1

Choose the Correct answer

[1] A body of mass $m = (2t+5)$ kg and its Position vector $\vec{r} = (\frac{1}{2}t^2 + t - 5)\vec{c}$ where $\vec{c}$ is a unit vector where r in meter, t in second, then the magnitude of the force acts on the body at $t = 10$ sec equals ------ newton

(a) 37 (b) 42 (c) 45 (d) 47

$\because \vec{r} = (\frac{1}{2}t^2 + t - 2)\vec{c}$

$\therefore \vec{v} = (t+1)\vec{c}$

$\because \vec{H} = m\vec{v}$

$\therefore \vec{H} = (2t^2 + 7t + 5)\vec{c}$

$\because \vec{F} = \frac{d\vec{H}}{dt} = (4t+7)\vec{c}$

and at $t = 10$ sec

$\therefore \vec{F} = 47\vec{c} \Rightarrow F = 47$

[2] In the opposite figure (Force-time) then the Impulse magnitude in the time interval $[0, 5]$ in Newton . sec equals ----

(a) 12 (b) 16 (c) 20 (d) 25

the impulse of the force within the first Five seconds

$= $ the area of the trapezium in the interval $[0, 5]$

$= \frac{1}{2}(5+3) \times 5 = 20$ newton-sec

[3] If $v = 3t^2 - 2t$, then the distance Covered within the interval $[0, 2]$ is ---- unit length

(a) $\frac{4}{27}$ (b) 4 (c) $\frac{112}{27}$ (d) $\frac{116}{27}$

$\because v = 3t^2 - 2t$

$\therefore v = 0$ at $t = 0$, $t = \frac{2}{3}$

$0 \qquad \frac{2}{3}$

$+ + + \,|\, - - - - - - \,|\, + + + +$

$\therefore S$ in the interval $[0, 2) =$

$= \int_0^{\frac{2}{3}} |(3t^2 - 2t)| dt + \int_{\frac{2}{3}}^{2} (3t^2 - 2t) dt$

$= \left|(t^3 - t^2)\right|_0^{\frac{2}{3}} + (t^3 - t^2)_{\frac{2}{3}}^{2}$

$= \left|\frac{-4}{27}\right| + \frac{112}{27} = \frac{116}{27}$

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2

4 A box of mass 70 kg is placed on the floor of of a lift of mass 630 kg. if the lift moves upwards with a uniform acceleration a m/sec and the magnitude of the tension in the string carrying the lift is 800 kg.wt then a = ---- m/sec²

a) 0.7 (b) 1.4 (c) 1.2 (d) 9.8

$\because T=(m_1+m_2)(g+a) \Rightarrow 800\times 9.8 = 700(9.8+a)$

$\Rightarrow a = 1.4\ m/sec^2$

5

the Time that a Car of mass 1800 kg . spent to reach to velocity 63 km/h from rest if the engine power is Constant and equals 75 horse = ---- sec

(a) 2.5 (b) 5 (c) 7.5 (d) 10

$\because W=\int_0^t(\text{the Power})\,dt$

$\therefore W=\int_0^t(75\times 735)\,dt$

$=(75\times 735)\,t$

$\because$ the change in Kinetic energy = the work done

$\therefore \frac{1}{2}m(v^2-v_0^2)=(75\times 735)\,t$

$\therefore \frac{1}{2}\times 1800\left[(63\times\frac{5}{18})^2-0\right]=75\times 735\,t$

$\therefore t = 5$ sec

6

If $v=3x$ then a at $x=2$ equals ----

(a) 4.9 (b) 9 (c) 18 (d) 24

$\because v=3x$

$\therefore \frac{dv}{dx}=3$

$\because a=v\,\frac{dv}{dx}$

$\therefore a=9x$

at $x=2$

$\therefore a=18$

7

The ratio between the masses of two bodies at rest is 3:4 A Force of magnitude F acted on each of them, then the ratio between their accelerations is ---- : ----

(a) 4 : 3 (b) 3 : 7 (c) 4 : 7 (d) 7:12

$\because \frac{m_1}{m_2}=\frac{3}{4} \Longrightarrow m_1=3m\ ,\ m_2=4m$

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$\because F = ma$ and F is a constant force

$\therefore m_1 a_1 = m_2 a_2 \Rightarrow \frac{a_1}{a_2} = \frac{m_2}{m_1} = \frac{4m}{3m} = \frac{4}{3}$

$\boxed{8}$

If the Power of a machine at any time (t) measured in seconds equals $(3t^2+2t)$, then the work done in the fourth second equals -----

(a) 23 (b) 36 (c) 44 (d) 704

the work done in the fourth second $= \int_3^4 (\text{the Power})\,dt$

$= \int_3^4 (3t^2+2t)\,dt = \left[t^3+t^2\right]_3^4 = 44$ work units

$\boxed{9}$

If the work done by the force $\vec{F} = m\hat{i} + 4\hat{j}$ during the displacement $\vec{S} = -3\hat{i} + (m+1)\hat{j}$ is equal to 0.05 Joule, $\|\vec{S}\|$ in cm, $\|F\|$ in newton where m is a constant, then the value of m = ----

(a) -1 (b) -0.1 (c) 1 (d) 0.1

$\because W = \vec{F} \cdot \vec{S} = (m, 4) \cdot (-3, m+1) = m+4$ | $\because W = 0.05$ newton.m $= 5$ newton.cm

$\therefore m+4 = 5 \Rightarrow m = 1$

$\boxed{10}$

A partical moves in s-line such that $s = 3t - \frac{1}{2}t^2$ then the distance traveled during the first six seconds is —

(a) 2 (b) zero (c) 9 (d) 18

$\because s = 3t - \frac{1}{2}t^2$

$\therefore v = 3 - t$

$\therefore v = 0$ at $t = 3$

$\therefore$ the distance coverd in the 1st. 6 seconds

$= |S_3 - S_0| + |S_6 - S_3|$

$= \left|\frac{9}{2} - 0\right| + \left|0 - \frac{9}{2}\right| = 9$

$\boxed{11}$

A body is suspended in a spring scale in a balloon moving vertically downwards with an acceleration of magnitude $= \frac{5}{8}$ the acceleration of gravity, then the ratio between the apparent weight of the body and its real weight = --- : ---

(a) $\frac{5}{8}$ (b) $\frac{3}{8}$ (c) $\frac{8}{5}$ (d) $\frac{8}{3}$

4

$\because R = m(g-a) \Rightarrow R = m(g - \frac{5}{8}g) = \frac{3}{8}mg$

$\therefore R : mg = 3 : 8$

$\boxed{12}$

A particle moves in a S. Line and the equation of its motion $x = \tan t$, then acceleration of motion a is equal to ----

(a) $\sec^2 t$ (b) $2\sec t$ (c) $2vx$ (d) vx

$\because x = \tan t$

$\therefore v = \frac{dx}{dt} = \sec^2 t$

$\therefore a = \frac{dv}{dt} = 2\sec t \cdot \sec t \tan t$

$\therefore a = 2\sec^2 t \tan t = 2vx$

$\boxed{13}$

A body of mass 1 kg . its position vector $\vec{r} = (at^2 + 4t + 1)\hat{i}$ where t in second, r in meter If the kinetic energy of the body at t = 1 sec equals 50 Joule then a = ----

(a) 2, 5 (b) 3, -7 (c) -3, 7 (d) -2, -5

$\vec{r} = (at^2 + 4t + 1)\hat{i}$

$\vec{v} = \frac{d\vec{r}}{dt} = (2at + 4)\hat{i}$

$\because T = \frac{1}{2}mv^2$

$\therefore 50 = \frac{1}{2} \times 1 \times (2a+4)^2$

$\therefore (2a+4)^2 = 100$

$2a + 4 = 10$ | $2a + 4 = -10$

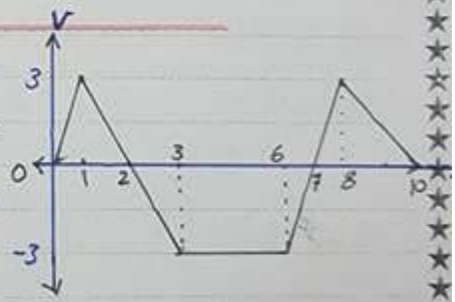
$2a = 6$ | $2a = -14$

$a = 3$ | $a = -7$

$\boxed{14}$

From the (velocity - time) graph in the opposite figure, the distance traveled = ---- unit length

(a) 4.5 (b) 10.5 (c) 13.5 (d) 19.5



the distance traveled = the sum of areas (with +ve sign)

$A_1 = \frac{1}{2} \times 2 \times 3 = 3$

$A_2 = \frac{1}{2}(5+3) \times 3 = 12$

$A_3 = \frac{1}{2} \times 3 \times 3 = 4.5$

$\therefore$ the distance traveled $= 3 + 12 + 4.5 = 19.5$

but the magnitude of displacement $= |3 - 12 + 4.5| = 4.5$ #

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5

15 If $\vec{S} = (\frac{1}{3}t^3 - 3t^2)\,\hat{i}$, then the motion is retarded in the time interval ----

(a) $]0, 3[$ (b) $[0, 6[$ (c) $]3, 6[$ (d) $[6, \infty[$

$\because \vec{S} = (\frac{1}{3}t^3 - 3t^2)\,\hat{i}$

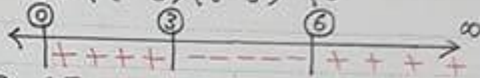
$\because$ the motion is to be retarded when $va < 0$

$\therefore v = t^2 - 6t$

$a = 2t - 6$

$(t^2 - 6t)(2t - 6) < 0$

$2t(t-6)(t-3) < 0$



$\therefore va < 0$ when $t \in]3, 6[$

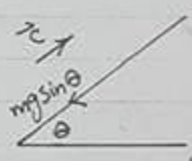
16

A Person of mass 72 kg ascends a road inclined at an angle of sine $\frac{1}{6}$ to the horizontal, he covers a distance of 120 m, then the change in the potential energy of the Person = ---- Joule.

(a) 11142 (b) 14211 (c) 14112 (d) 12114

$\because$ W (the work done by the weight)

$= -mg\sin\theta \cdot S$



$\therefore W = -72 \times 9.8 \times \frac{1}{6} \times 120 = -14112$ Joule

$\because$ the change in the potential energy $= -W = 14112$ Joule

17 If $a(t) = -4\sin 2t$, $v(0) = 2$, $x(0) = -3$ then $x(\pi) =$ ----

(a) -3 (b) Zero (c) 2 (d) 3

$\int_2^v dv = \int_0^t -4\sin 2t$

$v - 2 = [2\cos 2t]_0^t$

$v - \cancel{2} = 2\cos 2t - \cancel{2}$

$\therefore v = 2\cos 2t$

$\int_{-3}^{x} dx = \int_0^t 2\cos 2t\, dt$

$x + 3 = [\sin 2t]_0^t$

$\therefore x(t) = \sin 2t - 3$

$\therefore x(\pi) = -3$

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$\boxed{18}$ A body moves in a S.Line such that the acceleration of its motion a is given as a function of time as $a = 2t - 6$ m/sec^2 and t in sec. If the mass of the body is 8 kg, then the change of the momentum of the body in the time interval $3 \leqslant t \leqslant 5$ equals ----

(a) 15 (b) 27 (c) 32 (d) 47

the change of the momentum $= m \int_{t_1}^{t_2} a\,dt$

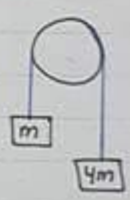
$$= 8 \int_3^5 (2t-6)\,dt = 8\left[t^2 - 6t\right]_3^5 = 8 \times 4 = 32$$

$\boxed{19}$ If a body moves in a S-Line from Point $A(1,2)$ to point $B(5,3)$ under the action of the force $\vec{F} = 3\hat{i} - 2\hat{j}$, then the work done by this force = ----- work unit

(a) 8 (b) 10 (c) 12 (d) 13

$\vec{S} = \overrightarrow{AB} = \vec{B} - \vec{A} = (4,1) \Rightarrow W = \vec{F} \cdot \vec{S} = (3,-2)\cdot(4,1) = 10$

$\boxed{20}$ In the opposite figure the Pulley is smooth, then the acceleration of motion = ---



(a) $\frac{3}{5} g$ (b) $\frac{3}{4} g$ (c) $\frac{5}{3} g$ (d) $\frac{4}{3} g$

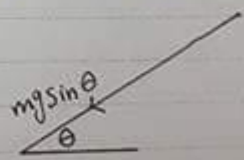
$$a = \frac{m_1 - m_2}{m_1 + m_2} \times g = \frac{3m}{5m} \times g = \frac{3}{5} g$$

$\boxed{21}$ If a body moves on a smooth inclined plane and inclines with an angle of measure θ under the action of its weight only, then its acceleration of motion is equal to ---

(a) g (b) $g \cos\theta$ (c) $g \sin\theta$ (d) zero

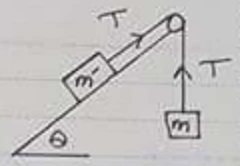
$\cancel{m} g \sin\theta = \cancel{m} a$

$\therefore a = g \sin\theta$



7

22 In the opposite figure if the system starts its motion from rest, then the pressure on the axis of the Pulley is ----



(a) $2T$ (b) $T\sqrt{2(1+\sin\theta)}$ (c) $\sqrt{2}\,T$ (d) $\sqrt{3}\,T$

23

A body moves in a s. Line with a uniform velocity under the action of three forces $\vec{F_1} = a\hat{i} - 5\hat{j} + 7\hat{k}$, $\vec{F_2} = -3\hat{i} + b\hat{j}$, $\vec{F_3} = 2\hat{i} + 4\hat{j} + c\hat{k}$, then $a+b+c =$ ----

(a) 5 (b) −5 (c) −4 (d) −6

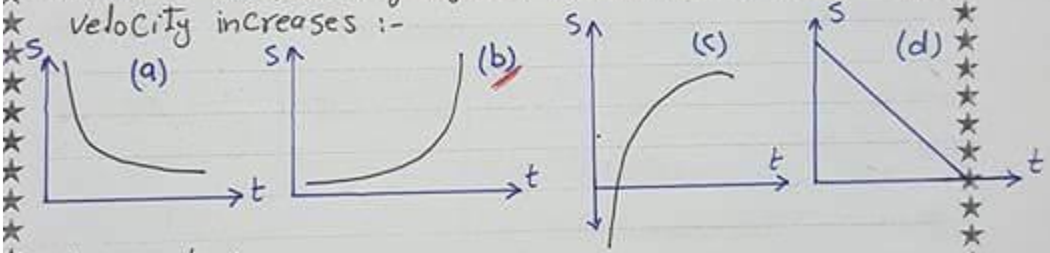
$\because$ the motion with a uniform velocity $\therefore \vec{F} = \vec{F_1} + \vec{F_2} + \vec{F_3} = 0$

$\therefore a = 1 \qquad b = 1 \qquad c = -7$

$\therefore a + b + c = -5$

24

which of the following Figures represents a particle whose velocity increases :-



the graph (b)

the velocity is positive because the tangent to the curve at any point is an increasing s. Line

the acceleration is positive because the Curve is convex down wards $\therefore Va > 0$

25

A Force of magnitude 8 newton acts on a rest body of mass 4 kg then the velocity of the body after 5 sec from starting motion = ----

(a) 6.4 m/sec (b) 10 m/sec (c) 20 m/sec (d) 40 m/sec

$F = ma$

$\therefore 8 = 4a$

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

$V_0 = \text{zero}$

$t = 5 \text{ sec}$

$V = V_0 + at$

$V = 10 \text{ m/sec}$

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26. A Particle moves in a s. line with initial velocity 10 m/sec from a Constant Point such that $a = 2x + 3$ then its velocity at $x = 14$ m equals —— m/sec

(a) 24 (b) 34 (c) 476 (d) 576

$\because a = v\frac{dv}{dx} \Rightarrow v\,dv = a\,dx$

$\therefore \int_{10}^{v} v\,dv = \int_{0}^{x} (2x+3)dx \Rightarrow \left[\frac{v^2}{2}\right]_{10}^{v} = \left[x^2+3x\right]_{0}^{x}$

$\therefore \frac{v^2}{2} - 50 = x^2 + 3x \Rightarrow v^2 = 2x^2 + 6x + 100$

at $x = 14 \Rightarrow v = 24$ m/sec

27. A bullet of mass 98 gm moves horizontally by velocity 720 km/h towards a Constant verticall barrier to embed in it for a distance 10 cm, then the magnitude of the resistance in kg.wt = -----

(a) 1000 (b) 2000 (c) 3000 (d) 4000

$v_0 = 720 \times \frac{5}{18} = 200$ m/sec

$v = 0$

$s = 0.1$ m

$v^2 = v_0^2 + 2as$

$0 = (200)^2 + 2 \times a \times 0.1$

$\therefore a = -200000$ m/sec^2

$-R = ma$

$-R = \frac{98}{1000} \times -200000$

$R = 2000$ kg.wt

28. If $\vec{S} = (5t - t^2)\,\hat{i}$ in meter, t in sec then the displacement = ----- m and the distance = ---- m during the first three seconds of motion

(a) 5, 6.5 (b) 6, 6.5 (c) 6.5, 6 (d) 5, 6

the displacement at $t = 3$ $\vec{S} = (15-9)\hat{i} = 6\,\hat{i}$

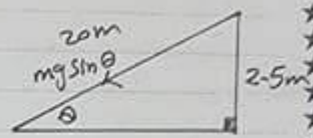
to calculate the distance $\vec{v} = (5-2t)\,\hat{i} = 0 \Rightarrow t = \frac{5}{2}$ sec

$S_3 = |S_{2\frac{1}{2}} - S_0| + |S_3 - S_{2\frac{1}{2}}| = |6\frac{1}{4}| + |6 - 6\frac{1}{4}| = 6.5$ m

9

[29] A smooth inclined plane of length 20 m and height 2.5m a body is placed at the top of the plane and let to move downwards the plane then it reaches the bottom of the plane by velocity ---- m/sec

(a) 7 (b) 70 (c) Zero (d) 35



$mg\sin\theta = ma$

$\therefore a = 9.8 \times \frac{2.5}{20} = 1.225 \text{ m/sec}^2$

$v^2 = v_0^2 + 2as = 2 \times 1.225 \times 20 = 49$ $\therefore v = 7 \text{ m/sec}$

[30] A body of mass 1 kg is projected vertically upwards with velocity 29.4 m/sec from a point on the ground surface then the potential energy of the body after 2 sec from the moment of projection = ---- Joule

(a) 84 (b) 384.16 (c) 834.16 (d) 816

$v_0 = 29.4$ m/sec

$g = -9.8$ m/sec^2

$t = 2$ sec

$\therefore s = v_0 t + \frac{1}{2} g t^2$

$= 29.4 \times 2 + \frac{1}{2} \times -9.8 \times 4$

$s = 39.2$ m

$P = mg \cdot \ell$

$= 1 \times 9.8 \times 39.2$

$= 384.16$ Joule

[31] A person of mass 75 kg ascends up a slope of height 90 meters in two minutes, then its power at this time = ---- horse.

(a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) $\frac{4}{3}$ (d) $\frac{3}{4}$

the work done $= -mg\sin\theta \cdot S$

$= -75 \times 9.8 \times \frac{90}{S} \cdot S = -75 \times 9.8 \times 90$ Joule

the Power $= \frac{\text{the magnitude of work}}{\text{time}} = \frac{75 \times 9.8 \times 90}{60 \times 2 \times 735} = \frac{3}{4}$ horse

[32] A variable force F (measured in newton) acts up on a body where $F = 3S^2 - 4$, then the work done by this force in the interval $s = 2$m to $s = 5$m equals ---- Joule

(a) 105 (b) 96 (c) 150 (d) 500

$F = 3S^2 - 4$, $w = \int_{S_1}^{S_2} F\, ds$

$\therefore w = \int_2^5 (3S^2 - 4)\, ds = [S^3 - 4S]_2^5 = 105$ Joules

$\boxed{34}$

A body moves from position $A(1,3)$ to position $B(3,7)$ under the action of the force $\vec{F} = m\,\hat{i} - 4\,\hat{j}$ and if the change of the potential energy of the body = 10 Joule then the value of m = --- where F in newton, S in meter

(a) −3 ~~(b) 3~~ (c) 5 (d) −5

$w = \vec{F} \cdot \vec{S}$

$= (m, -4) \cdot (2, 4)$

$\therefore w = 2m - 16$

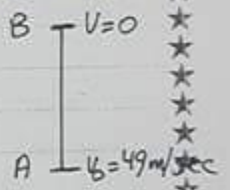
$\because$ the change of the potential energy = − the work done

$\therefore 2m - 16 = -10 \Rightarrow m = 3$

$\boxed{35}$

A body of mass 200 gm is projected vertically upwards with velocity 49 m/sec, then the potential energy of the body at the maximum height = --- Joule

(a) 240.1 (b) 300 (c) 200 (d) 270.5



$T_A + \cancel{P_A} = \cancel{T_B} + P_B$

$\therefore P_B = T_A = \frac{1}{2} m v^2 = \frac{1}{2} \times 0.2 \times (49)^2$

$= 240.1$ Joule

$\boxed{36}$

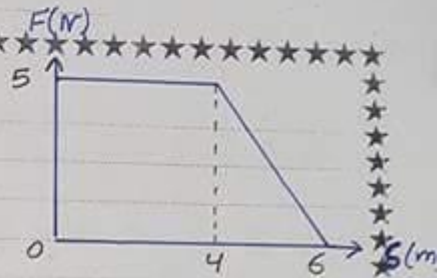
If a body moves in an inclined plane upwards with a uniform velocity then the work done by the resultant forces

(a) $mg\,S$ (b) $F \cdot S$ ~~(c) Zero~~ (d) $mg \sin\theta\, S$

$\because$ the motion of the body with a uniform velocity then the resultant of all forces = Zero

$\therefore$ the work done = Zero

37 The opposite figure represents the action of the force (F) on a body moving a distance (S), then the work done by this force to make the body move from S=0 to S=6m is equal to --- Joule



(a) 12.5 (b) 25 (c) 30 (d) 50

The work done represents the area of the trapizum

$= \frac{1}{2}(4+6) \times 5 = 25$ Joule

38

A body of mass 1 kg moves with a uniform velocity of magnitude 12 m/sec. A resistance force of magnitude $6x^2$ newton where x is the distance which the body travels under the action of the resistance in meter then

(i) the work done by the resistance when $x = 4$ is ----

(a) 128 (b) −128 (c) 96 (d) −96

$$w = \int_0^4 F\,dx = \int_0^4 (-6x^2)\,dx = (-2x^3)\Big|_0^4 = -128 \text{ Joule}$$

(ii) the kinetic energy at $x = 2m$ equals ---- Joule

(a) 56 (b) 65 (c) 49 (d) 70

$\because$ the change of the kinetic energy = the work done

$$\therefore T - T_0 = \int_0^2 F\,dx \qquad \therefore T - 72 = \left[-2x^3\right]_0^2$$

$$\therefore T - \frac{1}{2} \times 1 \times 144 = \int -6x^2\,dx \qquad T - 72 = -16$$

$$T = 56 \text{ Joule}$$

39 If the two forces $\vec{F_1} = 2\hat{i} - 14\hat{j}$, $\vec{F_2} = 3\hat{i} + 2\hat{j}$ act up on a body for a time interval of magnitude $\frac{1}{2}$ of second, then the magnitude of the impulse of the force in N.sec is ----

(a) $6\frac{1}{2}$ (b) $7\frac{1}{2}$ (c) 9 (d) 13

12

$\vec{F} = 5\hat{i} - 12\hat{j}$ $\quad\therefore$ Impulse $= F \cdot t$

$\|\vec{F}\| = 13$ newton $\quad = 13 \times \frac{1}{2} = 6.5$ N.sec

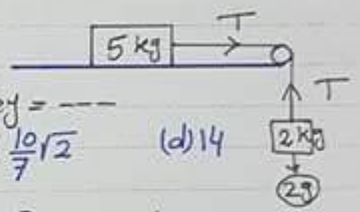
40 A force F is acted upon a body of mass 700 gm to change its velocity from 30 cm/sec to 65 cm/sec in the same direction in 10 sec, then the magnitude of the force F in gm.wt = ----

(a) 2.5 (b) 25 (c) 1225 (d) 2445

$\because I = m(v - v_0) = F \cdot t$ $\quad\therefore F = 2450$ dyne

$\therefore 700(65 - 30) = F \times 10$ $\quad\therefore F = 2.5$ gm.wt

41 In the opposite figure the plane is smooth, then the pressure on the axis of the pulley = ---



(a) 1.4 (b) $1.4\sqrt{2}$ (c) $\frac{10}{7}\sqrt{2}$ (d) 14

$2g - T = 2a$

$T = 5a$

$2g = 7a$

$\therefore a = \frac{2}{7} g$

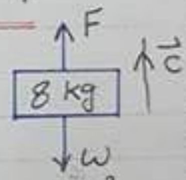
$\therefore T = 5 \times \frac{2}{7} g = \frac{10}{7} g$

$\therefore P = \sqrt{2}\, T = \frac{10\sqrt{2}}{7} g$

$\therefore P = 14\sqrt{2}$ newton $= \frac{10}{7}\sqrt{2}$ kg.wt

42

A body of mass 8 kg moves vertically upwards by acceleration a (uniform) under the action of a force of magnitude 12 kg.wt in the same direction of motion, then a = ---- m/sec^2



(a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) 4.9 (d) 14.7

$F - w = ma \Rightarrow 12 \times 9.8 - 8 \times 9.8 = 8a$

$\Rightarrow a = 4.9$ m/sec^2

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[43] A Parachutist lands vertically downwards and the air resistance to its motion is proportional to the square of his velocity and V_1 is his velocity when the air resistance is equivalent to $\frac{9}{25}$ of his weight and V_2 is the landing max velocity to the Parachutist. Calculate $V_1 : V_2$ -----

(a) 9 : 25 (b) 25 : 9 (c) 3 : 5 (d) 5 : 3

$$\frac{R_1}{R_2} = \frac{V_1^2}{V_2^2} \Rightarrow \frac{\frac{9}{25}w}{w} = \frac{V_1^2}{V_2^2} \Rightarrow \frac{V_1^2}{V_2^2} = \frac{9}{25}$$

$$\therefore V_1 : V_2 = 3 : 5$$

[44]

A body of unit mass moves under the action of the force $\vec{F} = (a+3)\hat{i} + b\hat{j}$ and if the displacement vector $\vec{s}$ is given by the relation $\vec{s} = t^2\hat{i} + \frac{1}{2}t^2\hat{j}$ then $a+b =$ ---

(a) 2 (b) −2 (c) 3 (d) Zero

$\vec{s} = t^2\hat{i} + \frac{1}{2}t^2\hat{j}$

$\therefore \vec{v} = 2t\hat{i} + t\hat{j}$

$\vec{a} = 2\hat{i} + \hat{j}$

$\because \vec{F} = m\vec{a}$

$(a+3)\hat{i} + b\hat{j} = 2\hat{i} + \hat{j}$

$\therefore a+3 = 2$, $a = -1$ | $b = 1$ $\therefore a+b = 0$

[45]

A ball of mass 200 gm moves in a S-Line with velocity 3 m/sec collides with another ball of mass 400 gm. If the 1st ball rest after collition directly, then the velocity of the 2nd ball = ---- m/sec

(a) 1.2 (b) 3 (c) 1.5 (d) 4.5

$m_1V_1 + m_2V_2 = m_1V_1' + m_2V_2' \Rightarrow 200 \times 3 = 400\, V_2' \Rightarrow V_2' = 1.5$ m/sec

[46]

A body of weight 140 gm is projected vertically upwards from the top of a tower of height 25 m from the ground surface, then the change of the kinetic energy from projection to reach the ground = ---

(a) 34.3 (b) 25 (c) 32 (d) 29

$T - T_0 = W = mg \cdot S = 0.14 \times 9.8 \times 25 = 34.3$ Joule

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