

Ex 5C, P98

① (↑) : $R + 50 \sin 30 - 10g = 0 \Rightarrow R = \dots$

(→) : $50 \cos 30 = 10a \Rightarrow a = \dots$

② (↑) : $R + P \sin 30 = 10g \Rightarrow R = \dots$

(→) : $P \cos 30 = 10(5\sqrt{3}) \Rightarrow P = \dots$

④ (↑) : $R - 10g - 50 \sin 20 + 50 \sin 20 = 0 \Rightarrow R = \dots$

(←) : $50 \cos 20 + 50 \cos 20 = 10a \Rightarrow a = \dots$

⑦ (↖) : $P - 10g \sin 30 = 20 \Rightarrow P = \dots$

(↗) : $R - 10g \cos 30 = 0$

⑧ (↙) : $10g \sin 40 + 50 \cos 40 = 10a \Rightarrow a = \dots$

(↘) : $R - 10g \cos 40 + 50 \sin 40 = 0 \Rightarrow R = \dots$

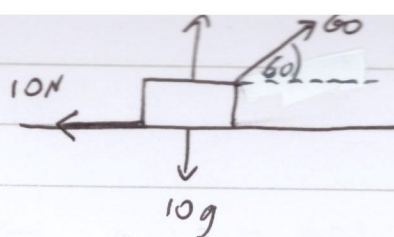
⑩ (↓) : $8g - T = 8a$

(↗) : $T - 10g \sin 30 = 10a$

So $a = 1.633\dots$ & $T = 65.33\dots$

⑪

(12)



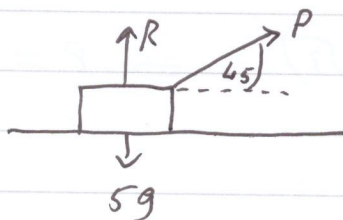
S	U	V	A	T
?	0		?	3

Find \underline{a} : (\rightarrow) : $60 \cos 60 - 10 = 10a$

$$\Rightarrow a = 2 \text{ m/s}^2$$

So $S = ut + \frac{1}{2} at^2 \Rightarrow S = 0 + \frac{1}{2} (2) (9) = 9 \text{ m}$

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S	U	V	A	T
10	0		?	5

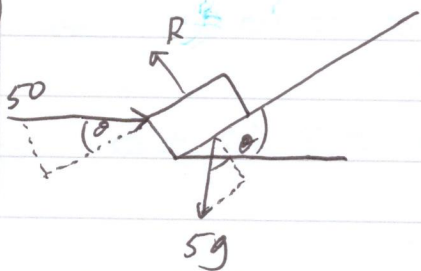
So $S = ut + \frac{1}{2} at^2 \Rightarrow 10 = 0 + \frac{1}{2} (a) (25)$
 $\Rightarrow a = 0.8 \text{ m/s}^2$

Then (\rightarrow) : $P \cos 45 = 5 (0.8)$

$$\therefore P = 4\sqrt{2}$$

ultimately $R = \dots$

(14)



$$\sin \theta = \frac{3}{5}, \therefore \cos \theta = \frac{4}{5}$$

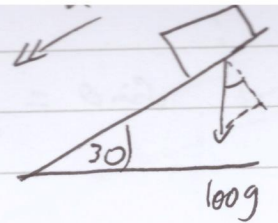
(\uparrow) : $R - 5g \cos \theta - 50 \sin 30 = 0$

$$\therefore R = 49 + 30 = 69.2 \text{ N}$$

(\nearrow) : $+50 \cos \theta - 5g \sin \theta = 5a \Rightarrow a = \frac{40 - 3g}{5} = 2.12 \text{ m/s}^2$

$\left. \begin{array}{l} S \quad U \quad V \quad A \quad T \\ ? \quad 0 \quad \checkmark \quad 4 \end{array} \right\} \text{ So } S = ut + \frac{1}{2} at^2 \Rightarrow S = 0 + \frac{1}{2} (2.12) (16)$
 $= 16.96 \text{ m}$

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S	U	V	A	T
20	0	?	?	

So, (\downarrow): $100g \sin 30 = 100a$ *

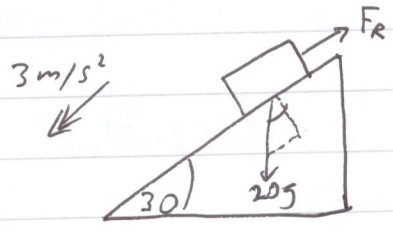
$\Rightarrow a = g \sin 30 = 4.9 \text{ m/s}^2$

$\therefore v^2 = u^2 + 2as \Rightarrow v^2 = 0 + 2(4.9)(20)$
 $= 196 \text{ m/s}$

$\therefore v = 14 \text{ m/s}$

If mass = 50 kg, v is the same since mass values cancel in *

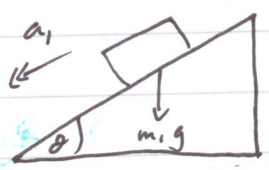
(16)



(\downarrow): $20g \sin 30 - F_r = 20a$

$\Rightarrow F_r = 38 \text{ N}$

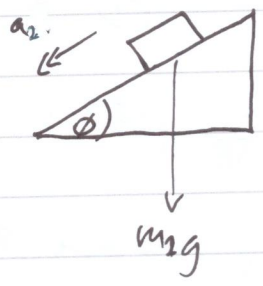
(17)



$\sin \theta \approx \frac{1}{48}$

So $m_1 g \sin \theta = m_1 a_1 \Rightarrow a_1 = g \cdot \frac{1}{48}$

(18)

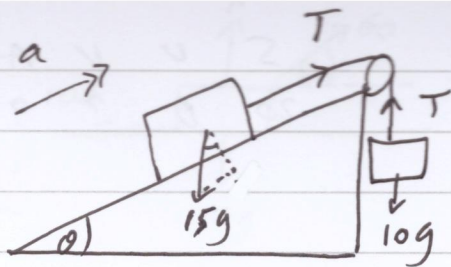


$\sin \phi \approx \frac{1}{70}$

So $m_2 g \sin \phi = m_2 a_2 \Rightarrow a_2 = g \cdot \frac{1}{70}$

S	U	V	A	T	} So $s = ut + \frac{1}{2} at^2 \Rightarrow 5 = 0 + \frac{1}{2} (g \cdot \frac{1}{48}) t_1^2$
5	0	v	?	$\& 6 = 0 + \frac{1}{2} g (\frac{1}{70}) t_2^2$	
6	0	v	?	$\Rightarrow t = t_1 - t_2 = 10 - 9.258 = 0.74 \text{ Secs } \checkmark$	

(19)



$$\sin \theta = \frac{1}{49} \text{ (given)}$$

$$(\nearrow) : T - 15g \sin \theta = T - \frac{15g}{49} = 15a$$

$$(\downarrow) : 10g - T = 10a$$

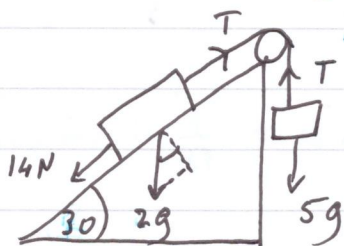
$$\text{adding: } 10g - \frac{15g}{49} = 25a \Rightarrow a = 3.8 \text{ m/s}^2$$

S	U	V	A	T
?	0		3.8	2

$$\text{So } S = ut + \frac{1}{2} at^2 \Rightarrow S = 0 + \frac{1}{2} (3.8) \times 2^2$$

$$\Rightarrow S = 7.6 \text{ m}$$

(20)



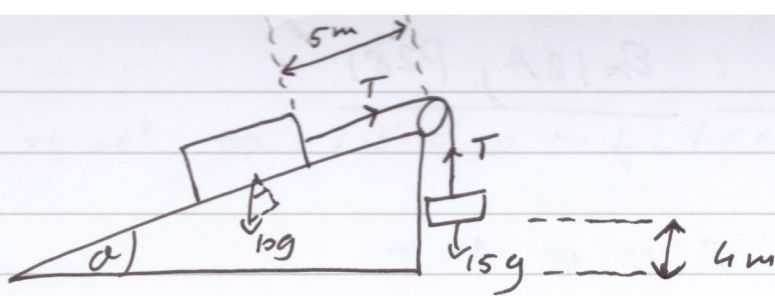
$$(\nearrow) \quad T - 14 - 2g \sin 30 = 2a \quad (1)$$

$$(\downarrow) \quad 5g - T = 5a \quad (2)$$

$$\text{adding: } 5g - 14 - 2g \sin 30 = 7a \Rightarrow a = 3.6 \text{ m/s}^2$$

$$\text{So into (2): } T = 5g - 5(3.6) = 31 \text{ N}$$

(21)



S U V A T
 4 0 $?$ $1\frac{3}{7}$
 (Notes)
 (Why?)

$$\therefore S = ut + \frac{1}{2}at^2 \Rightarrow 4 = 0 + \frac{1}{2}(a)\left(1\frac{3}{7}\right)^2$$

$$\Rightarrow a = 3.92 \text{ m/s}^2$$

Resolve (\nearrow): $T - 10g \sin\theta = 10(3.92)$

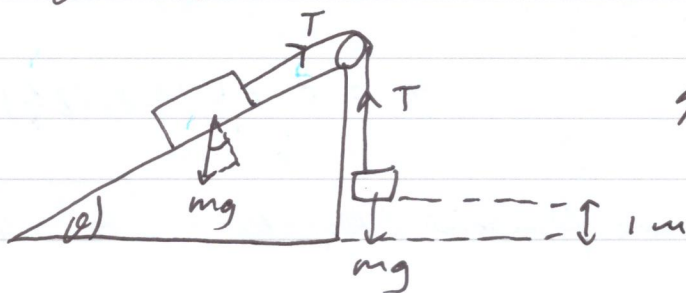
(\downarrow): $15g - T = 15(3.92)$

add: $15g - 10g \sin\theta = 25(3.92)$

$$\therefore \sin\theta = \frac{15g - 25(3.92)}{10g} = \frac{49}{98} = \frac{1}{2}$$

So $\theta = 30^\circ$.

(22)
(22)



given $\sin\theta = \frac{1}{14}$

(\nearrow): $T - mg \sin\theta = ma$

(\downarrow): $mg - T = ma$

add: $mg - mg \cdot \frac{1}{14} = 2ma \Rightarrow mg\left(1 - \frac{1}{14}\right) = 2ma \Rightarrow a = 4.55$

S U V A T

1 0 4.55 $?$

$$\text{So } S = ut + \frac{1}{2}at^2 \Rightarrow 1 = 0 + \frac{1}{2}(4.55)t^2$$

$$\Rightarrow t = 0.663 \text{ Sec.}$$

(Not 2 n. 01)