SET-A

Time: 3 hrs **10+1- PHYSICS (March-2025)** **MM: 70**

Q. 1	**ONE MARK QUESTIONS**
i.	If the force applied to a body is doubled and the mass is cut in half, the acceleration ratio is (a) 1:1 (b) 1:2 (c) 2:1 (d) 1:4
ii.	Collision between gas molecules is assumed to be (a) elastic (b) inelastic (c) perfectly inelastic (d) all
iii.	The orbital velocity of a satellite as compared to its escape velocity is (a) lesser (b) more (c) equal (d) none
iv.	When the distance travelled by a body is proportional to the time taken, its speed (a) increases (b) decreases (c) becomes zero (d) remains same
v.	Both light and heavy bodies have equal momenta, the body possessing more kinetic energy is (a) heavy body (b) lighter body (c)both will have same K.E. (d) both will have zero K.E.
vi.	In which region of Earth, the weight of a body is slightly greater than the other regions (a) polar region (b) equator (c) tropic of Cancer (d) tropic of Capricorn
vii.	Number of significant figures in 0.0256 is (a) 3 (b) 4 (c) 5 (d) 6
viii.	When half-filled closed cylindrical container rotates in a horizontal plane about a perpendicular bisector, the moment of inertia will (a) decrease (b) increase (c) becomes zero (d) remains same
ix.	Trajectory of a particle moving in a plane with uniform acceleration having direction different from instantaneous velocity is (a) circle (b) parabola (c) ellipse (d) straight line
x.	The material, which remains unaffected by an applied elastic force is (a) quartz (b) steel (c) copper (d) rubber
xi.	If a body is rotating about an axis passing through its centre of mass, the angular momentum of the body is directed along its (a) radius (b) circumference (c) axis of rotation (d) none
xii.	S.I. Unit of Luminous intensity is: (a) lumen (b) candela (c) lux (d) watt
xiii.	Which of the following has the greatest inertia (a) An atom (b) a molecule (c) a one rupee coin (d) cricket ball
xiv.	For which of the following liquids, the liquid meniscus in the capillary tube is convex (a) water (b) mercury (c) both water and mercury (d) none
xv.	Which of the following is not true about isothermal expansion of an ideal gas (a) dU=0 (b) dQ=dW (c) PV/T =constant (d) PV= constant
xvi.	In the equation, PV = RT, V refers to any volume of gas. **(True or False)**
xvii.	The monoatomic molecules have only three degrees of freedom. **(True or False)**
xviii.	If the length of a simple pendulum is increased then it's time period will increase. **(True or False)**
xix.	When steam is converted into water, internal energy of the system decreases. **(True or False)**
xx.	Every periodic motion is oscillatory, but not vice versa. **(True or False)**
	TWO MARKS QUESTIONS
Q. 2	How can distance and acceleration be calculated from velocity-time graph? **Or** A car starts from rest and accelerates uniformly over a time of 5 seconds for a distance of 110m.Determine acceleration of the car.
Q. 3	Write two applications and two limitations of dimensional analysis? **Or** Check the correctness of the relation $v = \sqrt{2gH}$,v = velocity, g = acceleration due to gravity, H = height
Q. 4	Give one example of positive, negative, zero work each. Write unit of electrical energy.
Q. 5	What is weightlessness? Write situations, where it can be felt.

Q. 6	Define an ideal gas. Under what conditions, real gas behaves as ideal gas.
Q. 7	Friction is a necessary evil. Comment on the statement.
Q. 8	What can be said about two vectors A and B if (a) cross product of A and B is zero (b) dot product of A and B is zero.
	THREE MARKS QUESTIONS
Q. 9	A man of mass 70 kg stands on a weighing scale in a lift What would be readings on the scale if lift moves (a) Upward with a uniform speed of $10ms^{-1}$ (b) upwards with uniform acceleration of $5\ ms^{-1}$ (c) downwards with uniform acceleration of $5\ ms^{-1}$ **Or** What will be maximum velocity with which a vehicle can take a turn safely if friction is taken in account.
Q.10	Discuss effect of height on acceleration due to gravity.
Q.11	Define centre of mass Derive an expression for it for two particle system. **Or** The moment of inertia of a solid sphere about a tangent is $7/5\ MR^2$.Find moment of inertia about its diameter.
Q.12	State Stoke' s law. Obtain an expression for it.
Q.13	Explain different temperature scales. Write expression showing relation between them.
Q.14	Derive the relation $C_p - C_v = R$ for specific heats of a gas at constant pressure and constant volume. **Or** Find the height of geostationary satellite assuming Earth as a sphere of radius 6400 km.
Q.15	Define S.H.M. Prove that acceleration is proportional to displacement in S.H.M. ($a = -w^2y$)
	FIVE MARKS QUESTIONS
Q.16	What do you mean by capillary and capillary action. Derive an expression for rise of liquid in a capillary (ascent formula). 1+3+1 **Or** Giving assumptions and limitations, state and prove Bernoulli's theorem. 1+1+3
Q.17	Derive equations of uniformly accelerated motion graphically. (a) $v = u + at$ (b). $v^2 - u^2 = 2aS$ (c) $S = ut + 1/2\ at^2$ 1+2+2 **Or** Define 'projectile. Write its two examples. Show that path followed by projectile fired at an angle with horizontal is parabolic. 1+3+1
Q.18	Read the passage carefully and answer the questions: When we approach a stationary source of sound with high speed, the pitch of sound heard appears to be higher than that of the source. As the observer recedes away from the source, the observed pitch becomes lower than that of the source. This motion related frequency change is called Doppler effect. It holds not only for sound but also for electromagnetic waves. Doctors use it in sonography, to study blood flow and heart beats. It is useful in detecting enemy aircraft, speed of vehicles, receding galaxies. (i)What is Doppler effect? (ii)Is this effect holds for electromagnetic waves? Yes (iii)What does Red shift indicate? (iv)Write applications of Doppler effect? (v)Which shift indicates that object is coming towards us? (1+1+1+1+1+1)