(١)

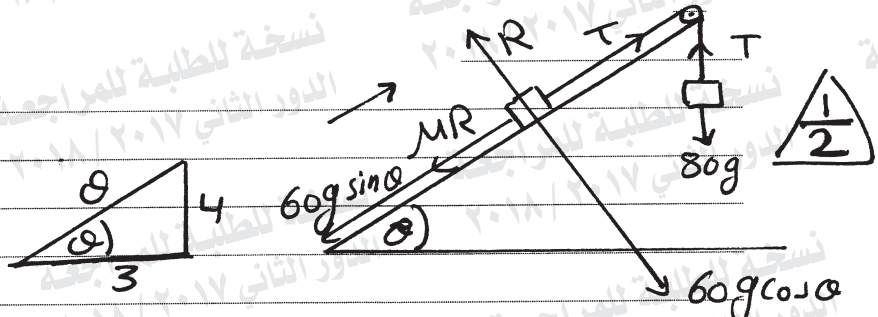
**1-**

(d) 5 (1)

**2-**

(a) 100 (1)

**3-**




(1/2)

$\because u=0 \ , s=49\ cm \ , t=1\ sec.$

$\because s=ut+\frac{1}{2}at^2$

$\therefore 49=0+\frac{1}{2}\times a\times 1$ $\quad \therefore a=98\ cm/sec^2$ (1/2)

$R=60g\cos\alpha=36g$ (1/2)

$\because 80>60g\sin\alpha$ $\quad \therefore$ the motion upwards

$\therefore 80a=80g-T$ (1/2)

$60a=T-60g\sin\alpha-MR$ (1/2)

by adding.

$140a=80g-60g\sin\alpha-MR$

$14-32=-36M$

$M_k=\frac{1}{2}$ (1/2)

4-

[a] $I = \int_0^t f\,dt = \int_0^3 (3t^2 - 2t)\,dt$ (1/2) $= [t^3 - t^2]_0^3$

$= (72 - 9) = 18$ Newton.sec (1/2)

[b] $I = \int_3^4 (3t^2 - 2t)\,dt$ (1/2) $= [t^3 - t^2]_3^4$

$= 48 - 18 = 30$ Newton.sec (1/2)

(تراعى الحلول الأخرى)

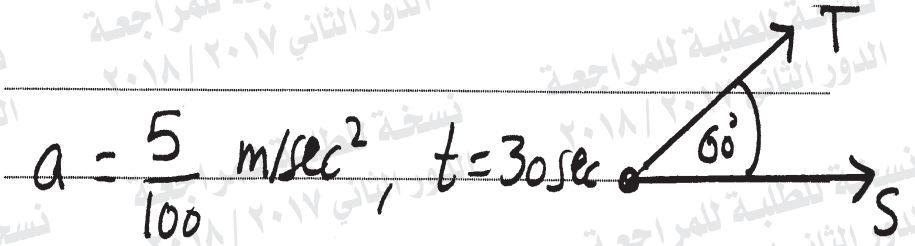
**5-**

(C) 1000 Newton (1)

**6-**

(b) 1 (1)

**7-**




$a = \frac{5}{100}$ m/sec$^2$, $t = 30$ sec

$\because S = ut + \frac{1}{2}at^2$

$S = 0 + \frac{1}{2} \times \frac{5}{100} \times (30)^2 = 22.5$ meter (1)

$W = FS \cos 60^\circ$ ($\frac{1}{2}$)

$= 500 \times 9.8 \times 22.5 \times \frac{1}{2} = 55125$ Joule ($\frac{1}{2}$)

**8-**

Power = F x V $\frac{1}{2}$

$210 \times 75 = F \times 63 \times \frac{5}{18}$

$F = 900$ kg.wt. $\frac{1}{2}$

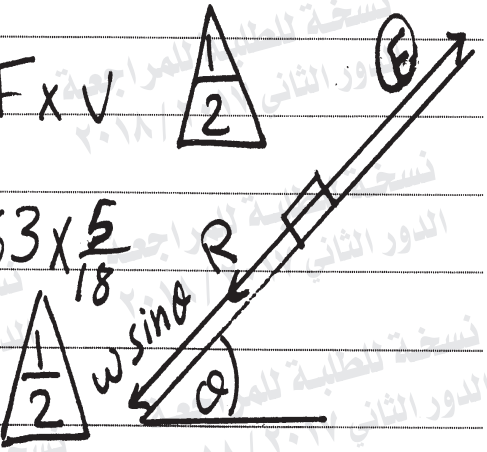
$F = R + w \sin\theta$ $\frac{1}{2}$

$R = F - w \sin\theta$

$R = 900 - 6 \times 10^3 \times \frac{1}{100} = 840$ kg.wt

The resistance per each ton $= \frac{840}{6}$ $\frac{1}{2}$

$= 140$ kg.wt /ton




(تراعى الحلول الأخرى)

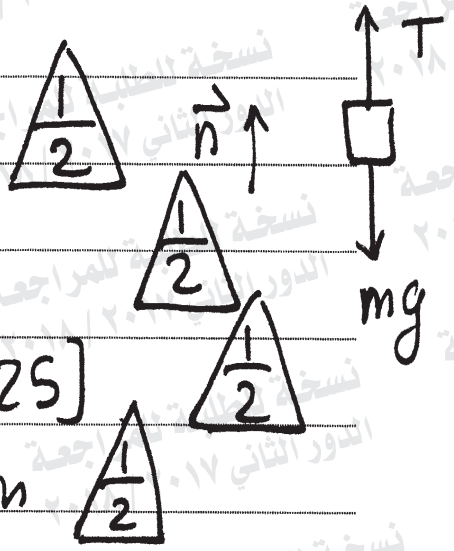
**9-**

(d) 5 1

**10-**

(c) 1 1

**11-**

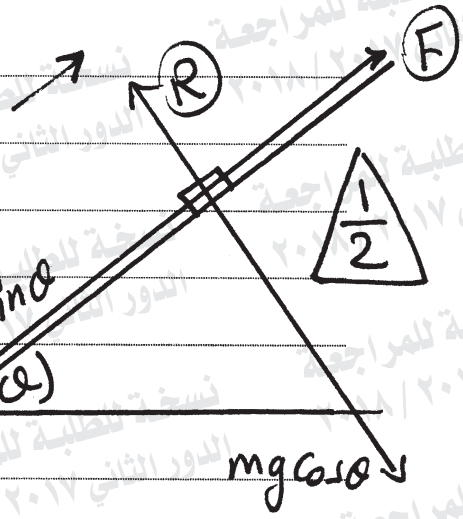



(a) $ma = T - mg$ $\frac{1}{2}$

$T = m(a+g)$ $\frac{1}{2}$

$T = 100[9.8 + 0.25]$ $\frac{1}{2}$

$T = 1005$ Newton $\frac{1}{2}$




[b] $F = 80$ newton

$mg\sin\theta = 10 \times 9.8 \times \frac{3}{5}$

$= 58.8$ N

$\therefore F > mg\sin\theta$ (1/2)

$\therefore$ The motion upwards

$\therefore -mg\sin\theta + F = ma$

$10a = 80 - 58.8$

$\therefore a = 2.12$ m/sec$^2$ upwards (1/2)

$R = mg\cos\theta$

$R = 10 \times 9.8 \times \frac{4}{5}$

$R = 78.4$ newton (1/2)

(تراعى الحلول الأخرى)

**12-**

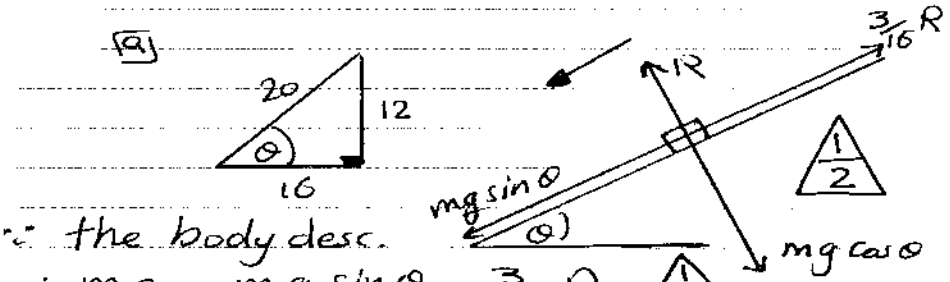
(b) 480 (1)

**13-**

(c) 180 (1)

**14-**

(a)




(1/2)

∵ the body desc.

$ma = mg\sin\theta - \frac{3}{16}R$ (1/2)

$ma = mg\sin\theta - \frac{3}{16} \times mg\cos\theta$ (1/2)

$\therefore a = 9.8\left[\frac{12}{20} - \frac{3}{16} \times \frac{16}{20}\right] = 4.41\ m/sec^2$ (1/2)

$v^2 = u^2 + 2gs$

$= 0 + 2 \times 4.41 \times 20 = 176.4$ (1/2)

$T = \frac{1}{2}mv^2 = \frac{1}{2} \times 60 \times 176.4 = 5292$ Joule (1/2)

Another solutions:

$T - T_0 = \omega$ (1/2)

$T - 0 = (mg\sin\theta - \mu R)s$ (1)

$T = \left[60 \times 9.8 \times \frac{12}{20} - \frac{3}{16} \times 60 \times 9.8 \times \frac{16}{20}\right] \times 20$ (1)

$T = 5292$ Joule (1/2)

(b) $\vec{S} = \vec{r} - \vec{r}_0$ ½

$\vec{S} = 2t^2\,\vec{i} + 4\,\vec{j}$ ½

$W = \vec{F} \cdot \vec{S}$ ½

$= (4,5) \cdot (2t^2, 4t)$

$= 8t^2 + 20t$ ½

from $t = 0$ to $t = 2$

$W = [8t^2 + 20t]_0^2 = 72$ Joule ½

∴ The change in potential energy $= -W$

$= -72$ Joule ½

(تراعى الحلول الأخرى)

**15-**

(b) 320 (1)

**16-**

(a) 0.1 (1)

**17-**

$\because V = 6t^2 - 24$
when the velocity reaches 72 m/sec

$\therefore 72 = 6t^2 - 24$ (1/2)
$\therefore t = 4$ sec.

at $V = 30$ m/sec.
$\therefore 30 = 6t^2 - 24$ (1/2)
$\therefore t = 3$ sec.

$\because a = \frac{dv}{dt} = 12t$

at $t = 3$sec. $\Rightarrow a = 12 \times 3 = 36$ m/sec$^2$ (1/2)

$S = \int_1^4 V\,dt$ (1/2) $= \int_1^4 (6t^2 - 24)\,dt$ (1/2)

$S = [2t^3 - 24t]_1^4 = -32 + 22 = 54$ meter (1/2)

**18-**

$m_1v_1 + m_2v_2 = m_1v_1' + m_2v_2'$ (1/2)

200 (200) 600 (600)

$200 \times 20 = 600 \times 4$

$= -200 \times 16 + 600v_2'$ (1/2) $v_1 = 20$ $v_2 = 4$

$1600 + 3200 = 600v_2'$ $v_1' = 16$

$v_2' = 8$ m/Sec. (1/2) The rebound velocity of 2nd ball (1/2)

$I = m_1(v_1' - v_1) = 200(-16 - 20)$ (1/2)

$I = -7200$

$I = 7200$ gm. m/sec. (1/2)

(تراعى الحلول الأخرى)

(انتهت الإجابة وتراعى الحلول الأخرى)