Paper Code Number: 2478	2024 (1st-A) INTERMEDIATE PART-I (11th Class)	Roll No: MTN-2-24
PHYSICS PAPER-I GROUP-II		
TIME ALLOWED: 20 Minutes	OBJECTIVE	MAXIMUM MARKS: 17

Q.No.1 **You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question.**

S.#	QUESTIONS	A	B	C	D
1	A fixed mass of an ideal gas in a cylinder is compressed isothermally. Which is true statement?	Heat is dissipated from the system	K.E. of the gas increases	P.E of the gas increases	No work is done on the gas
2	Number of significant zeroes in 3.50070 are:	1	2	3	No significant zero
3	If we add the numbers 2.7543, 4.10, 1.273, the rounded off answer will be:	8.1273	8.127	8.2	8.13
4	If vector $\vec{A}$ makes an angle θ with Y–axis, then its Y–component will be:	$A\sin\theta$	$A\cos\theta$	$A\tan\theta$	A
5	The magnitude of $\vec{A} = \cos\theta\,\hat{i} + \sin\theta\,\hat{j}$ is:	$\sqrt{\cos\theta + \sin\theta}$	2	1	$\sqrt{1+\cos^2\theta}$
6	A body moves in a circle of radius r. The displacement covered in one rotation is:	$2\pi r$	πr	$\frac{\pi}{2}r$	Zero
7	A stone is dropped from the top of a tower. It takes 2s to reach the ground. The height of the tower is:	19.6 m	9.8 m	40 m	19 m
8	Two masses M and $4M$ are moving with same K.E. The ratio of their linear momenta is:	1 : 16	1 : 2	$\sqrt{2}$: 1	4 : 1
9	Which is a correct relation?	$\vec{v} = \vec{r} \times \vec{w}$	$\vec{w} = \vec{v} \times \vec{r}$	$\vec{v} = \vec{w} \cdot \vec{r}$	$\vec{v} = \vec{w} \times \vec{r}$
10	A body of mass m is moving in a vertical circle of radius r, tied with a string. The tension at the lowest point is:	$T = m\left(\frac{v^2}{r} - g\right)$	$T = m\left(\frac{v^2}{r} + g\right)$	$T = m$ $(v^2 - gr)$	$T = m$ $(v^2 + gr)$
11	1 torr = _____ N/m^2	133.33	123.33	122.22	143.33
12	What will be the displacement of a particle in SHM when its velocity is half the maximum velocity (amplitude = x_o):	$\frac{3}{\sqrt{2}}x_o$	$\sqrt{2}x_o$	$\frac{3}{4}x_o$	$\frac{\sqrt{3}}{2}x_o$
13	A physical system under going forced vibrations in known as:	Simple harmonic oscillator	Driven harmonic oscillator	Damped harmonic oscillator	Torsional oscillator
14	The frequency of sound emitted from a source in water is 600 Hz. If speed of sound in water and air is 1500 m/s and 300 m/s respectively, then frequency of sound heard above the water surface is:	300 Hz	750 Hz	600 Hz	120 Hz
15	Which monochromatic light will produce maximum orders of spectra using a diffraction grating?	Blue	Red	Green	Yellow
16	Multimode step index fibre is useful for short distance to carry white light due to:	Polarization effects	Diffraction effects	Interference effects	Dispersion effects
17	In PV graph of isothermal and adiabatic process, the adiabatic curve has _____ work under the curve, than isothermal curve,:	Greater	Smaller	Equal	Negative work

TIME ALLOWED: 2.40 Hours	SUBJECTIVE	MAXIMUM MARKS: 68

NOTE: Write same question number and its parts number on answer book, as given in the question paper.

SECTION-I

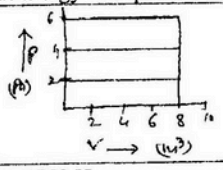
2. Attempt any eight parts. **8 × 2 = 16**

(i)	Differentiate between random error and systematic error.
(ii)	What is principle of homogeneity?
(iii)	Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards?
(iv)	Give the drawbacks to use the period of a pendulum as a time standard?
(v)	Why the cross product is not commutative? Explain briefly.
(vi)	The vector sum of three vectors gives a zero resultant. What can be the orientation of the vectors?
(vii)	If one of the rectangular components of a vector is not zero, can its magnitude be zero? Explain.
(viii)	Can the velocity of an object reverse direction when acceleration is constant? If so give an example.
(ix)	Calculate the force due to water when it flows out from a pipe at $3kgs^{-1}$ and its velocity changes from $5ms^{-1}$ to zero on striking the wall?
(x)	An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air?
(xi)	Derive a relation between power and velocity.
(xii)	A person holds a bag of groceries while standing still, talking to a friend. A car is standing still while its engine is running. From stand point of work, how are these two situations similar?

3. Attempt any eight parts. **8 × 2 = 16**

(i)	Show that orbital angular momentum $L_o = mvr$.
(ii)	What is meant by moment of inertia? Explain its significance.
(iii)	Prove that 1 radian $= 57.3^{o}$.
(iv)	Write down applications of communication satellites.
(v)	What are the factors upon which drag force acting upon a small sphere of radius "r" moving through a liquid, depend?
(vi)	A chimney works best when it is tall. Why?
(vii)	Does frequency depends on amplitude for harmonic oscillators?
(viii)	The equation for SHM of an object is given by $X = 0.25\cos\left(\frac{\pi}{8}\right)t$. What will be displacement after 2 seconds?
(ix)	What is Hook's law? Write its mathematical form.
(x)	Explain why sound travels faster in warm air than in cold air.
(xi)	How will you differentiate between longitudinal and transverse wave?
(xii)	What is period of 300 cycles per second of sound waves?

4. Attempt any six parts. **6 × 2 = 12**

(i)	Why interference is necessary to produce diffraction pattern? Answer this question with the analytical approach.
(ii)	Explain the term "Optical rotation".
(iii)	Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
(iv)	Explain how a convex lens is used as a magnifier?
(v)	Explain scattering and absorption as a loss of power?
(vi)	If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the object lens?
(vii)	What happens to the temperature of room, when an air conditioner is left running on a table in the middle of the room?
(viii)	Is it possible to convert internal energy into mechanical energy? Explain with an example.
(ix)	Calculate the work done in the given diagram: 

SECTION-II

NOTE: Attempt any three questions. **3 × 8 = 24**

5.(a)	What do you know about collision? How would two balls collides elastically in different cases?	5
(b)	The magnitude of dot and cross product of two vectors are $6\sqrt{3}$ and "6" respectively. Find the angle between vectors.	3
6.(a)	Define absolute potential energy. Derive its mathematical expression $U = \frac{-GMm}{r}$	5
(b)	An organ pipe has a length of 50cm. Find the frequency of its fundamental note when it is closed at one end. (Speed of sound = $350\,ms^{-1}$).	3
7.(a)	How orbital radius of Geostationary orbits are calculated mathematically. Also calculate its value and its height from the earth surface.	5
(b)	A spring, whose spring constant is $80.0\,Nm^{-1}$ vertically supports a mass of 1.0 kg in the rest position. Find the distance by which the mass must be pulled down, so that on being released, it may pass the mean position with a velocity of $1.0\,ms^{-1}$.	3
8.(a)	State and prove the Bernoulli's equation in dynamic fluid; that relates pressure to fluid speed and height.	5
(b)	$336J$ of energy is required to melt 1g of ice at $0^{o}C$. What is the change in entropy of 30g of water at $0^{o}C$ as it is changed to ice at $0^{o}C$ by a refrigerator.	3
9.(a)	What is compound microscope? Describe its construction and working. Also calculate its magnifying power.	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^{o}.	3