

Time : 8:00 am - 8:30 am

A student can submit only one response. Submit your response before 1 min from stipulated time period.

In the question paper ^ indicates power and \_ indicates suffix

A body is at rest on the surface of  $\frac{1}{1}$  the earth. Which of the following statements is correct?

- No force is acting on the body
- only weight of the body acts on it
- net downward force is equal to the net upward force
- none of these

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Which is a vector quantity?

1/1

- angular momentum
- work
- potential energy
- electric current

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The potential energy of a system 1/1  
increases if work is done

- Upon the system by a non conservative force
- By the system against a conservative force
- By the system against a non conservative force
- Upon the system by a conservative force



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What is the minimum number of coplanar vectors of different magnitudes which can give zero resultant? 1/1

- One
- Two
- Three
- Four

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Two bodies of mass  $m$  and  $4m$  have equal kinetic energy. What is the ratio of their linear momentum? 0/1

- 1:4
- 1:2
- 1:1
- 1:3

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If the maximum and minimum values of the resultant of two forces acting at a point are 7N and 3N respectively, the smaller force is equal to 1/1

4N

5N

3N

2N



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Three vectors A,B and C add up to zero. Which statement is false?

- $(A \times B) \times C$  is not zero unless B,C are parallel
- $(A \times B) \cdot C$  is not zero unless B,C are parallel
- If A,B,C define a plane,  $(A \times B) \times C$  is in that plane
- $(A \times B) \cdot C = |A||B||C| \rightarrow C^2 = A^2 + B^2$

A body is falling freely under the action of gravity alone in vacuum. Which of the following quantities remain constant during the fall? 1/1

- Kinetic energy.
- Total mechanical energy.
- Potential energy.
- Total linear momentum

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A couple is acting on a two particle system. The resultant motion will be

0/1

- purely rotational motion
- purely linear motion
- can be both linear and rotational
- no motion



The horizontal range of a projectile fired at an angle of  $15^\circ$  is 50 m. If it is fired with the same speed at an angle of  $45^\circ$ , its range will be

1/1

- 60 m
- 71 m
- 100 m
- 141 m

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An object is thrown vertically upward and it reaches to a maximum height 'h' from the ground. During its flight, on reaching  $\frac{3}{4}$  of height H, it will acquire? 0/1

- less potential and high kinetic energy
- more potential and less kinetic energy
- same potential and kinetic energy
- only kinetic energy

A particle is given a displacement of  $4\text{m}$  in the  $x - y$  plane. If the  $x$  component of displacement vector is  $2\text{m}$ , then  $y$  component is

- $2\text{m}$
- $2\sqrt{2}\text{ m}$
- $2\sqrt{3}\text{ m}$
- $4\text{m}$

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If a body of mass ( $4m$ ) is lying in  $xy$  plane at rest. It suddenly explodes into three pieces. Two pieces each of mass( $m$ ) move perpendicular to each other with equal speed( $v$ ). The total kinetic energy generated due to explosion is 1/1

- $mv^2$
- $3mv^2/2$
- $2mv^2$
- $4mv^2$

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A bullet is fired and gets embedded in a block kept on a table. If the table is frictionless, then

0/1

- kinetic energy gets conserved
- potential energy gets conserved
- momentum gets conserved
- none of these

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A motor cycle racer takes a round 0/1 with speed  $20\text{m/s}$  in a curvature of radius  $40\text{m}$  then the leaning angle of motorcycle for safe turn is-----  
-(use  $g=10\text{m/s}^2$ )

- $20^\circ$
- $30^\circ$
- $45^\circ$
- $60^\circ$



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If the force acting on a body is  $\propto 1/t$  inversely proportional to its speed, then its kinetic energy is

- Linearly related to time
- Inversely proportional to time
- Inversely proportional to square of time
- A constant

A cricket ball of mass 150 g moving with a speed of 126 km/h hits at the middle of the bat, held firmly at its position by the batsman. The ball moves straight back to the bowler after hitting the bat. Assuming that collision between ball and bat is completely elastic and the two remain in contact for 0.001s, the force that the batsman had to apply to hold the bat firmly at its place would be

- 10.5N
- 21 N
- $1.05 \times 10^4$  N
- $2.1 \times 10^4$  N

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A rope is wound around a hollow cylinder of mass 3kg and radius 40cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30N? 0/1

- 25m/s<sup>2</sup>
- 0.25rad/s<sup>2</sup>
- 25rad/s<sup>2</sup>
- 5m/s<sup>2</sup>

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A ring of mass  $m$  and radius  $r$  rotates about an axis passing through its centre and perpendicular to its plane with angular velocity  $\omega$ . Its kinetic energy is

0/1

- $mr^2\omega^2/2$
- $mr\omega^2$
- $mr^2\omega^2$
- $mr\omega^2/2$

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The work done by the push of air 0/1  
on an object of mass 10 kg falling  
from rest through a vertical  
distance of 10 m is 500 J. Find the  
velocity of the object at the end of  
10 m fall: ( $g = 10 \text{ m/s}^2$ )

- 20 m/s
- 12 m/s
- 5 m/s
- 10 m/s

A block of mass 60 kg just slides over a horizontal distance of 0.9 m. if the coefficient of friction between their surfaces is 0.15 then work done against friction will be-----(use  $g=10\text{m/s}^2$ ) 0/1

- 18 J
- 97.54 J
- 105.25 J
- 81 J

A truck and a car are moving with 0/1 equal velocity. On applying brakes, both will stop after certain distance, then

- truck will cover less distance before stopping
- car will cover less distance before stopping
- both will cover equal distance
- none of these

Which of the following is true regarding projectile motion?

1/1

- horizontal velocity of projectile is constant
- vertical velocity of the projectile is constant
- acceleration is not constant
- momentum is constant

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## PHYSICS

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A body is executing uniform circular motion. At any instant, its velocity vector and acceleration vector is acting 0/1

- along the same direction
- in opposite direction
- normal to each other
- none of these

If the co-efficient of friction of a surface is  $\sqrt{3}$ , then the angle of inclination of the plane to make a body on it just to slide is

- $30^\circ$
- $60^\circ$
- $45^\circ$
- $90^\circ$

**Your score has been released for  
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Two racing cars of masses  $m_1$  and  $m_2$  are moving in circles of radii  $r_1$  and  $r_2$  respectively. Their speeds are such that each makes a complete circle in the same duration of time  $t$ . The ratio of the angular speed of the first to the second car is

- 1:1
- $r_1:r_2$
- $m_1:m_2$
- none of these

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Impulse is equal to the change in - 1/1  
-----

- force
- linear momentum
- velocity
- kinetic energy

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Two bodies of masses 2kg and 4kg are moving with velocities 2m/s and 10m/s respectively. What is the velocity of their centre of mass? 1/1

- 5.3m/s
- 7.3m/s
- 6.4m/s
- 8.1m/s

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The coefficient of restitution for a perfectly elastic collision is

- 0
- 1
- 1
- infinity

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SI unit of power is

1/1

- kilowatthour
- kilowatt/hour
- watt
- horse power



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A spring of force constant 1/1  
800N/m has an extension of 5cm.  
The work done in extending it  
from 5cm to 15cm is

- 16J
- 8J
- 32J
- 24J

Vectors which are having equal or 1/1 unequal magnitudes and are acting along parallel straight lines are

- Coplanar vector
- Collinear vector
- Co-initial vector
- Localized vector

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The horizontal range of projectile 0/1 is  $4\sqrt{3}$  times of its maximum height . The angle of projection will be

$40^\circ$

$90^\circ$

$30^\circ$

$45^\circ$

In a two dimensional motion, instantaneous speed  $v_0$  is a positive constant. Then which of the following are necessarily true?

0/1

- The acceleration of the particle is zero.
- The acceleration of the particle is bounded.
- The acceleration of the particle is necessarily in the plane of motion.
- The particle must be undergoing a uniform circular motion.





In the question paper “ indicates power and  
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The magnitude of the resultant of 1/1  
two equal vectors is equal to the  
magnitude of either vector. Then  
the angle between the two  
vectors is

- 150°
- 120°
- 90°
- 60°