



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER 11 (UNSOLVED)

Part I

1. Force F is given by $F = at + bt^2$. Where "t" is time. What are the dimensions of "a" and

"cb"?

A. MLT^{-3} and MLT^{-4}

B. MLT^{-1} and MLT^0

C. MLT^{-3} and MLT^4

D. MLT^{-4} and MLT

Answer: A



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2. Unit of impulse.....

A. Ns

B. Ns^{-1}

C. Nm

D. Nm^{-1}

Answer: A



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3. A ball with an initial momentum 'P' collides normally with a rigid wall. If P_1 is the linear

momentum after the perfectly elastic collision

,.....

A. $P_1 = P$

B. $P_1 = -P$

C. $P_1 = -2P$

D. $P_1 = 2P$

Answer: C



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4. If a person moving from pole to equator of the earth then the centrifugal force acting on him is

A. increases

B. decreases

C. remains the same

D. increases and then decreases

Answer: A



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5. 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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6. 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: A



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7. The ratio of the radii of gyration of a circular disc to that of circular ring, each of same mass and same radius about their axes is

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

B. $1 : \sqrt{2}$

C. $\sqrt{2} : 1$

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

Answer: B



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8. The average translational kinetic energy of gas molecules depends on

A. number of moles and T

B. only on T

C. P and T

D. P only

Answer: A



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9. 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





10. A body is floating in a liquid with $\frac{1}{5}$ of its volume outside the liquid. If the relative density of the body is 0.9, that of the liquid is

A. 0.9×5

B. $0.9 \times \frac{5}{4}$

C. $0.9 \times \frac{4}{5}$

D. 0.9×4

Answer: B



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11. Two masses M_1 and m_2 are experiencing the same force where $m_1 < m_2$ the ratio of their acceleration $\frac{a_1}{a_2}$ is

A. 1

B. greater than 1

C. less than 1

D. all of above

Answer: B



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12. Boiling water is changing into steam. Under this condition the specific heat of water is

A. zero

B. one

C. infinite

D. less than one

Answer: C



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13. In an isochoric process we have

A. $W = 0$

B. $Q = 0$

C. $\Delta U = 0$

D. $\Delta T = 0$

Answer: A



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14. A particle is executing simple harmonic motion given by $x = 5 \sin\left(4t - \frac{\pi}{6}\right)$. The velocity of the particle when its displacement is 3 units is.....

A. $\frac{2\pi}{3}$ unit

B. $\frac{5\pi}{6}$ units

C. 20 units

D. 16 units

Answer: D



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15. Compute the distance between anti-node and neighbouring node .

A. λ

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

C. $\frac{\lambda}{3}$

D. $\frac{\lambda}{4}$

Answer: D



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Part II

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



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2. Define a vector. Give examples.



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3. What are internal frames ?



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4. A motor cyclist is going in a vertical circle.

What is the necessary condition so that he

may not fall down ?



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5. Two point masses 3 kg and 5 kg are at 4 m and 8 m from the origin on X-axis. Locate the position of center of mass of the two point masses (from the origin and (1) from 3 kg mass.



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6. What happens to the pressure inside a soap bubble when air is blown into it ?



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



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8. Eiffel tower is made up of iron and its height is roughly 300 m. During winter season (January) in France the temperature is 2°C and in hot summer its average temperature 25°C . Calculate the change in height of Eiffel

tower between summer and winter. The linear thermal expansion coefficient for iron

$$\alpha = 10 \times 10^{-6} \text{ per } ^\circ C$$



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9. The speed of a wave in a certain medium is 900 m/s. If 3000 waves passes over a certain point of the medium in 2 minutes, then compute its wavelength.



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1. Write any two limitations of dimensional analysis. Give relevant examples.



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2. Find the angle between two vectors.

$$A = \hat{i} + 2\hat{j} - \hat{k} \text{ and } B = -4\hat{i} + \hat{j} - 2\hat{k}.$$



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3. A 40gm of bullet moving at $250ms^{-1}$ stops after penetrating 20cm of wood. Calculate the average force by the bullet. ?



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4. Discuss the force - displacement graph for a spring.



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5. A wire of length 2 m with the area of cross section $10^{-6}m^2$ is used to suspend a load of 980 N. Calculate (i) The stress developed in the wire (ii) the strain and (iii) the energy stored .
Given $Y = 12 \times 10^{10}Nm^{-2}$.



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6. Obtain the Coefficient of performance (COP).
(β).



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7. State Bernoulli's theorem.



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8. Write down the postulates of kinetic theory of gases.



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9. The maximum velocity of a particle , executing simple harmonic motion with an amplitude 7mm is 4.4ms^{-1} . The period of oscillation is



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Part Iv

1. Obtain in expression for the time period T of a simple pendulun. The time period depend

upon (i) mass 'm' of the bob (ii) length 'l' of the pendulum and (iii) acceleration due to gravity g at the place where the pendulum is suspended. (Constant $k = 2\pi$) i.e.



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2. Explain the types of equilibrium with suitable examples



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3. Explain in detail the triangle law of addition.



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4. Derive equations of uniformly acceleration motion by calculus method.



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



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6. What are the limitations of the first law of thermodynamics?



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7. State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and streamlined flow or fluid.



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



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9. Derive an expression for escape speed.



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10. Explain the different types of modulus of elasticity.





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