



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER - 18 (UNSOLVED)

Part I

1. Identify the unit vector in the following .

A. $\hat{i} + \hat{j}$

B. $\hat{k} - \frac{\hat{j}}{\sqrt{2}}$

C. $\hat{k} - \frac{\hat{j}}{\sqrt{2}}$

D. $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

Answer: D



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2. Which one of the following physical quantities cannot be represented by a scalar?

A. mass

B. length

C. momentum

D. magnitude of acceleration

Answer: C



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3. A body is moving in a circle with a uniform speed ' v ' In moving from a point to another diametrically opposite point

A. the momentum changes by ' mv '

B. K.E changes by $1 / 2mv^2$

C. the momentum changes by $2mv$

D. K.E changes by mv^2

Answer: C



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4. If the internal energy of an ideal gas U and volume V are doubled, then the pressure of the gas :

A. doubles

B. remains same

C. halves

D. quadruples

Answer: B



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5. The potential energy of a system increases,
if work is done

A. by the system against a conservative force

B. by the system against a non-conservative force

C. upon the system by a conservative force

D. upon the system by a non-conservative force

Answer: A



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6. At what temperature the value of celcius and fahrenheit scale concid.

A. 40°

B. -273°

C. -40°

D. 0°

Answer: C



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7. 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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8. If the mass and radius of the Earth are both doubled, then the acceleration due to gravity g

A. remains same

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

C. $2g$

D. $4g$

Answer: B



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9. The modulus of rigidity of a liquid is

.

A. zero

B. 1

C. infinite

D. none of these

Answer: A



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10. Two wires of same material , having cross-sectional areas in the ratio 1 : 2 and lengths in the ratio 1 : 4 are stretched by the same force.

The ratio of the stresses in the wires will be

A. 1 : 2

B. 2 : 1

C. 1 : 4

D. 4 : 1

Answer: B





11. If the distance between the Earth and Sun were to be doubled from its present value, the number of days in a year would be

A. 64.5

B. 1032

C. 182.5

D. 730

Answer: B



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12. Which of the following gases will have least rms speed at a given temperature?

A. Hydrogen

B. Nitrogen

C. Oxygen

D. Carbon-di-oxide

Answer: D



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13. A particle is oscillating according to the equation $x = 5 \cos(0.5\pi t)$ where t is in seconds. The particle moves from the position of equilibrium to the position of maximum displacement in time.....

A. 1s

B. 2s

C. 0.5s

D. 4s

Answer: A



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14. Bernoulli's equation is an example of conservation of

A. mass

B. momentum

C. energy

D. angular momentum

Answer: C



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15. With the rise of temperature, the speed of sound in a gas

A. increases

B. decreases

C. remains same

D. may increase or decrease depending on
the corresponding change in pressure

Answer: A



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Part II

1. What is significant figures?



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2. What is meant by Cartesian coordinate system?



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3. Under what condition will a car skid on a leveled circular road ?



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4. What does the work - kinetic energy theorem imply ?



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5. Define couple.



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6. If the Earth's pull on the Moon suddenly disappears, what will happen to the Moon?



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7. State the law of floatation.



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8. State the law of equipartition of energy.



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9. A student comes to school by a bicycle whose tire is filled with air at a pressure 240 kPa at 27°C . She travels 8 km to reach the school and the temperature of the bicycle tire increases to 39°C . What is the change in pressure in the tire when the student reaches school?



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Part iii

1. What are fundamental units and derived units?



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



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3. Define the following terms: (a) Isothermal process (b) adiabatic process (c) isobaric

proces (d) isochoric process.



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4. What does the work - kinetic energy theorem imply ?



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5. Find the moment of inertia of a uniform rod about an axis which is perpendicular to the rod and touches any one end of the rod.



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6. State kepler's laws of planetary motion.



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7. A capillary tube is dipped first in cold water and then in hot water. Comment on the capillary rise in the second case.



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8. A train was moving at the rate of 54kmh^{-1} when brakes were applied. It came to rest within a distance of 225 m. Calculate the retardation produced in the train.



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9. State the laws of simple pendulum.



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1. Explain in detail the various types of errors.



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2. Obtain an expression for the time period T of a simple pendulum. [The time period T depend upon (i) mass l of the bob (ii) length m of the pendulum and (iii) acceleration due to gravity g at the place where pendulum is suspended.]

Assume the constant $k = 2\pi$



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3. Derive the kinematic equations of motion for constant acceleration.



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4. Derive an expression for escape speed.



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5. Derive the expression for moment of inertia of a uniform disc about an axis passing through the centre and perpendicular to the plane.



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6. Suppose we go 200 km above and below the surface of the Earth, what are the g values at these two points? In which case, is the value of g small?





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7. Calculate the temperature at which the rms velocity of a gas triples its value at S.T.P.

$$[T_1 = 273K]$$



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8. In an adiabatic expansion of the air the volume is increased by 4% what is percentage change in pressure ? (For air $\gamma = 1.4$)



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9. Discuss in detail the energy in simple harmonic motion.



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10. What are stationary waves? write down the characteristics of stationary waves.



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