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1-


(c)  $12t + 13$  

2-

(c)  $16$  

3-



(a)  $\frac{3}{2}ma = 34g - mg \rightarrow (1)$  


$ma = 32g - mg \rightarrow (2)$  


From (1) and (2) by subtraction

$\frac{1}{2}ma = 2g \Rightarrow ma = 4g \rightarrow (3)$

From (3) in (2)

$\therefore 4g = 32g - mg$    
 $mg = 28g \Rightarrow m = 28 \text{ kg}$  

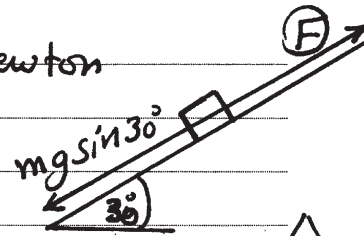
Sub. in (3)  $\Rightarrow 28a = 4g$  

$\therefore a = \frac{4g}{28} = \frac{4 \times 9.8}{28} = 1.4 \text{ m/sec}^2$  

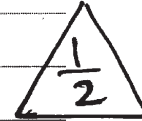
$$b) F = \frac{1}{2} \times 9.8 = 4.9 \text{ Newton}$$

$$mg \sin 30 = \frac{1}{2} \times 9.8 \times \sin 30$$

$$= 2.45 \text{ Newton}$$

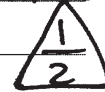


$$\therefore F > mg \sin 30$$



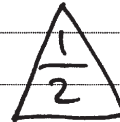
$\therefore$  The motion upwards the plane

$$\therefore ma = F - mg \sin 30$$



$$\frac{1}{2} a = 4.9 - 2.45$$

$$\therefore a = 4.9 \text{ m/sec}^2$$



after 2 sec.

$$V = U + at = 0 + 4.9 \times 2 = 9.8 \text{ m/sec.}$$



when the force vanish.

$$a' = -g \sin 30 = -9.8 \times \frac{1}{2}$$

$$\therefore a' = -4.9 \text{ m/sec}^2$$



$$\therefore V^2 = U^2 + 2a's$$

$$= (9.8)^2 - 2 \times 4.9 S$$

$$S = 9.8 \text{ meter.}$$



(تراجعى الحلول الأخرى)

4-

(b) 20



5-

(b) 168750



6-

$$a) P_A = mg \times 10$$

$$P_A = 0.3 \times 9.8 \times 10 = 29.4 \text{ Joule}$$



$$T_A = 0 \quad \therefore P_B = 0.3 \times 9.8 \times 3 = 8.82 \text{ Joule}$$



$$\therefore T_A + P_A = T_B + P_B$$



$$0 + 29.4 = T_B + 8.82$$

$$T_B = 29.4 - 8.82 = 20.58 \text{ Joule}$$



b)  $\therefore m(\angle AMC) = 120^\circ$

$\therefore m(\angle AMO) = 60^\circ$

In  $\triangle AOM$

$\therefore OM = 20\text{cm} \therefore BO = 20\text{cm}$

(i)  $P_A - P_B = mg \times 20$

$= 8 \times 980 \times 20 = 156800 \text{ Erg.}$

(ii)  $\therefore T_B + P_B = T_A + P_A$

$\therefore \frac{1}{2} mV^2 + 0 = 0 + 156800$

$4V^2 = 156800$

$V^2 = 39200$

$V \approx 198 \text{ cm/sec.}$

(تراجعى الحلول الأخرى)

النموذج (د)

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7-

(a) 32



8-

(b) 72



9-

$$\therefore v = \frac{dx}{dt}$$

$$\therefore x = \int_0^3 v dt = \int_0^3 (3t^2 - 2t) dt$$

$$\therefore x = [t^3 - t^2]_0^3 = 27 - 9 = 18 \text{ meter}$$

$\therefore$  The car will be at 18 m. apart from the start point.

$$\therefore a = \frac{dv}{dt} = 6t - 2$$

$$\text{at } t = 3 \text{ sec. } \therefore a = 6 \times 3 - 2 = 16 \text{ m/sec}^2$$

10-

$$\therefore m_1 v_1 + m_2 v_2 = m_1 v_1' + m_2 v_2'$$



$$\therefore 300 \times 5 + 300 \times 9 = 300 \times 8 + 300 v_2'$$



$$5 + 9 = 8 + v_2'$$

$$\therefore v_2' = 6 \text{ m/sec.}$$



in the same direction  
of its motion.



$$v_2 = 9 \text{ m/sec}$$

$$v_1 = 5 \text{ m/sec}$$

$$v_1' = 8 \text{ m/sec}$$

$$I = m_1 (v_1' - v_1)$$



$$I = 300 (8 - 5)$$

$$I = 900 \text{ gm.cm.sec}$$




(تراجعى الحلول الأخرى)

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11-

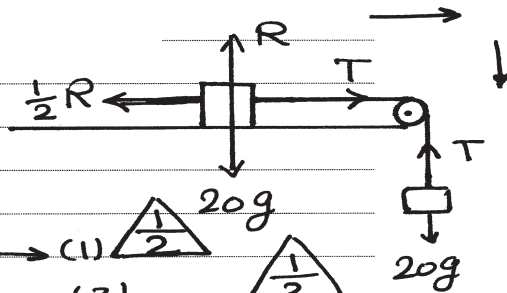
(d)  $t = \text{cost} - 2$  

12-

(c) 129.8 

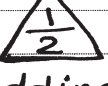
13-

$R = 20g$



equation of motion:


$20a = 20g - T$    $\rightarrow$  (1)

$20a = T - \frac{1}{2}R$    $\rightarrow$  (2)

by adding

$40a = 20g - \frac{1}{2} \times 20g$


$40a = 10g$

$a = \frac{1}{4}g = 245 \text{ cm/sec}^2$  

Subs. in (1)

$T = 20g - 20a$


$T = 20(980 - 245) = 14700 \text{ dyne}$  

$\therefore P = \sqrt{2}T = 14700\sqrt{2} \text{ dyne.}$  

$V^2 = u^2 + 2as$

$V^2 = 0 + 2 \times 245 \times 250$

$V = 350 \text{ cm/sec.}$

$\therefore$  The velocity of the suspended mass 

when it reached the ground = 350 cm/sec

14-

$$\vec{r} = (3t^2 + 2)\vec{i} + (4t^2 + 3)\vec{j}$$

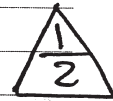
$$\vec{r}_0 = 2\vec{i} + 3\vec{j}$$

$$\Delta \vec{r} = \vec{r} - \vec{r}_0$$

$$\Delta \vec{r} = 3t^2\vec{i} + 4t^2\vec{j}$$

$$\vec{v} = \frac{d\vec{r}}{dt} = 6t\vec{i} + 8t\vec{j}$$

$$\vec{a} = \frac{d\vec{v}}{dt} = 6\vec{i} + 8\vec{j}$$



$$\vec{F} = m\vec{a} = 3(6\vec{i} + 8\vec{j})$$

$$\vec{F} = 18\vec{i} + 24\vec{j}$$

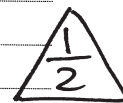
∴ the force is constant



$$\therefore W = \vec{F} \cdot \vec{s}$$

$$= (18, 24) \cdot (3t^2, 4t^2)$$

$$= 150t^2$$



The work done in the interval from  $t=1$  to  $t=5$

$$W = [150t^2]_1^5$$

$$= 150(5)^2 - 150(1)^2 = 3600 \text{ work unit}$$



(تراجعى الحلول الأخرى)



15-


(c) 3.5 

16-

(b) 9 


17-

(a) The equation of  $\vec{OA}$


$$\frac{F-0}{n-0} = \frac{5-0}{2-0} \Rightarrow F = \frac{5}{2} t$$



the impulse during the 1<sup>st</sup> sec.

$$I = \int_0^1 F dt = \int_0^1 \frac{5}{2} t \cdot dt = \left[ \frac{5t^2}{4} \right]_0^1$$

$$I = \frac{5}{4} \text{ Newton} \cdot \text{sec.}$$


(b) The impulse during the interval  $[0, 6]$

$$I = \int_0^2 \frac{5}{2} t dt + \int_2^6 5 dt$$


$$= \left[ \frac{5t^2}{4} \right]_0^2 + \left[ 5t \right]_2^6 = 5 + (30 - 10) = 25 \text{ Newton} \cdot \text{Sec.}$$


18-

let the number of boxes =  $y$

$$W = 30y \times 9.8 \times 0.9$$

$$\therefore \text{The average power} = \frac{\text{Work}}{\text{time}}$$

$$30y \times 9.8 \times 0.9 = 0.3 \times 75 \times 9.8 \times 60$$

$$y = 50$$

$\therefore$  Number of boxes = 50 box

(تراجعى الحلول الأخرى)

(انتهت الإجابة وتراجعى الحلول الأخرى)