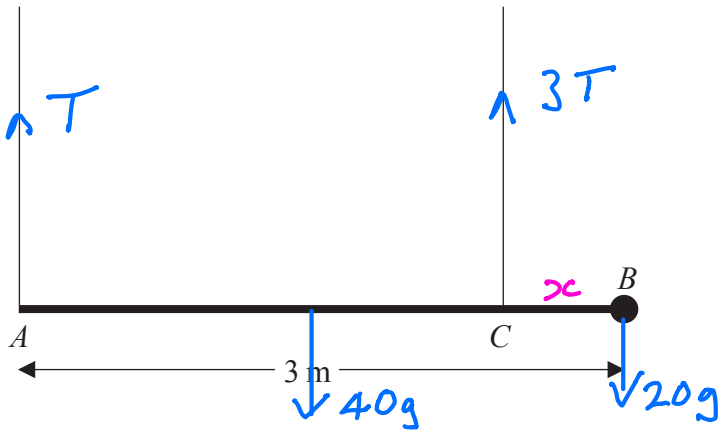
Leave blank

2. **Figure 1**



A plank AB has mass 40 kg and length 3 m. A load of mass 20 kg is attached to the plank at B. The loaded plank is held in equilibrium, with AB horizontal, by two vertical ropes attached at A and C, as shown in Figure 1. The plank is modelled as a uniform rod and the load as a particle. Given that the tension in the rope at C is three times the tension in the rope at A, calculate

(a) the tension in the rope at C,

(2)

(b) the distance CB.

(5)

a) ↕ equilibrium $4T = 60g$

$T = 15g$

$3T = 45g = 441\text{ N}$

Tension at $C = 441\text{ N}$

b) Moments about B

$T \times 3 + 3T \times x = 40g \times 1.5$

$441 + 441x = 588$

$441x = 147$

$x = \frac{147}{441} = \frac{1}{3}\text{ m}$