

1) Taking moments about the centre.

clockwise moments = anti clockwise moments

$$x(45g) = 2(30g)$$

$$x = \frac{60g}{45g}$$

$$x = \underline{\underline{\frac{4}{3} \text{ m}}}$$

2) a) Forces up = Forces down
 $R_c + R_D = 4g$

Taking moments about C:

$$1(4g) = 1.5 R_D$$

$$\underline{\underline{\frac{8}{3}g}} = R_D$$

$$R_D = \underline{\underline{\frac{8}{3}g \text{ N}}}$$

$$R_c = 4g - \frac{8}{3}g \\ = \underline{\underline{\frac{4}{3}g \text{ N}}}$$

b) $R_c = 0$

Moments about D.

$$1(w) = 0.5(4g)$$

$$w = \underline{\underline{2g \text{ N}}}$$

c) Forces Up = Forces Down

$$R_D = 4g + 2g \\ = \underline{\underline{6g \text{ N}}}$$

$$3a) \quad \text{Forces up} = \text{Forces Down}$$

$$2T_c + T_c = 12g$$

$$3T_c = 12g$$

$$T_c = \underline{\underline{4g \text{ N}}}$$

b/

$$\underline{\underline{T_n = 8g \text{ N}}}$$

Taking moments about A

$$12g(x) = 4(4g)$$

$$12g(x) = 16g$$

$$x = \underline{\underline{\frac{4}{3} \text{ m}}}$$

$$4) \quad \text{Forces up} = \text{Forces Down}$$

$$T + T + 10 = 10g + 15g$$

$$2T + 10 = 25g$$

$$2T = 25g - 10$$

$$T = \frac{25g - 10}{2}$$

$$T_B = 117.5 \text{ N}$$

$$T_A = 127.5 \text{ N}$$

moments about A:

$$40(10g) + x(15g) = 200(117.5)$$

$$x = \frac{200(117.5) - 400g}{15g}$$

$$= 133 \text{ cm (nearest cm)}$$