

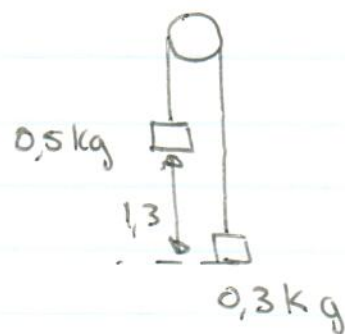
## Week 14

### Exercise 9B

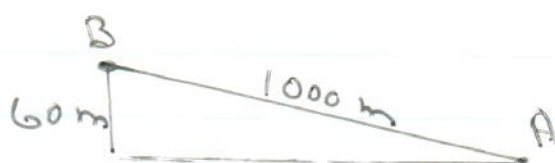
$$(1) (E_k)_1 + (E_p)_1 = (E_k)_2 + (E_p)_2$$

$$0 + 0,5(10)1,3 = \frac{1}{2}(0,5+0,3)v_2^2 + 0,3(10)1,3$$

$$\therefore v = 2,55 \text{ m}\cdot\text{s}^{-1}$$



(8)



$$(E_k)_A + (E_p)_A + \sum W_{N-c} = (E_k)_B + (E_p)_B$$

$$\frac{1}{2} 1200(25)^2 + 1200(0) + 1600(1000) - 1150(1000)$$

$$= \frac{1}{2} 1200 v_2^2 + 1200(10)(60)$$

$$\therefore v_2 = 13,2 \text{ m}\cdot\text{s}^{-1}$$

①

Miscellaneous Ex. 9

$$(1) (E_k)_1 + (E_p)_1 = (E_k)_2 + (E_p)_2$$

$$0 + mga = \frac{1}{2}mv^2 + mg'a \cos \theta$$

$$\therefore v^2 = 2ga - 2ga \cos \theta$$

$$\therefore v = \sqrt{2ag(1 - \cos \theta)}$$

$$(7)(a) \text{ At P: } (E_k)_p = \frac{1}{2}(650)(15)^2 = 73125 \text{ J}$$

$$\text{At Q: } (E_k)_q = \frac{1}{2}(650)(35)^2 = 398125 \text{ J}$$

$$\therefore \Delta E_k = 398125 - 73125 = 325000 \text{ J}$$

$$(b) \text{ At P: } (E_p)_p = 650(10)400 \sin 5^\circ = 226605 \text{ J}$$

$$\text{At Q: } (E_p)_q = 0$$

$$\therefore \Delta E_p = 227 \text{ kJ}$$

$$(E_k)_p + (E_p)_p + \sum W = (E_k)_q + (E_p)_q$$

$$\therefore 73125 + 226605 + F \cdot 400 = 398125$$

$$\therefore F = 246 \text{ N}$$

$$\text{At Q, } v = 35 \text{ m s}^{-1} : P = F \cdot v = 246(35)$$

$$\therefore P = 8.61 \text{ kW}$$

P.T.O.

①

$$\sum F = ma$$

$$F_D - 900 + 650(10) \sin 5^\circ = 0$$

$$\therefore F_D = 333,5 \text{ N}$$

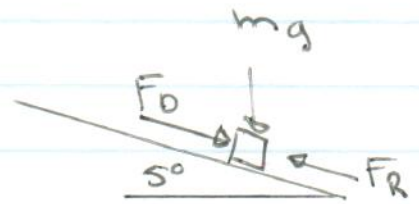
$$\therefore P = F_D \cdot v = 333,5(35) = 11672 \text{ W} \approx 11,7 \text{ kW}$$

At P:  $P = F_D \cdot v \Rightarrow F_D = \frac{P}{v} = \frac{11672}{15} = 778 \text{ N}$

$$\therefore \sum F = ma$$

$$\therefore 778 + 650(10) \sin 5^\circ - 900 = 650 a$$

$$\therefore a = 0,684 \text{ m s}^{-2}$$

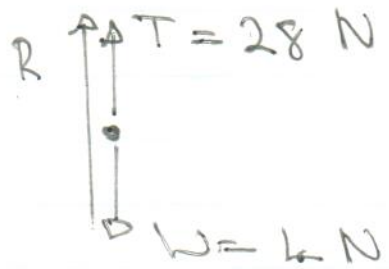


## Exercise 10 A

(3) (a)

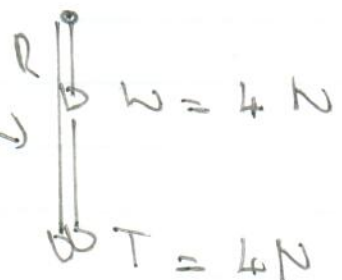
$$A) R = T - W = 28 - 4$$

$$\therefore R = 24 \text{ N } \uparrow \text{ (Vertically upwards)}$$



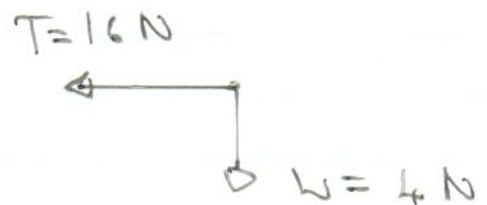
$$(b) \downarrow R = W + T = 4 + 4$$

$$\therefore R = 8 \text{ N } \downarrow \text{ (Vertically down)}$$

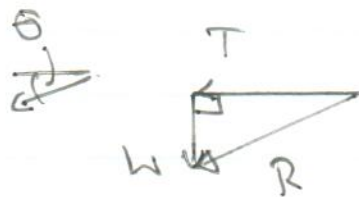


$$(c) R^2 = W^2 + T^2 \\ = 4^2 + 16^2$$

$$\therefore R = 16,5 \text{ N}$$

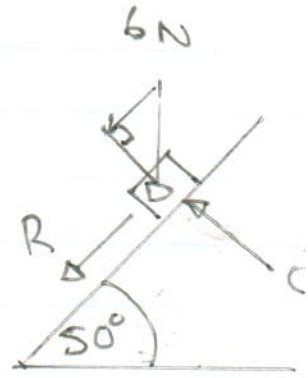
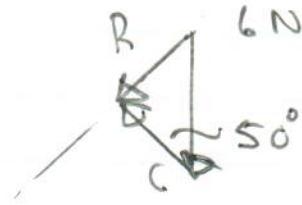


$$\theta = \tan^{-1}\left(\frac{4}{16}\right) = 14^\circ$$



(7)

(a)



$$R = 6 \sin 50^\circ = 4,6 \text{ N}$$

(b) ~~(a)~~  $\Sigma F = ma$

$$\therefore 4,6 = \frac{6}{10} \cdot a$$

$$\therefore a = 7,7 \text{ m} \cdot \text{s}^{-2}$$