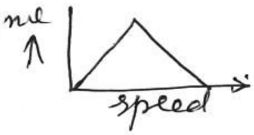
Ans key physics (XI) Ist Term 2017

Q1 time



Q2 $\theta = 90^\circ$

Q3 (a) Zero (b) Zero

Q4 positive

Q5 energy for burning come from work done against friction so, kinetic energy decrease and work done against friction reappear as heat energy

Q6 here $\alpha t = 1 \Rightarrow \alpha = \frac{1}{t} = T^{-1}$

$x = \frac{V_0}{T^{-1}} \Rightarrow V_0 = LT^{-1}$

Q7 Art.

Q8 Art

Q9 $R_{45+\theta} = R_{45-\theta}$

Q10 Art

Q11 As per question $u = 0$ $a = f$ $S = S$ so using $v^2 - u^2 = 2aS$

we have $v_1^2 - 0^0 = 2fS$ so $v_1 = \sqrt{2fS}$

the distance with velocity v_1 $S_2 = v_1 t = t\sqrt{2fS}$

and dec. motion $u = \sqrt{2fS}$ $a = -f/2$ $v = 0 \Rightarrow S = S_3$

So $v^2 - u^2 = 2aS \Rightarrow S_3 = 2S$

Now $S + S_2 + S_3 = 5S$ so $S = \frac{1}{2}ft^2$

Q12 Art (ll gm Law of vector addition

Q13 Art

Q14 $r = 3m$ $\mu = 0.15$ $v = 200$ rev/min $= \frac{200}{60}$ rps

Normal reaction provide centripetal force. So $R = mr\omega^2$

frictional force balance mg so $f = mg$.

the man will remain stick if $\mu R \geq f$

$\Rightarrow m r\omega^2 \geq mg = \omega \geq \sqrt{g/\mu r} \Rightarrow \omega \geq 4.67$ rad/sec.

or

for smooth plane $\theta = 45^\circ$ $a = g\sin 45^\circ = g/\sqrt{2}$

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

$$S = \frac{gt^2}{2\sqrt{2}} \quad (1)$$

On rough $a = g(\sin\theta - \mu\cos\theta) \Rightarrow a = \frac{g(1-\mu)}{\sqrt{2}}$

using $s = ut + \frac{1}{2}at^2$ $(t = nt)$

$$S = 0 + \frac{g(\mu-1)n^2t^2}{2\sqrt{2}} \quad (2)$$

Comparing $\mu = 1 - \frac{1}{n^2}$

Q15 Ans

Q16 a - ans (b) $a = r\omega^2 \Rightarrow \omega = \sqrt{\frac{a}{r}} = \sqrt{\frac{980}{20}} = 7$ rad/sec

Q17 - Ans Q18 Ans

Q19 $mu + 0 = (m+M)V \Rightarrow V = \frac{mu}{M+m}$

$KE_i = \frac{1}{2}mu^2$ $KE_f = \frac{1}{2}(m+M)V^2 = \frac{1}{2}(m+M)\frac{m^2u^2}{(m+M)^2}$

$Loss = KE_i - KE_f = \cancel{\frac{M}{M+m}} \cdot \frac{1}{2}mu^2\left(\frac{M}{M+m}\right)$

So fractional Loss $= \frac{\text{Loss in } KE}{KE_i} = \frac{M}{M+m}$

Q20 Ans

Q21 $m_2 = \frac{F_2}{a_2} \Rightarrow m_2 = \frac{F_1}{\epsilon\tau \cdot a_1 \epsilon\tau} = M_1/\epsilon^2\tau^2$

$||$ly $T_2 = T_1\epsilon$, & $L_2 = L_1\left(\frac{T_2}{T_1}\right)\epsilon^2\tau$ or $L_2 = L_1\epsilon^3\tau$

Q22 $t = Ax^2 + Bx^2 \Rightarrow \frac{dx}{dt} = v = (2Ax + B)^{-1}$

and $a = \frac{dv}{dt} = -(2Ax + B)^{-2} 2A\frac{dx}{dt}$

$\Rightarrow acc = -2AV^3$

Q23 (a) more observation, Presence of mind

b $h = \frac{1}{2}gt^2$ Also $100 - h = 25t - \frac{1}{2}gt^2 \Rightarrow$ Solving $t = 4$ sec

So $h = 78.4$ m

Q24 Ans Or (1) True (brief reason) (2) False (with reason)

(3) ~~cat~~ True (reason) (4) False (reason) (5) True (reason)

Q25(a) Ans $T_1\cos 60 = 4\times10 \Rightarrow T_1 = \frac{40}{\cos 60}$

$T_2\sin 60 = T_2$ $T_2 = \frac{T_1}{\sin 60}$, put values & get Ans

Or

a) Ans (b) $\tan\theta = v^2/rg$

Q26 a Art

(b) $u_1 = u$ $u_2 = 0$ $e = \frac{v_2 - v_1}{u_1 - u_2} \Rightarrow v_2 - v_1 = eu$ (1)

By conservation of momentum

$mu + m \times 0 = m v_1 + m v_2 \Rightarrow v_2 + v_1 = u$ (2)

So solve (1) & (2) $v_2 = \frac{u(1+e)}{2}$ $v_1 = \frac{u(1-e)}{2}$

So $\frac{v_2}{v_1} = \frac{1+e}{1-e}$ Ans

Or

a) Article

(b) $p_1 = \sqrt{2mE_1}$ $p_2 = \sqrt{2mE_2}$ Now $E_2 = E_1 + \frac{300}{100}E_1 = 4E_1$

$\therefore \frac{p_2 - p_1}{p} \times 100 = \frac{2p - p}{p} \times 100 = 100\%$