| Paper Code Number: 2477 | 2024 (1st-A) INTERMEDIATE PART-I (11th Class) | Roll No: MTN-I-24 |
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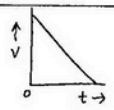
| PHYSICS PAPER-I GROUP-I | | |
| TIME ALLOWED: 20 Minutes | OBJECTIVE | MAXIMUM MARKS: 17 |

**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 | The resultant of two forces $\vec{F}_1$ and $\vec{F}_2$ making an angle of $90^o$ with each other is: | $(F_1 - F_2)^2$ | $F_1 + F_2$ | $(F_1 + F_2)^2$ | $\sqrt{F_1^2 + F_2^2}$ |
| 2 | The magnitude of $\hat{j} \cdot (\hat{k} \times \hat{i})$ is equal to: | 1 | $2\hat{j}$ | 0 | $-2\hat{j}$ |
| 3 | The velocity of a body changes with constant rate. The acceleration is: | Zero | Negative | Constant | Increases |
| 4 | The velocity time graph of a body is shown. It implies that:   | Force is positive | Force is negative | Force is zero | Force is constant |
| 5 | Gravity performs zero work when body accelerates: | Vertically upward | Vertically downward | Inclined plane | In a vertical loop |
| 6 | The acceleration of an object falling freely is: | $9.8ms^{-2}$ | $0ms^{-2}$ | $-9.8ms^{-2}$ | $5ms^{-2}$ |
| 7 | The rotational K.E of any ring of radius '$r$' is given by: | $\frac{1}{2}r\omega^2$ | $\frac{1}{2}mr^2\omega^2$ | $\frac{1}{2}mr^2$ | $\frac{1}{4}mr^2\omega^2$ |
| 8 | The viscosity of water at $30^oC$ is: | $0.019Nm^{-2}s$ | $1000Nm^{-2}s$ | $1Nm^{-2}s$ | $0.801Nm^{-2}s$ |
| 9 | The time period of a simple pendulum, whose length is 980m is: | $2\pi$ sec | $2\pi\sqrt{0.1}$ sec | $20\pi$ sec | $\frac{2}{\pi}$ sec |
| 10 | The speed of sound wave is independent of: | Pressure | Medium | Source of sound | Temperature |
| 11 | A longitudinal sinusoidal wave has wavelength of 1cm with a time period of 2sec, its wave velocity is: | $50ms^{-1}$ | $0.005ms^{-1}$ | $0.5ms^{-1}$ | $2ms^{-1}$ |
| 12 | Which one of the given cannot be polarized? | Light waves | Radio waves | Microwaves | Sound waves |
| 13 | The minimum number of rays required by a lens to form an image are: | 2 | 3 | 4 | 5 |
| 14 | When heat is removed from the system, entropy is: | Remain same | Positive | Negative | Zero |
| 15 | For mono atomic gas $C_V = \frac{3}{2}R$, therefore gamma "$\gamma$" for gas is: | $\frac{3}{5}$ | $\frac{2}{5}$ | 2 | $\frac{5}{3}$ |
| 16 | How many colours are used by colour printing to produce the entire range of colours? | 3 | 4 | 5 | 6 |
| 17 | The dimensions of the relation $mc^2$ are equal to the dimensions of: | Force | Momentum | Heat | Velocity |

| INTERMEDIATE PART-I (11th Class) | 2024 (1st-A) | Roll No: |
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**PHYSICS PAPER-I GROUP-I**

| TIME ALLOWED: 2.40 Hours | SUBJECTIVE | MAXIMUM MARKS: 68 |
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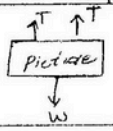
**NOTE: Write same question number and its parts number on answer book, as given in the question paper.**

## SECTION-I

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

| | |
|---|---|
| (i) | How do you check the correctness of an equation? |
| (ii) | How would a numerical data should be rounded off up to last significant figure? |
| (iii) | What do you understand about precise and accurate measurement? |
| (iv) | An old saying is that "A chain is only as strong as its weakest link" what analogous statement can you make regarding experimental data used in computation? |
| (v) | Two vectors have unequal magnitude. Can their sum be zero? Explain. |
| (vi) | What is the minimum value of tension in the string?   |
| (vii) | How do you subtract two vectors? |
| (viii) | An object is thrown vertically upward. Discuss the sign of acceleration due to gravity relative to velocity, while the object is in air. |
| (ix) | How a rocket is propelled in space? |
| (x) | When a moving car stops quickly, in what direction passengers fall and why? |
| (xi) | What is the method of fermentation? |
| (xii) | What sort of energy is in (a) compressed spring (b) moving car (c) water in a high dam? |

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

| | |
|---|---|
| (i) | If a body of mass 10kg is allowed to fall freely what will be its weight? |
| (ii) | Show that orbital angular momentum, $L_o = mvr$ . |
| (iii) | What is meant by moment of inertia? Explain its significance. |
| (iv) | Why does a diver change his body position before and after diving in the pool? |
| (v) | Explain the term viscosity. |
| (vi) | Why fog droplets appear to be suspended in air? |
| (vii) | What is second pendulum also write its length, time period and frequency? |
| (viii) | Can we realize an ideal simple pendulum? |
| (ix) | Describe some common phenomena in which resonance plays an important role? |
| (x) | A wave has speed 400 m/sec. Find wavelength of a wave if frequency is 2 kHz. |
| (xi) | Explain why sound travels faster in warm air than in cold air? |
| (xii) | What features do longitudinal waves have in common with transverse waves? |

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

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|---|---|
| (i) | How is the distance between interference fringes affected by the separation between the slits of Young's experiment? Can fringes disappear? |
| (ii) | How interference produced in their film? |
| (iii) | Could you obtain Newton's rings with transmitted light? If yes, would be pattern be different from that obtained with reflected light? |
| (iv) | What is Optical fibre? Write its types. |
| (v) | What is the function of turn table in the spectrometer? |
| (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 objective lens? |
| (vii) | State second law of thermodynamics in terms of entropy. |
| (viii) | Can the mechanical energy be converted into heat energy? If so give an example. |
| (ix) | A thermos flask containing milk as a system is shaken rapidly. Does the temperature of the milk rise? |

## SECTION-II

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

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|---|---|---|
| 5.(a) | Explain what is meant by projectile motion? Describe the expression for (i) Height of the projectile (ii) Time of flight | 5 |
| (b) | Find the projection of vector $\vec{A} = 2\hat{i} - 8\hat{j} + \hat{k}$ in the direction of vector $\vec{B} = 3\hat{i} - 4\hat{j} - 12\hat{k}$ | 3 |
| 6.(a) | How would you portray step by step guide for interconversion of PE and KE? | 5 |
| (b) | Find the temperature at which the velocity of sound in air is two times its velocity at $10^{o}C$ . | 3 |
| 7.(a) | Define real and apparent weight and discuss when apparent weight increases, decreases and becomes zero during vertical motion. | 5 |
| (b) | An 8.0kg body executes S.H.M with amplitude 30cm. The restoring force is 60N. When the displacement is 30cm. Find (i) period (ii) speed when the displacement is 12cm | 3 |
| 8.(a) | Bernoulli's equation represents the conservation of energy in fluid dynamics. Discuss it. | 5 |
| (b) | Show that the ratio of the root mean square speeds of molecules of two different gases at a certain temperature is equal to the square root of the inverse ratio of their masses. | 3 |
| 9.(a) | Describe the experiment performed by Michelson to find the speed of light. Also discuss the speed of light reduced in other materials than vacuum. | 5 |
| (b) | Light of wavelength 450nm is incident on a diffraction grating, on which 5000 lines per centimeter have been ruled. How many orders of spectra can be observed on either side of the direct beam? | 3 |