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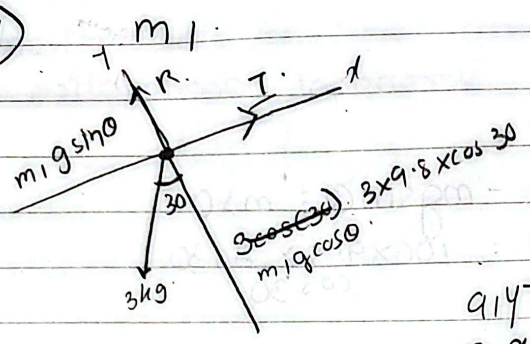
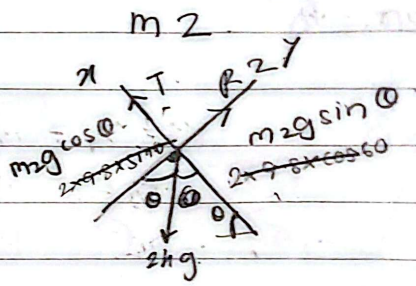
7)



$a_1y = 0$

$a_1x = a$



$m_1g\sin\theta_1 = 14.7$

$m_2g\sin\theta_2 = 16.97$

$a_1y = 0$

$a_1x = a$

$m_2g\sin\theta_2 - T = m_2a$

$16.97 - T = 2a$

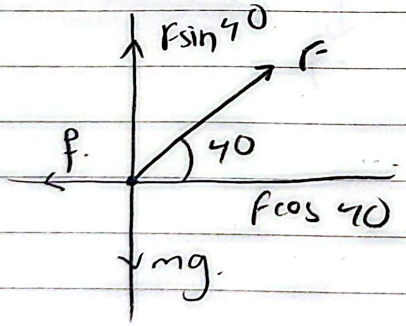
$T - m_1g\sin\theta = m_1a$

$T - 14.7 = 3a$

$T = 16.06\ N$

* Frictional force, $F = \mu R$

49.



$\mu_s = 0.5$

$\mu_k = 0.4$

$R = 2\times9.8 - 8\times\sin40$

$R = 14.45\ N$

$f_{s,max} = 0.5\times14.45 = 7.225\ N$

6, 11, 21, 23, 27, 28.
32, 35, 36, 39. 43, 48, 91,
105 Date / /

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6) $r = 3ti - 4t^2 j + 2k$

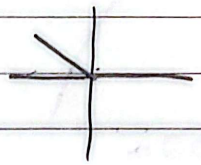
a) $v_t = 3i - 8tj + 0k$

a) $= 3i - 16j + 0k$

b) $= 16.28 \text{ ms}^{-1}$

c) $\tan^{-1}\left(\frac{8}{3t}\right)$ $\tan^{-1}\left(\frac{-16}{3}\right) = 79.38$

$= 100.62°$



21)

a) $V_{0x} = 10 \text{ ms}^{-1}$

$t = 0.19\text{s}$

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

$V_y = 0$

$s = \frac{1}{2}gt^2$

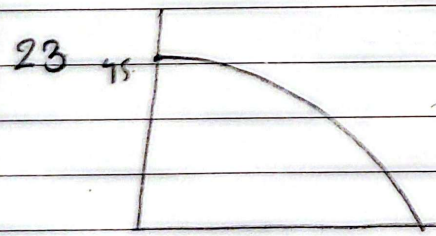
$= \frac{1}{2}(9.8)(0.19)^2 = 0.18$

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

$= ut + 0$

$= 10 \times 0.19$

23



a) $V_{0x} = 250 \text{ ms}^{-1}$

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

$45 = \frac{1}{2}(9.8) \cdot t^2$

$\sqrt{\frac{45 \times 2}{9.8}} = t$

$= 3.03\text{s}$

b) ~~$v = u + at$~~

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

$= ut = 250 \times 3.03 = 757.61 \text{ m}$

c) $v_y = u + at$

$= 0 + 9.81 \times 3.03 = 29.7 \text{ ms}^{-1}$

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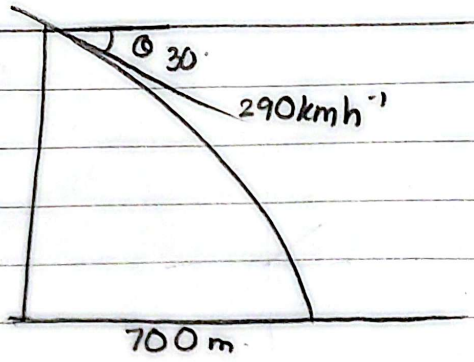
27.



$290 kmh^{-1} = \frac{290 \times 1000}{60 \times 60} = 80.6 ms^{-1}$

$V_{ox} = 69.8$

$V_{oy} = 40.3$

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

$700 = 69.8 \times t$

$t = 10s$

6) $v^2 = u^2 + 2as$

$0 = (40.3)^2 + 2(-9.81)s$] ×

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

$s = 40.3(10) + \frac{1}{2}(-9.81)(10)^2$

$= 897.1$

28 $V_{ox} = 42\cos 60 = 21$

$V_{oy} = 42\sin 60 = 36.37$

a) ~~$s = ut + \frac{1}{2}at^2$~~

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

$s = (36.37)(5.5) + \frac{1}{2}(-9.81)(5.5)^2$

$= 51.67m$

b) $V_y = u + at$

~~$= 21 - 9.81(5.5) = 32.955$~~

$V_y = 36.37 + (-9.81)(5.5)$

$V_x = 21$

$\sqrt{21^2 + V_y^2} = 27.39$

c) $v^2 = u^2 + 2as$

$0 = (36.37)^2 + 2(-9.81)(s)$

$= 67.42 m$ (Ans).

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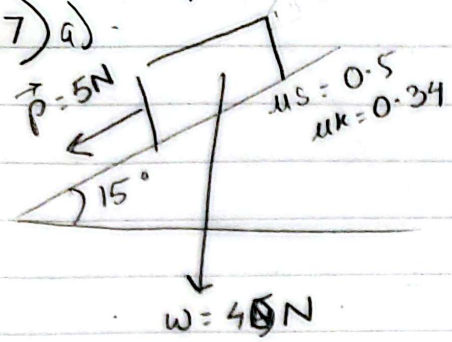
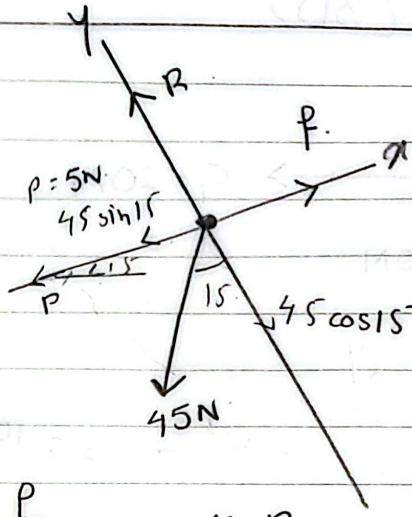
direction of motion = x axis.

Chapter - 6

17) a)





W
R
T.
F s/Fu.
μs = static fric
μk = kinetic friction.
App

$F_{smax} = \mu_s R$. $a_y = 0$ $a_x = ?$

$R = 45\cos 15$

$= 43.47$

$F_{smax} = 0.5 \times 43.47$

$= 21.73\ N$.

Force against friction.

$5 + 45\sin(15) = 16.65\ N$.

$16.64 < F_{smax}$ $\therefore a_x = 0$

$\therefore$ Frictional force = 16.65N. (Ans).

b) $P + 45\sin 15$

$= 8 + 45\sin 15 = 19.64$.

$19.64 <$ maximum val of static fric.

Friction worked = 19.64N.

c) $15 + 45\sin 15$

$= 26.65$.

$26.65 >$ max of static.

$\therefore$ kinetic friction is used

$F_k = \mu R = 0.34 \times 43.47 = 14.78\ N$.

$\therefore$ This a friction = 14.78.

$a_x = -a$ (negative as x+ motion in -x).

$11.87 = \frac{45}{9.8} a$.

$a = -2.59\ ms^{-2}$.