	(Objective Type)	Inter (1st – A – Exam – 2023)	
Time :	20 Minutes	Inter (Part – I)	(Group 1st)
Marks :	17	Session (2020 – 22) to (2022 – 24)	

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.

No.1 (1) Physical Quantities are divided into ——— Categories :
(A) = 1 (B) = 2 (C) = 3 (D) = 4

(2) Dimension of Force is :
(A) ML^{-2} (B) MLT^{-2} (C) $ML^{-1}T$ (D) MLT^{2}

(3) $A + (-A) =$:
(A) 2A (B) A (C) 0 (D) −1

(4) $\hat{i}.\hat{i} = \hat{j}.\hat{j} = \hat{k}.\hat{k} =$:
(A) 1 (B) 0 (C) −1 (D) None of these

(5) Acceleration " a " of the Rocket is :
(A) $\frac{Mv}{m}$ (B) $\frac{mv}{m}$ (C) $\frac{mv}{M}$ (D) $\frac{Mm}{v}$

(6) Height of Projectile is h = :
(A) $\frac{V_i \sin^2\theta}{2g}$ (B) $\frac{V_i \sin\theta}{g}$ (C) $\frac{V_i \sin\theta}{g}$ (D) $\frac{V_i \sin^2\theta}{2g}$

(7) No work is done when $\theta =$:
(A) 0° (B) 180° (C) 90° (D) 360°

(8) 1 rad = :
(A) $\frac{2\pi}{360^\circ}$ (B) $\frac{360^\circ}{2\pi}$ (C) $\frac{2\pi}{3}$ (D) $57^\circ\pi$

(9) When the lift is moving upward with an Acceleration " a " then tension in string is :
(A) $w + ma$ (B) $w + ma^2$ (C) $ma - w$ (D) $w - ma$

10) The Mass of Droplet is :
(A) $\frac{\rho}{v}$ (B) $\frac{v}{\rho}$ (C) ρV (D) $2\rho V$

11) Time Period of Pendulum is T = :
(A) $2\pi\sqrt{\frac{l}{g}}$ (B) $\sqrt{\frac{2\pi l}{g}}$ (C) $2\pi\sqrt{\frac{g}{\rho}}$ (D) $2g\sqrt{\frac{\pi}{\rho}}$

12) Laplace Expression for the speed of sound in Gas is V = :
(A) $\sqrt{\frac{vv}{p}}$ (B) $\sqrt{\frac{\gamma P}{\rho}}$ (C) $\rho\sqrt{\frac{\gamma}{p}}$ (D) $\gamma\sqrt{\frac{\rho}{p}}$

13) In the Fundamental Note, the distance between Anode and Antinode is :
(A) $\ell = \frac{\lambda_1}{4}$ (B) $\ell = \frac{4\lambda_1}{2}$ (C) $\ell = \frac{\lambda_1}{2}$ (D) $\ell = 2\lambda$

14) The distance between two adjacent dark fringes can be proved to be :
(A) $\frac{\lambda L}{d}$ (B) $\frac{\lambda d}{L}$ (C) $\frac{Ld}{\lambda}$ (D) $\frac{\lambda L}{d}$

15) Angular Magnification is defined as M = :
(A) $\frac{\alpha}{\beta}$ (B) $\frac{\beta}{\alpha}$ (C) $\alpha\beta$ (D) $\alpha^2\beta^2$

16) In Charles's Law, the constant is :
(A) Pressure (B) Temperature (C) Volume (D) Density

17) Entropy of the Universe is always :
(A) Remain Constant (B) Increases (C) Decreases (D) Always Zero

Roll No.	1008 - 25000	Inter (Part – I)	Session (2020 – 22) to (2022 – 24)
Physics (Subjective)	Inter (Ist – A– Exam – 2023)	Group Ist	Time 2 : 40 Hours Marks : 68

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

22 x 2 = 44

Q.No.2	(i)	Name several repetitive phenomenon occurring in nature which could serve as reasonable time standard.
	(ii)	Write the dimensions of : (a) Pressure (b) Density
	(iii)	Show that the expression $V_f = V_i + at$ is dimensionally correct.
	(iv)	Define and explain significant figures.
	(v)	Two vectors have unequal magnitudes. Can their sum be zero ? Explain.
	(vi)	Name the three different conditions that could make $\vec{A_1} \times \vec{A_2} = \vec{0}$
	(vii)	Write down the steps for addition of vectors by rectangular component method.
	(viii)	Explain the circumstances in which the velocity $\vec{v}$ and acceleration $\vec{a}$ of a car are : (a) Parallel (b) Perpendicular to one another
	(ix)	At what point or points in its path does a projectile have its minimum speed, its maximum speed ?
	(x)	What is an Inertial Frame of Reference ?
	(xi)	The Horizontal Range of a projectile is four times of its maximum height. What is the angle of projection ?
	(xii)	Explain how the swing is produced in a fast moving cricket ball ?
Q.No.3	(i)	Calculate the loss in work done when angle between force and displacement is changed from 0° to 60°.
	(ii)	A 70 Kg man runs up a long flight of stairs in 4 . 0 seconds. The vertical height of the stairs is 4 . 5 m . Calculate the power output in watts.
	(iii)	A girl drops a cup from a certain height which breaks into pieces. What energy changes are involved ?
	(iv)	How would you generate a plan to create artificial gravity in a space station ?
	(v)	Why does a diver change his body positions before and after diving in the pool ?
	(vi)	When Mud Flies off the tyre of a moving bicycle, in what direction does it fly ? Explain.
	(vii)	What is Sharpness of Resonance ? Give its purpose.
	(viii)	Name two characteristics of S.H.M.
	(ix)	Can we realize an Ideal Simple Pendulum?
	(x)	Differentiate between Red Shift and Blue Shift for a moving star.
	(xi)	Why sound travels faster in Warm Air than in Cold Air ? Support your answer by proper reasoning.
	(xii)	How should a sound source move with respect to an observer so that the frequency of its sound does not change ?
Q.No.4	(i)	Define Interference and Diffraction of Light.
	(ii)	An Oil Film spreading over a wet footpath shows colours. Explain how does it happen ?
	(iii)	Why the Polaroid sun glasses are better than ordinary sun glasses ?
	(iv)	Distinguish between Magnifying Power and Resolving Power.
	(v)	One can buy a cheap Microscope for use of Children. The images seen in such a Microscope have coloured edges. Why is this so ?
	(vi)	State First Law of Thermodynamics and give its formula.
	(vii)	What is a Heat Engine ? Write formula for its efficiency.
	(viii)	A Thermos Flask containing milk as a system is shaken rapidly. Does the temperature of milk rise ?
	(ix)	Can the Mechanical Energy be converted completely into heat energy ? If so give an example.

(Part - II)

(3 x 8 = 24)

Q.No.5	(a)	Define Scalar Product of Two Vectors. Write down the characteristics of Scalar Product of two vectors.	(5)
	(b)	A brick of mass 2 . 0 Kg is dropped from a rest position 5 . 0 m above the ground. What is its velocity at a height of 3 . 0 m above the ground ?	(3)
Q.No.6	(a)	Explain Elastic Collision in One Dimension to prove that magnitude of Relative Velocity of approach is equal to the magnitude of the relative velocity of separation and also write the equations of V_1' and V_2'.	(5)
	(b)	A Gramophone record turntable accelerate from rest to an angular velocity of 45 . 0 rev min^{-1} in 1 . 60 s . What is its Average Angular Acceleration ?	(3)
Q.No.7	(a)	Define Molar Specific Heat of a Gas and derive relation between them.	(5)
	(b)	What Gauge Pressure is required in the city main for a stream from a fire hose connected to the mains to reach a vertical height of 15 . 0 m ?	(3)
Q.No.8	(a)	Define and explain the phenomena of Resonance. Also give examples where Resonance plays an important role.	(5)
	(b)	The frequency of the note emitted by a Stretched String is 300 Hz. What will be the frequency of this note when the tension is increased by One – Third without changing the length of the wire ?	(3)
Q.No.9	(a)	Describe principle, construction and working of Michelson's Interferometer.	(5)
	(b)	An Astronomical Telescope having power of 5 consists of two thin lenses 24 cm apart. Find the Focal Length of the Lenses.	(3)

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Paper Code | INTERMEDIATE

Number: 2473

PHYSICS PAPER-I GROUP-I | OBJECTIVE | MAXIMUM MARKS: 17

TIME ALLOWED: 20 Minutes

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	Consumption of energy by a 60 watt electric bulb in 2 seconds is:	60 J	30 J	0.5 J	120 J
2	The rate of change of angular momentum is equal to:	Force	Rotational K.E	Torque	Impulse
3	A wheel of radius 4 m turns through an angle of 114.6°. It lays out a tangential distance:	4 m	8 m	458.4 m	28 m
4	The property of a fluid having constant density is called:	Compressible fluid	Non-ideal fluid	Turbulent fluid	Incompressible fluid
5	The K.E of a simple pendulum at equilibrium position is:	Maximum	Minimum	Zero	Medium
6	The types of waves are particularly useful for under sea communication and detection systems:	Radio waves	Microwaves	Ultrasonic waves	Infrared waves
7	Frequency range of hearing of dog is:	60 – 70,000 Hz	15 – 50,000 Hz	20 – 20,000 Hz	150 – 150,000 Hz
8	When light enters glass its suffers a change in:	Frequency only	Wavelength only	Velocity only	Both B and C
9	When the final image is formed at infinity, the magnification formula of simple microscope will be:	$1+\frac{d}{f}$	$2+\frac{d}{f}$	$\frac{d}{f}$	$\frac{f}{d}$
10	At constant temperature the graph between v and $\frac{1}{p}$ is:	Hyperbola	Straight line	Parabola	Semi circle
11	In irreversible process the entropy of system:	Increases	Decreases	Becomes zero	Remains constant
12	The dimensions of centripetal force is:	$[ML^{-2}T^{2}]$	$[MLT^{-2}]$	$[ML^{-1}T^{-2}]$	$[ML^{2}T^{-2}]$
13	Absolute uncertainty in a measuring instrument is equal to:	Least count	Accuracy	Fractional uncertainty	Percentage uncertainty
14	$(\hat{i}\times\hat{j})\cdot\hat{k}=$	0	−1	$\hat{k}$	1
15	Angle between two vectors $3\hat{i}+4\hat{j}$ and $4\hat{i}-3\hat{j}$ is:	30°	90°	60°	45°
16	When the body moves with constant acceleration, the velocity time graph is:	Parabola	Hyperbola	Straight line	Curve
17	If a mass of a body is doubled, then acceleration becomes:	Half	Double	One forth	Constant

INTERMEDIATE PART-I (11th Class)	2023 (Ist-A)	Roll No:
PHYSICS PAPER-I GROUP-I	SUBJECTIVE	MAXIMUM MARKS: 68
TIME ALLOWED: 2.40 Hours		

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. $8 \times 2 = 16$

(i) The wavelength λ of a wave depends on the speed v of the wave and its frequency f. Knowing that $[\lambda]=[L]$, $[v]=[LT^{-1}]$ and $[f]=[T^{-1}]$. Decide which of the following is correct, $f = v\lambda$ or $f = v/\lambda$

(ii) Give the drawbacks to use the period of pendulum as a time standard.

(iii) What rules should be followed in rounding of data?

(iv) Distinguish between Random error and Systematic error.

(v) If one of the rectangular components of a vector is not zero, can its magnitude be zero? Explain.

(vi) If all the components of the vectors, A_1 and A_2 were reversed, how would this alter $\vec{A}_1 \times \vec{A}_2$?s

(vii) Distinguish between Translational and Rotational equilibrium.

(viii) Explain the circumstances in which the velocity "v" and acceleration "a" of a car are:
(i) Parallel (ii) Anti-parallel

(ix) At what point or points in its path does a projectile have its minimum speed, its maximum speed?

(x) What do you mean by Inertia? How it is important in Newton's first law of motion?

(xi) What does the slope of velocity-time graph show?

(xii) A person is standing near a fast moving train. Is there any danger that he will fall towards it?

3. Attempt any eight parts. $8 \times 2 = 16$

(i) When a rocket re-enters the atmosphere, its nose cone becomes very hot. Where does this heat energy come from?

(ii) Write the two names of conservative forces and non-conservative forces.

(iii) A boy uses a catapult to throw a stone which accidentally smashes a green house window.
List the possible energy changes.

(iv) Write down the four uses of Geostationary satellites.

(v) Describe what should be the minimum velocity, for a satellite, to orbit close to the Earth around it.

(vi) On what factors the moment of inertia of a body depends? Explain.

(vii) What is a simple harmonic oscillator? Give an example.

(viii) If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?

(ix) What is the total distance travelled by an object moving with SHM in a time equal to its period, if its amplitude is A?

(x) If the speed of sound is $332\,ms^{-1}$ in air at $0^{\circ}C$ then find its speed at $20^{\circ}C$.

(xi) Explain the terms (i) Crest and (ii) Trough

(xii) Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave?

4. Attempt any six parts. $6 \times 2 = 12$

(i) Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?

(ii) How would you manage to get more orders of spectra using a diffraction grating?

(iii) Write two uses of Michelson's interferometer?

(iv) How the light signal is transmitted through optical fibre?

(v) Calculate the value of critical angle for glass by total internal reflection.

(vi) What happens to the temperature of the room, when an airconditioner is left running on a table in the middle of the room?

(vii) What is effect of pressure and density on speed of sound?

(viii) Does entropy of a system increase or decrease due to friction? Explain.

(ix) What will be the efficiency of an engine if it performs 100J of work and rejects 400J of heat energy to the cold reservoir?

SECTION-II

NOTE: Attempt any three questions. $3 \times 8 = 24$

5.(a) Explain vector product with its characteristics and examples. 5

(b) A force (Thrust) of 400N is required to overcome road friction and air resistance in propelling an automobile at $80\,kmh^{-1}$. What power (kW) must the engine develop? 3

6.(a) A projectile is thrown with initial velocity v_i making an angle θ with the horizontal. Find its time of flight, range and maximum range. 5

(b) A gramophone record turntable accelerates from rest to an angular velocity of $45.0\ rev\ min^{-1}$ in $1.60s$. What is its average angular acceleration? 3

7.(a) Define and explain molar specific heats of a gas. Also, derive their relation. 5

(b) Water flows through a hose, whose internal diameter is 1cm at a speed of $1\,ms^{-1}$. What should be the diameter of the nozzle if the water is to emerge at $21\,ms^{-1}$? 3

8.(a) How various factors affect the speed of sound? Discuss. 5

(b) What should be the length of simple pendulum whose period is 1.0 second at a place where $g = 9.8\,ms^{-2}$? What is the frequency of such a pendulum? 3

9.(a) Explain construction, ray diagram and magnification of an astronomical telescope. 5

(b) In a double slit experiment the second order maximum occurs at $\theta = 0.25^{\circ}$. The wavelength is 650 nm. Determine the slit separation. 3