



# PHYSICS

## BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

### SAMPLE PAPER-14 (UNSOLVED)

#### Part I

1. If error in radius is 3% , what is error in volume of sphere ?

A. 0.03

B. 0.09

C. 0.27

D. 0.65

**Answer: b**



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

A. 125 m

B. 75m

C. 100 m

D. 50 m

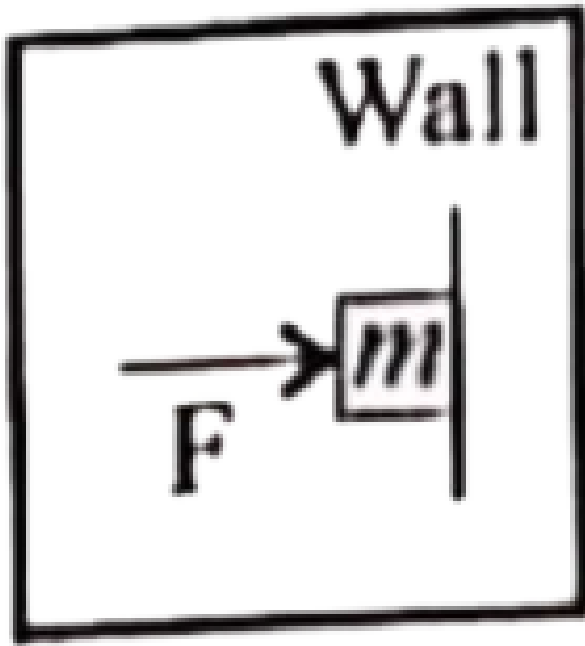
**Answer: c**



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**3.** An object of mass  $m$  held against a vertical wall by applying horizontal force  $F$  as the

minimum of the force is



- A. less than  $mg$
- B. equal to  $mg$
- C. greater than  $mg$

D. cannot determine

**Answer: c**



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4. When a particle moves in a circle with a uniform speed .....

A. its velocity and acceleration are both constant

B. its velocity is constant but the acceleration changes

C. its acceleration is constant but the velocity changes

D. the velocity and acceleration both change

**Answer: b**



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5. A force 'F' acts on an object and moves through a distance  $x$ . What is the work done by the force to move the object from  $x=0$  to  $x=6$  m .....

A. 12J

B. 13J

C. 13.5 J

D. 0 J

**Answer: c**



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6. Where will be the centre of mass on combining two masses  $m$  and  $M$  ( $M > m$ ) ?

- A. towards 'm'
- B. towards 'M'
- C. between  $m$  &  $M$
- D. away from  $m$  &  $M$

**Answer: b**



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7. A spring of force constant 'k' is cut into two pieces such that one piece is double the length of the other. Then the long piece will have a force constant of .....

A.  $\frac{2}{3}k$

B.  $\frac{3}{2}k$

C.  $3k$

D.  $6k$

**Answer: b**



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8. Mass of two substances are 1 g and 9 g respectively. If their kinetic energies are same, then the ratio of their momentum will be.....

A. 1 : 9

B. 9 : 1

C. 3 : 1

D. 1 : 3

**Answer: d**



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**9.** The velocity of a rain drop attains constant value because of .....

- A. (a) surface tension
- B. (b) upthrust of air
- C. (c) viscous force exerted by air
- D. air currents

**Answer: c**



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**10.** 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**



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**11.** What is the minimum velocity with a body of mass  $m$  must enter a vertical loop of radius  $R$  so that it can complete the loop ?

A.  $\sqrt{2gR}$

B.  $\sqrt{3gR}$

C.  $\sqrt{5gR}$

D.  $\sqrt{gR}$

**Answer: c**



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**12.** A rigid body rotates with an angular momentum  $L$ . If its kinetic energy is halved, the angular momentum becomes,

A.  $L$

B.  $\frac{L}{2}$

C.  $2L$

D.  $\frac{L}{\sqrt{2}}$

**Answer: d**



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**13.** In a simple harmonic oscillation, the acceleration against displacement for one complete oscillation will be.

- A. an ellipse
- B. a circle
- C. a parabola
- D. a straight line

**Answer: d**



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**14.** An air column in a pipe which is closed at one end, will be in resonance with the vibrating body of frequency 83 Hz. Then the length of the air column is

A. 1.5 m

B. 0.5 m

C. 1.0 m



D. 2.0 m

**Answer: c**



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**15.** The equation of a transverse wave is given by  $y = 10 \sin\{\pi(0.01x - 2t)\}$  where  $y$  and  $x$  are in cm and  $t$  is in seconds. Its frequency is .....

A.  $10s^{-1}$

B.  $2s^{-1}$

C.  $1s^{-1}$

D.  $0.01s^{-1}$

**Answer: c**



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## Part II

1. Define the gravitational field. Give its unit.



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2. Define a vector. Give examples.



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3. When you walk on the tiled floor where water is spilled, you are likely to slip . Why ?



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4. Give the unit and dimension of power.



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5. Which one of these is more elastic, steel or rubber ? Why ?



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6. Find the torque of a force  $7\hat{i} + 3\hat{j} - 5\hat{k}$  about the origin. The force acts on a particle whose position vector is  $\hat{i} - \hat{j} + \hat{k}$



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7. What are the factors affecting the surface tension of a liquid?



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8. Why does heat flow from a hot object to a cold object?



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9. The average range of frequencies at which human beings can hear sound waves varies from 20 Hz to 20 kHz. Calculate the wavelength of the sound wave in these limits .  
(Assume the speed of sound to be  $340\text{m s}^{-1}$ )



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### Part iii

1. What are the advantages of SI system?



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2. Define Average speed ?



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3. Centre of mass



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4. What are geostationary and polar satellites?





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5. Write the principle used in beam balance and define Mechanical Advantage.



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6. Why do we have seasons on Earth?



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7. How will you measure the diameter of the Moon using parallax method?



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8. State Newton's three laws and discuss their significance.



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9. Explain Laplace's correction.



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## Part Iv

1. Convert 76cm of mercury pressure into  $Nm^{-2}$  using the method of dimensions.



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2. Derive the equation of motion, range and maximum height reached by the particle

thrown at an oblique angle  $\theta$  with respect to the horizontal direction.



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3. Define Lami's theorem.



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4. Arrive at an expression for elastic collision in Dimension and discuss various case.



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5. The Moon orbits the Earth once in 27.3 days in an almost circular orbit. Calculate the centripetal acceleration experienced by the Moon? (Radius of the Earth is  $6.4 \times 10^6 m$  ).



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6. Derive the expression for the terminal velocity of a sphere moving in a high viscous fluid using stokes force.



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7. State and explain work energy principle.

Mention any three examples for it.



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8. State and prove parallel axis theorem



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9. Derive Mayer's relation for an ideal gas.



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10. Describe the vertical oscillations of a spring.



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