ANNUAL EXAM 2023 -24

Class - XI

Time: 3 Hrs   Subject -PHYSICS   M.M. -70

SECTION 'A'

Multiple Choice Ques tions:-   (1×20=10)

1. Escape speed of a body :-

   (a) is proportional to its mass

   (b) is inversely proportional to square of its mass.

   (c) is proportional to square of its mass

   (d) does not depends on the mass.

2. Dimensional formula of universal gravitational

   force is: -

   (a) $[MLT^{-2}]$ (b) $[ML^{3}T^{-2}]$

   (c) $[M^{-1}L^{3}T^{-2}]$ (d) $[M^{-1}LT^{-2}]$

P.T.O.

3. Centre of mass of a body: -

(a) always lies at geometrical centre.

(b) it may be anywhere outside or inside the body

(c) always lies inside the body

(d) always lies outside the body

4. A body moves with a constant velocity v under force F. Power of force is: -

(a) Fv   (b) F/v   (c) F/v^2 (d) Fxv^2

5. The formula of angle of banking at a turn of road is: -

(a) $\tan\theta = \dfrac{vg}{r}$ (b) $\tan\theta = \dfrac{v^2 r}{g}$

(c) $\tan\theta = \dfrac{rg}{v^2}$ (d) $\tan\theta = \dfrac{v^2}{rg}$

6. Friction force is: -

(a) Gravitational force (b) weak force

(c) nuclear force   (d) electromagnetic force

7. A car of moves 1000kg is moving with speed 40m/sec, brakes are applied to stop the car. If the average resistive force is 40000N, in how much time will the car stop   :-

   (a) 5 Sec.   (b) 15 Sec.

   (c) 20 Sec.   (d) 10 Sec.

8. A stone is thrown from the top of a tower, its path will be:

   (a) Straight line   (b) Circle

   (c) Ellipse   (d) Parabola

9. Unit vector in the direction of $\vec{A}=\hat{i}+2\hat{j}+3\hat{k}$ is: -

   (a) $\dfrac{\hat{i}+2\hat{j}+3\hat{k}}{\sqrt{14}}$ (b) $\dfrac{\hat{i}+2\hat{j}+3\hat{k}}{6}$

   (c) $\dfrac{\hat{i}+2\hat{j}+3\hat{k}}{14}$ (d) $\dfrac{\hat{i}+2\hat{j}+3\hat{k}}{\sqrt{6}}$

10. A ball is dropped from the top of a tower so that its moves under gravity. Which quantities, during motion, will remain constant:

                                          P.T.O

(a) Speed   (b) Velocity

(c) Acceleration   (d) displacement

11. Which of the following pairs have the same dimensions?

(a) Frequency and angle

(b) Angular velocity and linear velocity

(c) Specific heat and heat capacity

(d) Angular momentum and Planck's constant

12. Number of significant figures in 0.700m ^{2} are: -

(a) 1   (b) 2   (c) 3   (d) 4

13. Unit of modulus of elasticity is: -

(a) Kg/m^2-sec   (b) Kg/m-sec^2

(c) Kg/m sec   (d) Kg sec/m

14. A small lead ball is falling freely in a non - **viscous medium. It's velocity:-**

(a) will increase   (b) will decrease

(b) will remain constant   (d) None of these

P.T.O.

15. *Celsius is unit of:* -

(a) temperature   (b) heat

(b) specific heat   (d) Latent heat

16. Correct temperature in Kelvin at 0°C is: -

(a) 273.15K   (b) 272.85K

(b) 273K   (d) 273.2K

17. A fone of 150N is applied on a body. The body is displaced **by 15 metre by making an angle's 60°** from the force. Work done by force is: -

(a) 1125J   (b) 2250J

(b) 11.25×10^3J   (d) None of these

18. **Kepler's Law of planetary motion is:-**

(a) $T\alpha\ r^{3/2}$ (b) $T\alpha\ r$

(b) $T\ \alpha\ r^3$ (d) $T\ \alpha\ r^2$

19. Pressure does not depend :-

(a) Height of liquid column

(b) Density of liquid

(c) g   (d) Mass of liquid column

P.T.O.

20. Specific heat capacity is :-

   (a) $C=Q/m\Delta t$ (b) $Q=mL$

   (b) $C=m\Delta t/Q$ (d) None of these

SECTION 'B'

1 (i) What do you mean by conservative and non-conservative forces. Give example also. **[3]**

(ii) Two bodies of mass 1Kg and 2Kg are placed in x-y plane at points (1,2) ad (-1,4) respectively. Find the coordinates of centre of mass of the system. **[3]**

(iii) What do you mean by Centripetal force? A body mass 5Kg is revolving in a circular path of radius 2m with speed 10m/sec. Find the centripetal force acting on the body. **[3]**

(iv) Derived the second equation of motion by calculus method. **[3]**

(v) Why it is difficult to move a cycle with brakes? **[3]**

P.T.O.

(i) Write hooke's Law. Find the energy stored in per Unit volume in the wire when linear strain 2×10^{-4} is produced. Young's modulus of elasticity of material of the wire $Y = 1.2 \times 10^{11} N/m^2$. [3]

(ii) Explain construction and working Principle of hydraulic brake. [3]

(iii) Write the Principle of Continuity. A water drop of radius 10^{-2}cm is falling in air. Find viscous force acting on the drop when it is falling with terminal velocity given that coefficient of viscosity=1.8×10^{-4} paise

Terminal velocity 1.23×10^2 cm/sec. [3]

(iv) Derive a relation for acceleration due to gravity at a height h from the earth's surface in terms of acceleration due to gravity on the earth's surface and radius of earth. [3]

P.T.O.

(v) What is adiabatic process? Derive relation on b/w absolute temperature (T) and volume(V) of an ideal gas in adiabatic process. [3]

OR

What do you understand by escape velocity, derive the formula escape velocity in terms of gravitational constant, Mass of earth and radius of earth. https://www.upboardonline.com

3. Write Law of periods. Also derive the formula of Law of periods. [5]

OR

Explain second Law of thermodynamics and write its main statements.

OR

Explain second Law of thermodynamics and write its main statements.

OR

P.T.O.

3. Calculate the external work done required in decreasing Volume of ideal gas by $2.4 \times 10^{-4} m^3$ at normal temperature and $1.01 \times 10^5 N/m^2$ pressure.

4. Write Gravitational potential Energy. Derive the formula Gravitational Potential Energy.   [5]

OR

A force $\vec{F} = (3\hat{i} + 4\hat{j} - 5\hat{k})N$ is applied on a particle, it produce a displacement $\vec{S} = (5\hat{i} + 4\hat{i} + 3\hat{k})$ m in the particle. Find work done by the force and also find angle b/w the force $\vec{F}$ and displacement $\vec{S}$.

5. What do you understand by Kinetic Energy? Derive the formula of Kinetic Energy by using Calculus method.

OR

Write the applications of first Law of Thermodynamics.

OR

A Satellite of mass 1000Kg is revolving in a circular orbit at height 1600Km above the earth's surface for this satellite, find

(i) Orbital Speed (ii) Period of revolution.

6. What do you understand by power? Show that the instantaneous power of a force is equal to the scalar product of the force and instantaneous velocity? [5]

OR

Which Law does the equation dQ=dU+PdV, represent? Explain its meaning. Explain the concept of internal energy with the help of this Law. Here symbols used in this equation are having their usual meaning.

OR

Average distance of two planets from sun 10^{13} and 10^{12} respectively. Find the ratio of time period and speed of the planets.

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