



Physics	(B)	L.K.No. 1107	Paper Code No. 6473
Paper I	(Objective Type)	Inter - A - 2022	(Group Ist)
Time :	20 Minutes	Inter (Part I)	
Marks :	17	Session (2020 - 22) to (2021 - 23)	

Note : Four possible choices A, B, C, D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

BWP-GC-22

Q.No.1	Average Translational Kinetic Energy of Gas Molecule is related by :
(1)	(A) $\frac{1}{2} KT$ (B) KT (C) $\frac{2}{3} KT$ (D) $\frac{3}{2} KT$
(2)	The S.I. unit of product of Pressure and Volume is : (A) Watt (B) Joule (C) Pascal (D) Kelvin
(3)	When a Beam of white light falls perpendicularly on a plane of glass, then angle of refraction will be : (A) 90° (B) 60° (C) 0° (D) 180°
(4)	The phase difference of 180° is equivalent to a path difference of : (A) $\frac{\lambda}{2}$ (B) $\frac{\lambda}{4}$ (C) 2λ (D) λ
(5)	Speed of Sound in Air is independent of : (A) Density (B) Pressure (C) Temperature (D) Elasticity
(6)	Speed of Sound at $10^\circ C$ is : (A) 332 ms^{-1} (B) 339 ms^{-1} (C) 349 ms^{-1} (D) 360 ms^{-1}
(7)	Total Energy of Particle in SHM is proportional to square of : (A) Acceleration (B) Velocity (C) Time Period (D) Amplitude
(8)	Pressure is low where speed is : (A) High (B) Low (C) Zero (D) Constant
(9)	The range of a projectile becomes half of the maximum range at angle of projection : (A) 15° (B) 25° (C) 45° (D) 72°
(10)	How many Radians are in a Semi Circle : (A) $2\pi \text{ rad}$ (B) $\frac{\pi}{2} \text{ rad}$ (C) $\pi \text{ rad}$ (D) $10\pi \text{ rad}$
(11)	Escape Velocity of an object is independent of : (A) Mass of the Object (B) Mass of the Planet (C) Radius of the Planet (D) Type of Planet
(12)	For the impulse to be zero, which of the following must be constant : (A) Force (B) Velocity (C) Acceleration (D) All these
(13)	The time to reach the maximum height by the Projectile is : (A) $\frac{V_i \sin \theta}{g}$ (B) $\frac{2 V_i \sin \theta}{g}$ (C) $\frac{V_i^2 \sin^2 \theta}{g}$ (D) $\frac{V_i^2 \sin \theta}{g}$
(14)	Minimum Coplanar unequal forces for producing equilibrium are : (A) 2 (B) 3 (C) 4 (D) 5
(15)	$\hat{i} \cdot (\hat{j} \times \hat{k})$ equals : (A) 1 (B) Zero (C) \hat{i} (D) $-\hat{j}$
(16)	The percentage uncertainties in Length and Width of a rectangle are 2% and 3%. Its area has percentage uncertainty : (A) 1% (B) 5% (C) 6% (D) 2%
(17)	The number 56.8546 is rounded off to three significant figures as : (A) 57.0 (B) 56.8 (C) 56.9 (D) 56.854





Roll No.	1101 - 2020	Session (2020-22) to (2021-23)	Inter (Part - I)
Physics (Subjective)	Inter - A - 2022	Time 2 : 40 Hours Marks : 68	Group - Ist

Note : It is compulsory to attempt any (8 - 8) Parts each from Q.No. 2, Q.No.3 and attempt any (6) Parts from Q.No.4. Attempt any (3) Questions from Part - II. Write the Same Question Number and its Part Number as given in the Question Paper

Make Diagram where necessary.

Part - I

Q.No. 2

22 x 2 = 44

Q.No.2	(i)	What are the Dimensions and Units of Gravitational Constant G in the formula $F = G \frac{m_1 m_2}{r^2}$?
	(ii)	Why do we find it useful to have two units for the amount of substance, the kilogram and the mole ?
	(iii)	Write the dimensions of Pressure and Density.
	(iv)	Define Random Error and Systematic Error. How can these errors be reduced ?
	(v)	Can the velocity of an object reverse the direction when acceleration is constant? If so give an example.
	(vi)	Explain the circumstances in which the velocity \vec{v} and acceleration \vec{a} of a car are : (a) Anti Parallel (b) \vec{v} is zero but \vec{a} is not zero.
	(vii)	A football is thrown upward with an angle of 30° above the horizon. To throw a 40 m pass what must be the initial speed of ball ?
	(viii)	Differentiate clearly between Elastic and Inelastic Collision. What can you say about momentum during these Collisions?
	(ix)	For an Adiabatic Process, write down the form of first law of Thermodynamics.
	(x)	Give an example of natural process that involves an increase in entropy.
	(xi)	A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise ?
	(xii)	Why does the pressure of a Gas in a car tyre increase when it is driven through some distance ?
Q.No.3	(i)	Can a vector have a component greater than the vector magnitude?
	(ii)	Is it possible to Add a Vector Quantity to a Scalar Quantity ? Explain.
	(iii)	If $\vec{A} + \vec{B} = 0$ what can you say about the components of the two vectors ?
	(iv)	State First and Second Conditions of Equilibrium.
	(v)	Does the work done in raising a box on the platform depend upon how fast it is raised up ? If not why ?
	(vi)	When Rocket re - enters the atmosphere , its nose cone becomes very hot. Where does this heat energy come from ?
	(vii)	What is meant by Moment of Inertia ? Explain its role in angular motion.
	(viii)	Describe what should be the maximum velocity for a satellite to orbit close to the earth around it ?.
	(ix)	Differentiate between Angular Acceleration and Centripetal Acceleration.
	(x)	State the Huygen's Principle.
	(xi)	Under what conditions two or more sources of light behave as coherent sources ?
	(xii)	How would you manage to get more orders of spectra using a diffraction grating?
Q.No.4	(i)	Why Fog Droplets appear to be suspended in air ?
	(ii)	Does frequency depend on Amplitude for Harmonic Oscillators?
	(iii)	Can we realize an Ideal Simple Pendulum ?
	(iv)	What information would you use to elaborate the formula of time period of Simple Pendulum? Support your answer with varying different parameters.
	(v)	How are beats useful in tuning musical instruments ?
	(vi)	As a result of distant explosion , an observer senses a ground tremor and then hears the explosion. Explain the time difference.
	(vii)	How the power is lost in optical fibre through dispersion ? Explain.
	(viii)	How would you compile the facts for reflection of Waves ?
	(ix)	What information would you use to write for single mode step index fibre ?

Q.No.5	(a)	Define and explain the term Torque. Calculate the Torque due to force acting on a rigid body.	(5)
	(b)	How large a force is required to accelerate an electron ($m = 9.1 \times 10^{-31}$ Kg) from rest to a speed of $2.0 \times 10^7 \text{ ms}^{-1}$ through a distance of 5.0 cm?	(3)
Q.No.6	(a)	Discuss how Astronauts get Artificial Gravity in space? Derive $f = \frac{1}{2\pi} \sqrt{\frac{g}{R}}$	(5)
	(b)	What is the Least Speed at which an Aeroplane can execute a vertical loop of 1.0 Km Radius? So that there will be no tendency for the pilot to fall down at the highest point.	(3)
Q.No.7	(a)	Define Bernoulli's Equation and prove that : $P + \frac{1}{2} \rho v^2 + \rho gh = \text{constant}$ for Ideal Fluid.	(5)
	(b)	A steel wire hangs vertically from a fixed point, supporting a weight of 80 N at its lower end. The diameter of the wire is 0.50 mm and its length from the fixed point to the weight is 1.5 m. Calculate the fundamental frequency emitted by the wire when it is plucked? (Density of Steel is $7.8 \times 10^3 \text{ Kg m}^{-3}$)	(3)
Q.No.8	(a)	Discuss the energy conservation in Simple Harmonic Motion.	(5)
	(b)	A light is incident normally on a grating which has 2500 lines per centimeter. Compute the Wavelength of a Spectral Line for which the deviation in second order is 15.0° .	(3)
Q.No.9	(a)	Define Molar Specific Heat of Gas. Show that $C_p - C_v = R$	(5)
	(b)	A compound Microscope has lenses of focal length 1.0 cm and 3.0 cm. An object is placed 1.2 cm from the object lens. If a virtual image is formed 25 cm from the eye, calculate the separation of the lenses and the magnification of the instrument.	(3)

07-07-2022