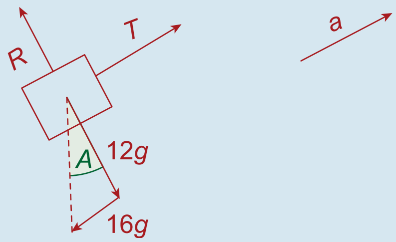
Q. 6. Since $\tan A = \frac{4}{3}$, $\sin A = \left(\frac{4}{5}\right)$, $\cos A = \frac{3}{5}$

(i) **20 kg's**

Forces **Acceleration**

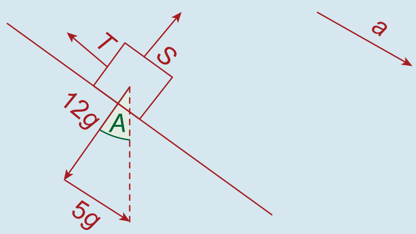


$T - 16g = 20a$ **Equation 1**

Since $\tan B = \frac{5}{12}$, $\sin B = \frac{5}{13}$, $\cos B = \frac{12}{13}$

13 kg's

Forces **Acceleration**



$5g - T = 13a$ **Equation 2**

Adding these gives

$-11g = 33a$

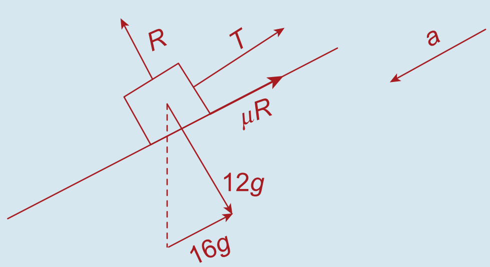
$\Rightarrow a = -\frac{1}{3}g$ (i.e. they go the other way)

The acceleration of the masses is

$\frac{1}{3}g$ m/s^2 and $T = \frac{28}{3}g$ N

(ii) **20 kg's**

Forces **Acceleration**



$R = 12g$

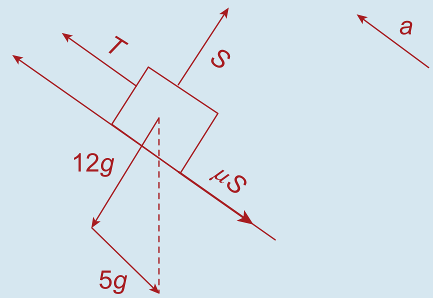
$\Rightarrow \mu R = \frac{1}{4}(12g) = 3g$

$16g - 3g - T = 20a$

$13g - T = 20a$ **Equation 1**

(ii) **12 kg's**

Forces **Acceleration**



Similarly,

$S = 12g \Rightarrow \mu S = \frac{1}{4}(12g) = 3g$

$T - 3g - 5g = 13a$

$\Rightarrow T - 8g = 13a$ **Equation 2**

Adding these gives:

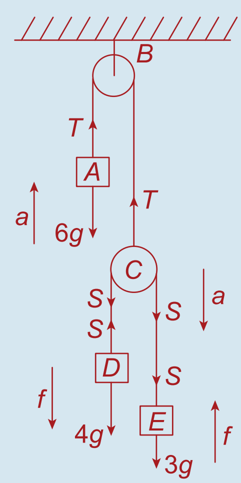
$5g = 33a$

$\Rightarrow a = \frac{5}{33}g$ m/s^2

$\Rightarrow T = \frac{329}{330}g$ N

Exercise 5F

Q. 1.



A: $T - 6g = 6a$

C: $2S - T = 0$

$\Rightarrow T = 2s$

D: $4g - S = 4(a + f)$

E: $S - 3g = 3(f - a)$

A becomes $2S - 6g = 6a$

$S = 3a + 3g$

$\therefore D$ becomes $4g - 3a - 3g = 4a + 4f$

$\Rightarrow 7a + 4f = g$