Applied math 2nd Sec.

Final revision

A car of mass 3 tons moves on a straight line with velocity 72 km./hr. , then the momentum of the car equals ·············· kg.m/sec.

(a) 60 (b) 60000 (c) 216 (d) 216000

A body of a mass 500 gm. is released from a height of 4.9 metres on the ground surface , then the magnitude of its momentum as it comes the ground is ………… kg.m./sec.

(a) 2.45 (b) 4.9 (c) 2 450 (d) 4 900

A rubber ball of mass 50 gm. is released from height 4.9 metres on horizontal ground after impact with the ground it rebounds upwards to height of 2.5 metres , then the magnitude of the change of its momentum due to the impact = ... gm.cm./sec.

(a) 8.4 (b) 8 400 (c) 84 000 (d) 840 000

A body of mass 70 gm. fell vertically. After 3 sec. it collides with the surface of a viscous liquid , it moves in the liquid with a uniform speed to cover 2.2 m. in $\frac{1}{2}$ second , then the change in momentum due to impact = ... kg.m./sec.

(a) 2.5 (b) 1.25 (c) – 1.75 (d) – 2.5

If the magnitude of the momentum of ball (A) is twice the magnitude of the momentum of ball (B) and the mass of ball (A) equals half the mass of ball (B) , then the ratio between the speed of (A) to the speed of (B) equals ....

(a) 1 : 1 (b) 1 : 2 (c) 1 : 4 (d) 4 : 1

A ball of mass 300 gm. moves horizontally. It hits a vertical wall with speed 60 m./sec. It rebounds after it loses $\frac{2}{3}$ of its speed then magnitude of the change in momentum of the ball as a result of impact in gm.m./sec. equals ....

(a) 3 000 (b) 6 000 (c) 24 000 (d) 60 000

If the magnitude of the momentum of a body of mass m_1 moves with a velocity 80 m./sec. is the same as the magnitude of the momentum of a body of mass m_2 moves with a velocity 100 m./sec. , and also equals to the magnitude of the momentum of a body of mass $(m_1 + m_2)$ moves with a velocity v , then v = ... km./h.

(a) $\frac{400}{9}$ (b) $\frac{32}{9}$ (c) 160 (d) 180

A missile of mass 1 kg. is launched at velocity 720 km./h. towards a tank of mass 50 tons moving towards the mortar at speed 20 m./sec. , then the magnitude of the momentum of the missile with respect to the tank is ....

(a) 200 kg.m./sec.

(b) 220 kg.m./sec.

(c) 10^7 kg.m./sec.

(d) 1.1×10^7 kg.m./sec.

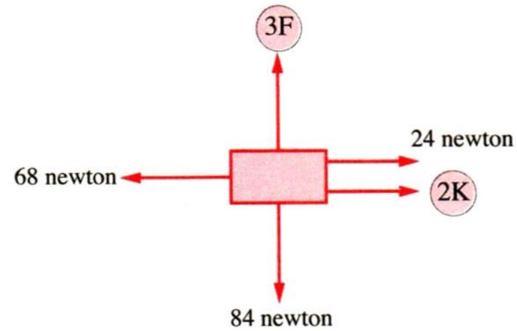
A body of mass 500 gm. is released from a height (h) above the ground , it has magnitude of momentum as it reach the ground surface = 8 400 gm. m/sec. , then the height h = ... m.

(a) 28.8 (b) 57.6 (c) 14.4 (d) 16.8

In the opposite figure :

If the body moves with a uniform speed downwards under action of set of forces

, then k + F = ... N.



(a) 22 (b) 28

(c) 44 (d) 50

A car of mass 3 tons moves in uniform motion on a horizontal road. If the resistance magnitude of motion is 75 kg.wt. per ton of mass , then the force magnitude of motor of the car = ... kg.wt.

(a) 225 (b) 405 (c) 675 (d) 2205

A locomotive pulls a train on a horizontal road with a uniform velocity , the mass of the locomotive and the train together is 250 tons and the engine force is 2000 kg.wt. , then the resistance in kg.wt. for each ton of the mass is …………… kg.wt.

(a) $\frac{1}{8}$ (b) 8 (c) 200 (d) 250

The total weight of a parachutist and his equipments is 90 kg.wt. and the air resistance during his descending is proportional to the square of his speed. If the maximum speed of the parachutist is 12 km./h. , then the air resistance when his speed is 8 km./hr. equals …………… kg.wt.

(a) 10 (b) 20 (c) 30 (d) 40

A balloon moves vertically downwards against a resistance of magnitude proportional with the square of its speed. If its maximum speed (v) m./sec. and when the balloon moves against a resistance of magnitude $\frac{16}{49}$ of its weight , its speed decreases by 1.5 m./sec. than its maximum speed , then the maximum speed that the balloon is moving = ... m./sec.

(a) 2.5 (b) 3.5 (c) 6 (d) 7

A body is pulled with a uniform speed on a horizontal plane with a force 1200 kg.wt. inclined to the horizontal at an angle of measure 60° against resistance of magnitude $= \frac{1}{2}$ the body weight , then the weight of the body equals …………… kg.wt.

(a) 600 (b) 800 (c) 1200 (d) 2400

A small metallic ball of weight 130 gm.wt. is moving in a liquid , if it moves equals distances in equal times , then the magnitude of the resistance of the liquid for motion of the ball = ... gm.wt.

(a) 65 (b) 130 (c) 260 (d) 32.5

The force that if acts on a body of mass 50 kg. causes it to accelerate 160 cm./sec^2 equals ....

(a) 80 dyne. (b) 80 newton. (c) 8000 dyne. (d) 8000 newton.

If the magnitude the engine force of a train is equal to 2.5 ton.wt. and mass of the train and the engine is 200 tons and if the train starts to move from rest , then the velocity of the train after half a minute = ... m./sec. (ignore the resistance)

(a) 2.25 (b) 2.175 (c) 3.175 (d) 3.675

A bullet of mass 7 gm. is fired horizontally from a pistol with speed 245 m./sec. at a wooden vertical barrier. It imbedded in it 12.25 cm. befor it stopped , then the magnitude of the resistance of the wood to the bullet equals ....

(a) 17.15 N (b) 175 N. (c) 175 kg.wt. (d) 1715 kg.wt.

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

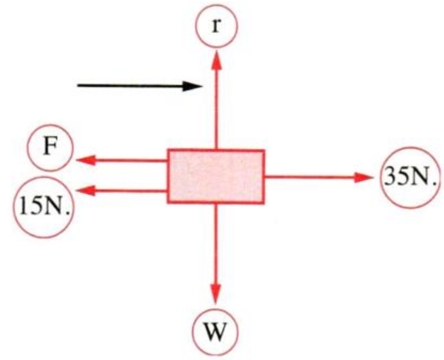
A ball of mass $\frac{3}{8}$ kg. , is projected vertically upwards with speed 7 m./sec. from a point below the room ceiling by 1.6 m. The ball collides with the ceiling and rebounds downwards. If the magnitude of the change in its momentum due to impact equals 2400 gm. m./sec. , then the speed of rebounding = ... m./sec.

(a) 2.2 (b) 3.6 (c) 4.2 (d) 6.4

In the opposite figure :

If the body of mass 5 kg. moves with uniform acceleration of magnitude 2 m./sec^2.

, then F = …………… N.



(a) 10 (b) 12

(c) 15 (d) 18

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.

If a body moves on a smooth inclined plane under the action of its weight only , then its acceleration is only based on ....

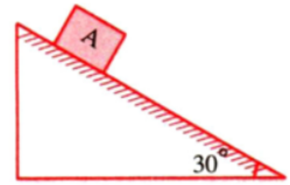
(a) its mass.

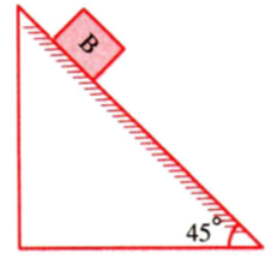
(b) its weight.

(c) the angle of inclination of the plane.

(d) the reaction of the plane.

In the opposite figure :





If the two planes are smooth the mass of A is (3 m) , the mass of B is (2 m). When the two bodies slide on the slope then :

$\frac{\text{Acceleration of (A)}}{\text{Acceleration of (B)}} = \dots\dots\dots\dots$

(a) $1 : \sqrt{2}$

(b) $3 : 2$

(c) $2 : 3$

(d) $\sqrt{3} : \sqrt{2}$

Three masses m_1 , m_2 , m_3 is placed on the top of an inclined smooth plane makes to the horizontal an angle of measure (θ) (where $m_1 < m_2 < m_3$) , then the three masses are moved with acceleration a_1 , a_2 , a_3 respectively , then ....

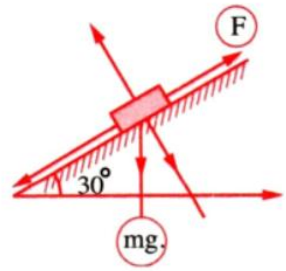
(a) $a_1 < a_2 < a_3$

(b) $a_1 > a_2 > a_3$

(c) $a_1 = a_2 = a_3$

(d) $a_1 : a_2 : a_3 = m_1 : m_2 : m_3$

In the opposite figure :



If the mass of the body placed on the smooth plane is 2 kg. and the body starts to move from rest under the action of the force $\vec{F}$ whose magnitude is 1.5 kg.wt. , then

The acceleration of motion equals ....

(a) 2.45 m./sec^2 down the plane.
(b) 2.45 m./sec^2 up the plane.
(c) 4.9 m./sec^2 down the plane.
(d) 4.9 m./sec^2 up the plane.

A force of magnitude 6 kg.wt. acted on a body and moved it with an acceleration of magnitude 4.9 m./sec^2. , then the mass of this body = …………… kg.

(a) 117.6 (b) 12 (c) $\frac{60}{49}$ (d) 29.4

A car of mass 2 ton ascends an inclined road with an angle of sin = $\frac{1}{20}$ to the horizontal against a resistance of magnitude 40 kg.wt. per each ton of its mass , it covered 4.9 m. in 10 sec. from the rest , then the magnitude of its engine force = …………… kg.wt.

(a) 100 (b) 200 (c) 300 (d) 350

If a body of mass m is placed at the top of an inclined rough plane that makes with the horizontal an angle of measure θ and the coefficient of kinetic friction between the body and the plane is μ_k. If the body slides under action of its weight only , then the acceleration = ...

(a) $g \sin \theta$

(b) $g \cos \theta$

(c) $g (\mu_k \sin \theta - \cos \theta)$

(d) $g (\sin \theta - \mu_k \cos \theta)$

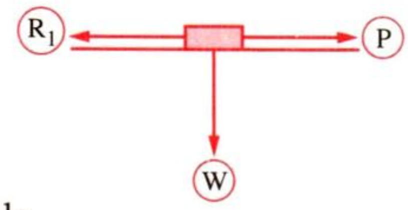
A body of mass 2 kg. is placed on a rough horizontal plane and the coefficient of the kinetic friction between the body and the plane is $\frac{1}{2}$, then the horizontal force making the body moves with a uniform acceleration 5 m./sec^2.
equals .... newtons.

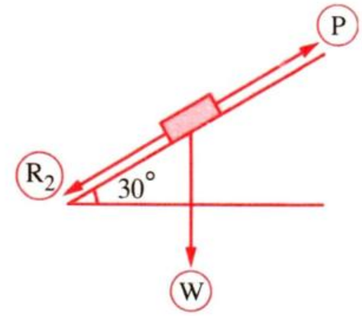
(a) 9.8 (b) 16 (c) 19.8 (d) 29.4

An inclined rough plane, of length 2.5 m. and height 1.5 m. , its coefficient of the kinetic friction is $\frac{1}{2}$ then the smallest speed at which a body will be projected from the lowest point in the plane in the direction of the line of the greatest slope to reach the top of the plane = ... m./sec.

(a) 5 (b) 7 (c) 14 (d) 17

A body of weight (W) moves on a horizontal plane with uniform velocity against resistance of magnitude R_1 under action of a horizontal force of magnitude $\vec{P}$ and the same body moves on an inclined plane which makes an angle of measure 30° with the horizontal , with a uniform velocity against a resistance of magnitude R_2 and under action of the same force $\vec{P}$, then $R_1 - R_2 =$ ....





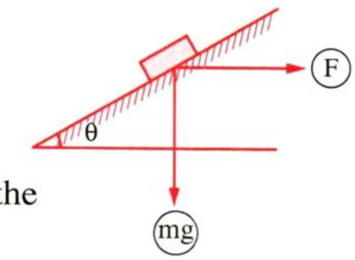
(a) W

(b) $\frac{1}{4}$ W

(c) $\frac{1}{2}$ W

(d) $\frac{\sqrt{3}}{2}$ W

In the opposite figure :



A body of mass (m) kg. is placed on a smooth plane inclined to the horizontal by an angle of measure θ , if a horizontal force of magnitude F = mg newton acted on it , then the body moves upwards the plane when ……………

(a) $\theta \in \left]\frac{\pi}{4}, \frac{\pi}{3}\right[$ (b) $\theta \in \left]0, \frac{\pi}{4}\right[$ (c) $\theta = \frac{\pi}{4}$ (d) $\theta \in \left]\frac{\pi}{3}, \frac{\pi}{2}\right[$

A box of mass 100 kg. , is lifted off vertically upwards by a string with a uniform acceleration of magnitude 25 cm./sec^2 , then the force of the tension magnitude in the string (neglect the resistance) = ... N.

(a) 915 (b) 980 (c) 1 005 (d) 1 025

Best wishes

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