JKBOSE
QUESTION PAPERS

Jammu & Kashmir Board of School Education



Roll No .....

Z–8–X

Total No. of Questions : 22] [Total No. of Printed Pages : 8

11th ARM(SZ)JKUT2024

1208–X

PHYSICS

Time : 3 Hours] [Maximum Marks : 70

Section–A

(Objective Type Questions) 1 each

1. (i) The number of significant numbers in 23.023 is :

(A) 2 (B) 3

(C) 4 (D) 5

(ii) Planck's constant has same dimensions as that of :

(A) Energy (B) Momentum

(C) Frequency (D) Angular momentum

(iii) A force F is given by $F = at + bt^2$, where (t) is time. What are dimensions of a and b ?

(A) MLT^{-3} and ML^2T^{-4}

(B) MLT^{-3} and MLT^{-4}

(C) MLT^{-1} and MLT^0

(D) MLT^{-4} and MLT^{-1}

(iv) A projectile will cover same horizontal distance, when the initial angles of projection are :

(A) 20°, 60°

(B) 20°, 70°

(C) 30°, 40°

(D) 50°, 60°

(v) A light and a heavy body have equal kinetic energy. Which has greater momentum ?

(A) Heavy body

(B) Light body

(C) Both have equal momentum

(D) Information is incomplete

(vi) Angular momentum is a :

(A) Polar vector (B) Axial vector

(C) Scalar (D) None of these

(vii) There is no atmosphere on moon as :

(A) It is closer to earth

(B) It revolves around the earth

(C) It gets light from the sun

(D) The escape velocity of gas molecules is less than their r.m.s. velocity on moon

(viii) The dimensional formula for the modulus of elasticity is same as that of :

(A) Stress (B) Strain

(C) Velocity (D) Surface tension

(ix) During the free expansion of gas, the entropy of gas will :

(A) Increase

(B) Decrease

(C) First increases, then decreases

(D) Remain same

(x) The r.m.s. speed of hydrogen at 27°C is v. What will be the r.m.s. speed of oxygen at 300 K ?

(A) $2v$ (B) 4

(C) $\frac{v}{2}$ (D) $\frac{v}{4}$

Section–B

(Very Short Answer Type Questions) 2 each

2. In Van der Waal's equation :

$$\left(P+\frac{a}{V^2}\right)(V-b)=RT$$

where P, V, R, T are pressure, volume, universal gas constant and temperature. What are dimensions of a and b ?

3. State Newton's three laws of motion.

4. Define Work and Power. Give their S.I. units.

5. Two bodies of mass 10 kg and 2 kg are moving with velocities $\left(2\hat{i}-7\hat{j}+3\hat{k}\right)$ m/s and $\left(-10\hat{i}+35\hat{j}-3\hat{k}\right)$ m/s respectively. Find velocity of centre of mass.

6. State Kepler's laws of planetary motion (any *two*).

7. Define streamline and turbulent flow.

8. State first law of thermodynamics in mathematical form.

9. Write down four postulates of kinetic theory of gases.

10. Distinguish between transverse and longitudinal wave motion.

Section–C

(Short Answer Type Questions) 3 each

11. A body covers first half of distance with a speed of 20 m/s and second half with a speed of 30 m/s. Find the average speed of the body.

12. A force $\vec{F} = (2 + x)N$ acts on a particle in x-direction in metre. Find the work done by this force during a displacement from $x = 1$ m to $x = 2$ m.

13. Define centre of the mass. Find an expression for the position vector of centre of mass of a two particle system.

14. Define escape velocity. Derive an expression for it.

15. Derive an expression for viscous force acting on a body of radius (r) falling with a velocity (v) through a viscous liquid on the basis of dimensional analysis.

16. State Bernoulli's theorem in different forms. Explain its one application.

17. An electric heater supplies heat to a system at a rate of 100 W. If system performs work at a rate of 75 Joules per second, at what rate is internal energy increasing ?

18. State law of equipartition of energy. Write the number of degrees of freedom of monoatomic, diatomic and triatomic gas.

19. At what distance from the mean position is kinetic energy equal to potential energy ? Briefly explain in case of S.H.M.

Section-

(Long Answer Type Questions) 5 each

20. Derive :

(i) $v = u + at$

(ii) $s = ut + \frac{1}{2}at^2$

Where letters have their usual meanings.

Or

Define Projectile. Derive an expression for maximum height of flight and horizontal range of a projectile fired at an angle with the horizontal.

21. State and explain principle of conservation of linear momentum with the help of an example.

Or

Define Centripetal Force. Derive an expression for it.

22. Define Simple Harmonic Motion. Derive an expression for displacement, velocity and acceleration of a particle executing S.H.M.

Or

What is a Plane progressive wave ? Derive an expression for displacement of plane progressive wave.

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