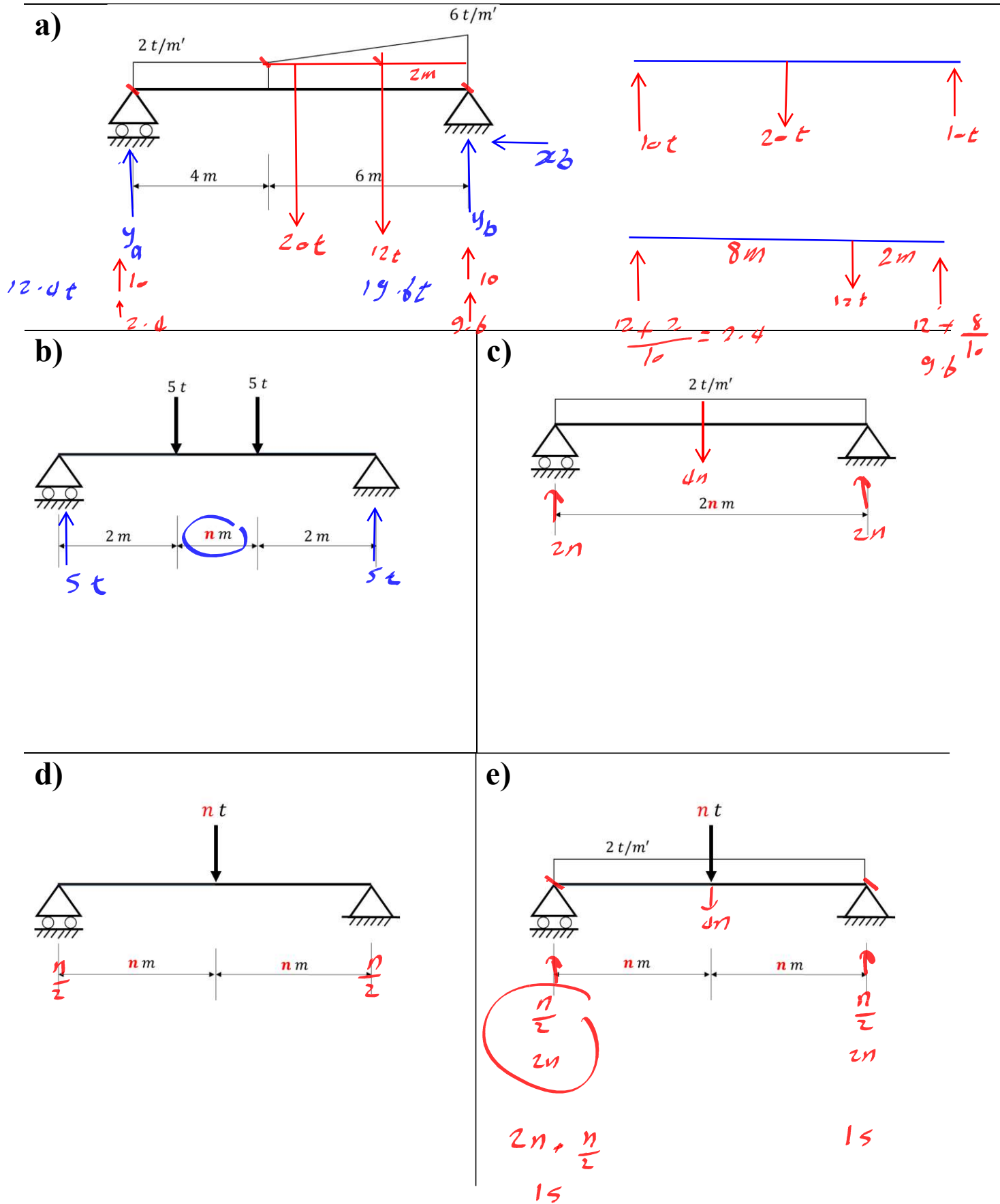


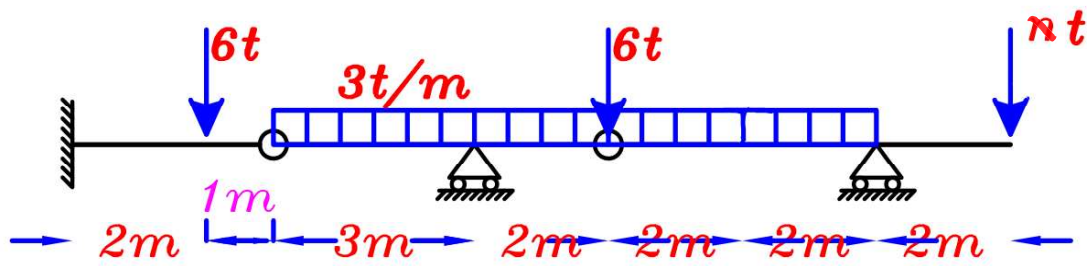
Question One: (20 Marks)

Calculate the reactions for the shown beams (a to e).



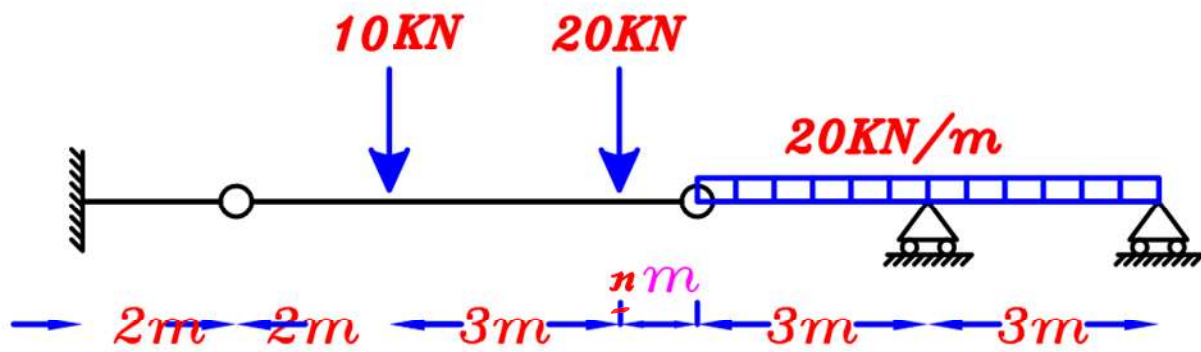
Question Two: (20 Marks)

Calculate the reactions for the shown beam.



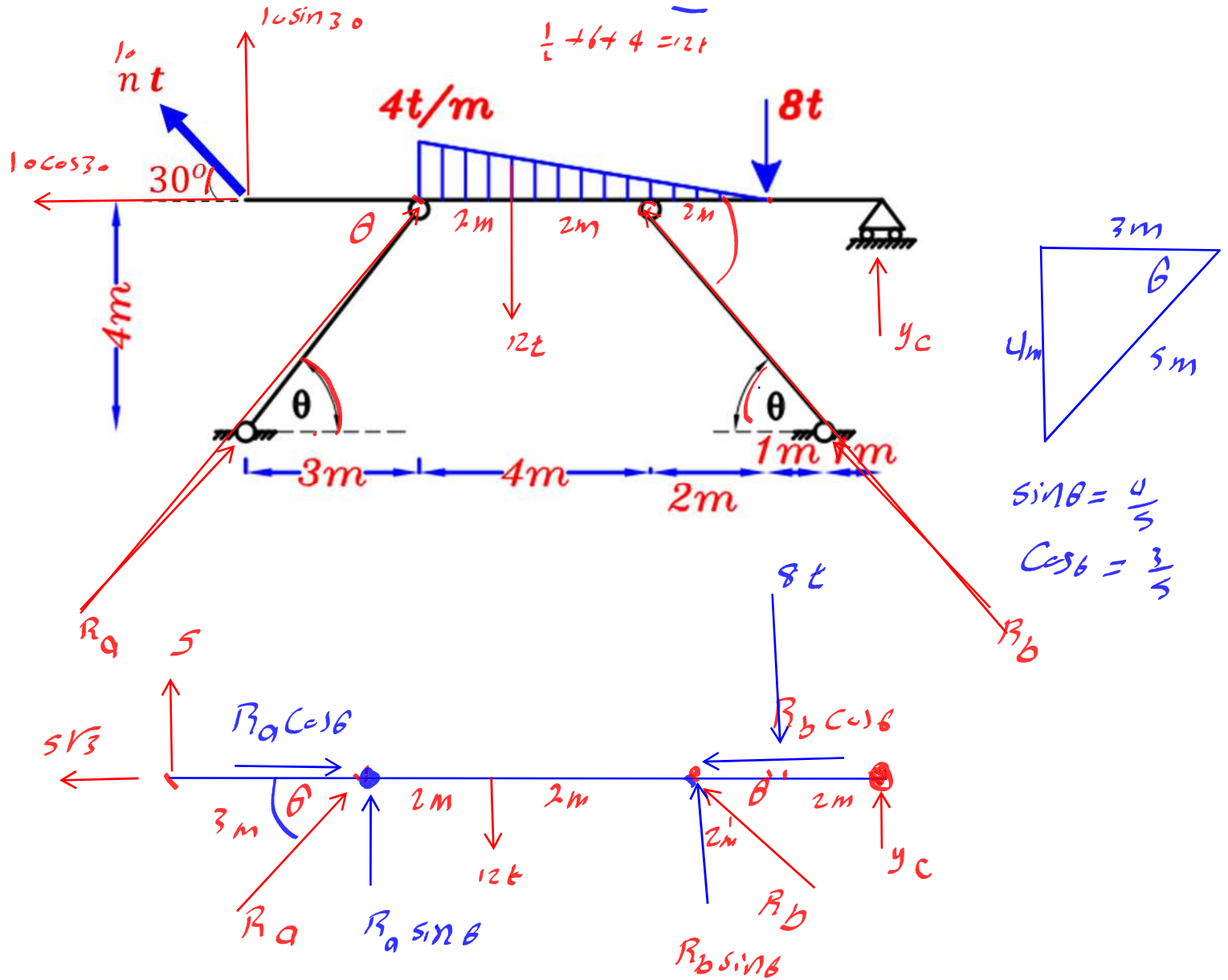
Question Three: (20 Marks)

Calculate the reactions for the shown beam.



Question Four: (20 Marks)

Calculate the reactions and the forces in the link members.



$$\sum F_x = -5\sqrt{3} + R_a \frac{3}{5} - R_b \times \frac{3}{5} = 0 \Rightarrow \frac{3}{5} R_a - \frac{3}{5} R_b = 5\sqrt{3} \quad *$$

$$\sum M_c = 8 \times 2 - R_b + \frac{4}{5} \times 4m + 12 \times 6 - R_a \times \frac{4}{5} \times 8 - 5 \times 11 = 0$$

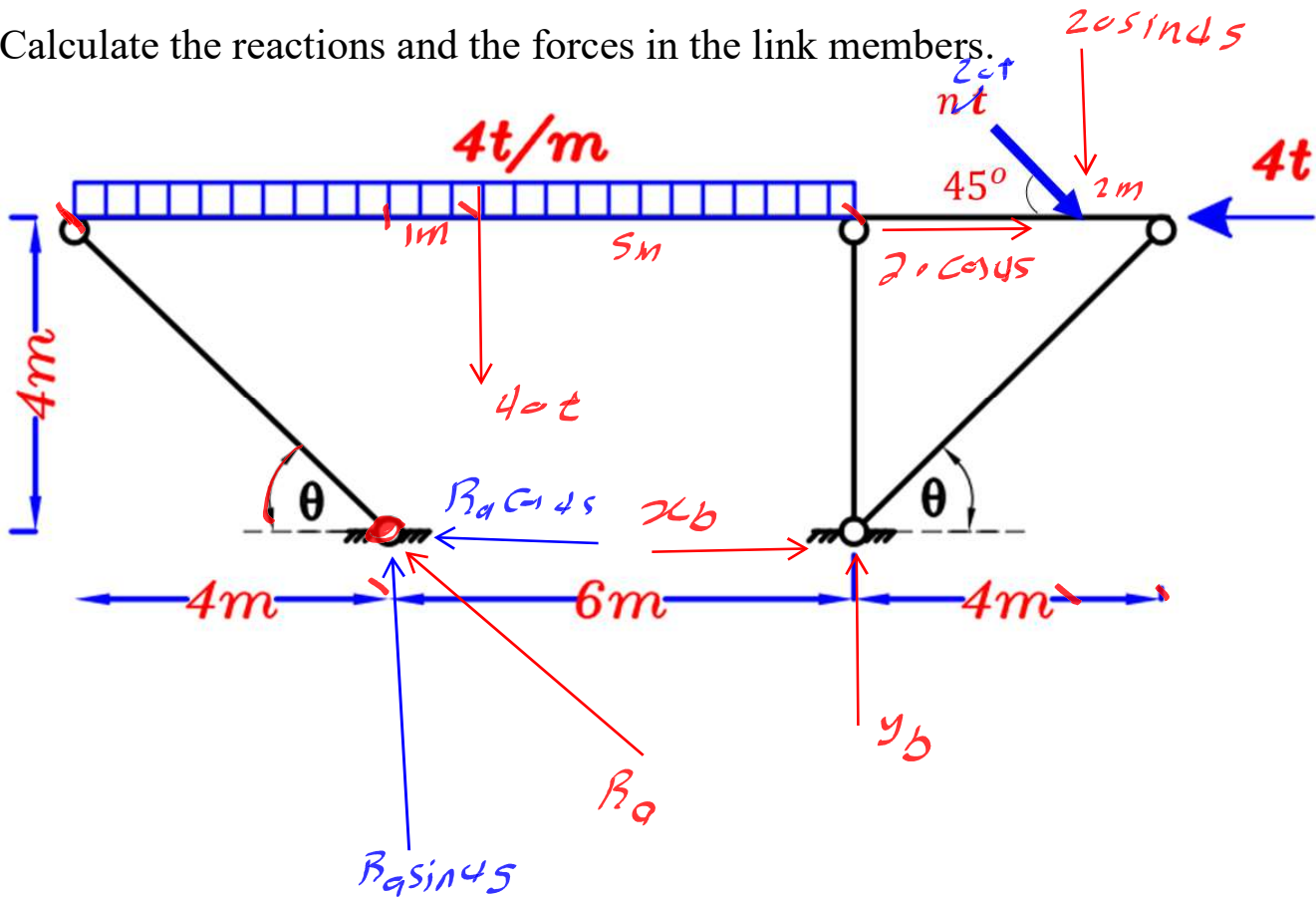
$$-R_a \times \frac{4}{5} \times 8 - R_b + \frac{4}{5} \times 4 = -8 \times 2 - 12 \times 6 + 5 \times 11 \quad *$$

$$R_a = 8.25t \text{ Com}, R_b = -6.2t \Rightarrow 6.2t \text{ Tension}$$

$$\sum F_y = 5 + 8.25 \times \frac{4}{5} - 12 + (-6.2) \times \frac{4}{5} - 8 + y_c = 0 \Rightarrow y_c = 13.76t$$

Question Five: (20 Marks)

Calculate the reactions and the forces in the link members.



$$\sum M_a = -40 \times 1 + y_b \times 6 - 20 \cos 45^\circ \times 4 - 20 \sin 45^\circ \times 8 + 4 \times 4 = 0$$

$$y_b = 32.28t$$

$$\sum F_y = -40 + R_a \sin 45^\circ + 32.28 - 20 \sin 45^\circ = 0$$

$$R_a = 30.92t \text{ Comp}$$

$$\sum F_x = -R_a \cos 45^\circ + x_b + 20 \cos 45^\circ - 4 = 0$$

$$x_b = 11.72t$$

$$\sum F_x = 11.72 + t_1 \cos 45^\circ = 0$$

$$t_1 = \frac{-11.72}{\cos 45^\circ}$$

$$t_1 = 16.57 \text{ Comp}$$

$$\sum F_y = 32.28$$

$$+ t_1 \sin 45^\circ + t_2 = 0$$

$$t_2 = +20.44 \text{ Comp}$$

