



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SOLVED PAPER 12 (UNSOLVED)

Part I

1. The displacement of a particle moving along x-axis with respect to times is given by

$x = at + bt^2 - ct^3$. The dimensions of b are

A. L^0T^{-3}

B. LT

C. LT^{-2}

D. LT^{-3}

Answer: C



Watch Video Solution

2. Find $\left| \vec{a} \times \vec{b} \right|$ where $\vec{a} = 3\hat{i} + 4\hat{j}$ and $\vec{b} = \hat{i} + \hat{j} + \hat{k}$

A. 45°

B. 90°

C. -45°

D. 180°

Answer: B



Watch Video Solution

3. Consider the motion of the tip of the minute hand of a clock . In one hour

(i) the displacement is zero

(ii) the distance covered is zero

(iii) the average speed is zero

(iv) the average velocity is zero

A. (i), (ii) are correct

B. (i), (ii) ,(iii) are correct

C. (i),(iii) are correct

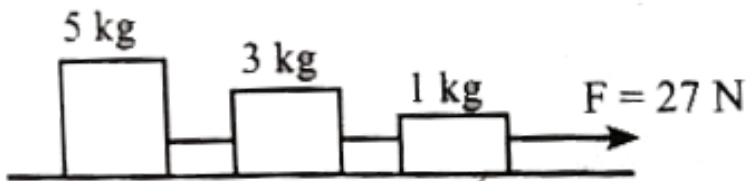
D. (i),(iv) are correct

Answer: D



Watch Video Solution

4. The surface over which blocks are placed is smooth. What is the acceleration of each block in the given diagram ?



A. $9 \text{ m} / \text{s}^2$

B. $3 \text{ m} / \text{s}^2$

C. $2m / s^2$

D. $0.33m / s^2$

Answer: B



Watch Video Solution

5. The centre of mass of a system of particles does not depend upon

A. position of particles

B. relative distance between particles

C. mass of particles

D. force acting on particles

Answer: D



Watch Video Solution

6. If the potential energy of the particle is

$\alpha - \frac{\beta}{2}x^2$, then force experienced by the

particle is:

A. $F = \frac{\beta}{2}x^2$

B. $F = \beta x$

C. $F = -\beta x$

D. $F = -\frac{\beta}{2}x^2$

Answer: B



Watch Video Solution

7. The damping force on an oscillator is directly proportional to the velocity . The units of the constant of proportionality are

A. $kgms^{-1}$

B. $kgms^{-2}$

C. $kg s^{-1}$

D. $kg s$

Answer: C



Watch Video Solution

8. A satellite is launched into a circular orbit of radius R around the earth. A second satellite is

launched into an orbit of radius $4R$. The ratio of their respective periods is

A. 4:1

B. 1:8

C. 8:1

D. 1:4

Answer: B



Watch Video Solution

9. A couple produces

A. pure rotation

B. pure translation

C. rotation and translation

D. no motion

Answer: A



Watch Video Solution

10. Two small spheres of radii r and $2r$ fall through a viscous liquid with the same constant speed. The viscous forces experienced by them are in the ratio

A. 1 : 2

B. 2 : 1

C. 1 : 4

D. 4 : 1

Answer: A



Watch Video Solution

11. When a cycle tyre suddenly bursts, the air inside the tyre expands. This process is.....

A. isothermal

B. adiabatic

C. isobaric

D. isochoric

Answer: B



Watch Video Solution

12. If the balls are projected at an angle of 60° and 45° and the total heights reached are same, then their initial velocities are in the ratio of

A. $2\sqrt{2} : 3$

B. $3 : 2\sqrt{2}$

C. $\sqrt{2} : \sqrt{3}$

D. $2 : 3$

Answer: C



Watch Video Solution

13. The loudness and pitch of a sound note depends on

A. intensity and frequency

B. intensity and velocity

C. frequency and velocity

D. frequency and number of harmonics

Answer: A



Watch Video Solution

14. When a particle oscillates simple harmonically, its potential energy varies periodically. If the frequency of oscillation of the particle is n , the frequency of potential energy variation is.....

A. $\frac{n}{2}$

B. n

C. $2n$

D. $4n$

Answer: C



Watch Video Solution

15. If the absolute temperature of a gas is increased 3 times the rms velocity of the molecules will be

A. 3 times

B. 9 times

C. $\sqrt{3}$ times

D. $\sqrt{6}$ times

Answer: C



Watch Video Solution

Part II

1. What are the limitations of dimensional analysis?



Watch Video Solution

2. Define angular displacement and angular velocity.



[Watch Video Solution](#)

3. How will you calculate the length of the S period.



[Watch Video Solution](#)

4. A force of $\vec{F} = (4\hat{i} - 3\hat{j} + 5\hat{k})N$ is applied at a point whose position vector is $\vec{r} = (7\hat{i} + 4\hat{j} - 2\hat{k})m$. Find the torque of force about the origin.



[Watch Video Solution](#)

5. Define the gravitational field. Give its unit.



[Watch Video Solution](#)

6. A fly wheel rotates with a uniform angular acceleration. If its angular velocity increases from 20π rad/s to 40π rad/s in 10 seconds. Find the number of rotations in that period.



[Watch Video Solution](#)

7. Define stress and strain.



[Watch Video Solution](#)

8. Why moon has no atmosphere?



[Watch Video Solution](#)

9. A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of 31.4 cm/s. The frequency of its oscillation is.....



[Watch Video Solution](#)

1. Discuss the laws of transverse vibration in stretched strings.



[Watch Video Solution](#)

2. An object is projected at an angle such that the horizontal range is 4 times of the maximum height. What is the angle of projection of the object?



[Watch Video Solution](#)

3. Discuss conservation of angular momentum with example.



[Watch Video Solution](#)

4. State and prove parallel axis theorem



[Watch Video Solution](#)

5. State the law of floatation.



[Watch Video Solution](#)

6. A comet orbits the sun in a highly elliptical orbit. Does a comet have a constant

(i) Linear speed



[Watch Video Solution](#)

7. List few applications of surface tension.



[Watch Video Solution](#)

8. An unknown planet orbits the sun with distance twice the semi major axis distance of the Earth's orbit. If the Earth's time period is T_1 , what is the time period of this planet?



[Watch Video Solution](#)

9. Define precision and accuracy. Explain with one example.



[Watch Video Solution](#)

Part IV

1. What is significant figures?



[Watch Video Solution](#)

2. Explain why a cyclist bends while negotiating a curve road?



[Watch Video Solution](#)

3. Check the correctness of the equation $\frac{1}{2}mv^2 = mgh$ using dimensional analysis method.



[Watch Video Solution](#)

4. Write shorts notes on the oscillations of liquid column in U-tube.



[Watch Video Solution](#)

5. A particle of mass 5 units is moving with a uniform speed of $v = 3\sqrt{2}$ units in the XOY plane along the line $y = x + 4$. Find the magnitude of angular momentum.



[Watch Video Solution](#)

6. A geostationary satellite is orbiting the earth at a height of $5R$ above the surface of the earth, R being the radius of the earth. Find

the time period of another satellite at a height of $2R$ from the surface of the earth.



[Watch Video Solution](#)

7. Explain the variation of g with depth from the Earth's surface.



[Watch Video Solution](#)

8. Derive an expression for the elastic energy stored per unit volume of a wire.



[Watch Video Solution](#)

9. Describe Newton's formula for velocity of sound waves in air.



[Watch Video Solution](#)

10. Derive an expression for power and velocity.



[Watch Video Solution](#)

