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SET A



**INDIAN SCHOOL MUSCAT
SECOND TERM - EXAMINATION
PHYSICS (042)**

CLASS: XI

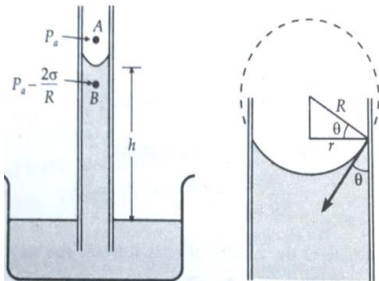
TERM 2

Max. Marks: 35

MARKING SCHEME

SET A	QN. NO	VALUE POINTS	MARKS SPLIT UP
		SECTION A	3 x 2 = 6
	1	Any four differences between Isothermal and adiabatic process.	4 x ½ = 2
	2	(a) On a rainy day, water vapour content in air is more than any other day. Hence on a rainy day, the density of air is lesser. Speed of sound in air is inversely proportional to the square root of its density. Sound travels faster in lighter air than in the heavier one. (b) The distance between a node and the immediate next anti-node is one fourth of a wavelength	1 1
	3.	(a) Wien's displacement law states that the black-body radiation curve for different temperatures will peak at different wavelengths that are Inversely proportional to the temperature. (b) Latent heat of fusion of a solid is defined as the amount of heat required to convert a unit mass of the substance from the solid state to the liquid state without changing the temperature. (OR) (a) Stefan's law of radiation: The quantity of radiant energy emitted by a perfect blackbody per unit time per unit surface area of the body is directly proportional to the fourth power of its absolute temperature. (b) Latent heat of vaporization is defined as the amount of heat required to convert a unit mass of the substance from the liquid state to the vapors state without changing the temperature.	1 1 1 1
		SECTION - B	8 x 3 = 24
	4.	A motion be Simple harmonic motion only when, 1. Acceleration of particle is just opposite to motion of body 2. Acceleration is directly proportional to displacement e.g., $a = -\omega^2 x$	

	<div data-bbox="256 100 457 466" data-label="Image"> </div> <p>restoring force, $F = -mg \sin \theta$, When displacement of pendulum is very small, then $\sin \theta \approx \theta$ so, $F = -mg \theta$, also here it is clear, $\theta = x/L$ $\therefore F = -mg x/L$ Now use $F = ma$ {Newton's second law} $ma = -mg x/L \Rightarrow a = -g x/L$ Now, compare both the expressions, $\therefore \omega^2 = g/L$ we know, $\omega = 2\pi/T$, here T is time period . so, $\{2\pi/T\}^2 = g/L$ $\Rightarrow T = 2\pi\sqrt{L/g}$ Hence, for pendulum time period is $T = 2\pi\sqrt{L/g}$</p> <p style="text-align: center;">(OR)</p> <p>Derivation for total energy of the particle executing simple harmonic motion.</p> <p>Expression for KE</p> <p>Expression for PE</p> <p>The variation of kinetic energy and potential energy with displacement.</p> <div data-bbox="267 1465 592 1726" data-label="Figure"> </div>	<p>1 Dig.</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p>
5.	<p>(a) The number of independent ways in which a molecule of gas can move is called the degree of freedom.</p> <p>(b) (i) Monoatomic gas is made of a single atom. i.e., $N = 1$, so $K = 0$, therefore $f = 3 \times 1 - 0 = 3$. Degrees of freedom of monoatomic gas molecule is 3.</p>	<p>1</p> <p>1</p>

10.	<p>Consider a capillary tube of radius r dipped in a liquid of surface tension σ and density ρ. As the pressure is greater on the concave side of a liquid surface,</p> $p = \frac{2\sigma}{R}$ <p>where R = radius of curvature of the concave meniscus Due to this excess pressure, the liquid rises In the capillary tube to height h, $p \frac{r}{R} = \cos \theta$; $R = \frac{r}{\cos \theta}$;</p> $p = \frac{2\sigma \cos \theta}{r} = h\rho g$ $h\rho g = \frac{2\sigma \cos \theta}{r} \quad ; \quad h = \frac{2\sigma \cos \theta}{r \rho g}$ 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ Dig.	
11	<p>(a) Modulus of elasticity is defined as ratio of the stress to the corresponding strain produced, within the elastic limit. N/m^2</p> <p>(b) Definition of Young's modulus and Bulk modulus of elasticity.</p> <p>(c) Due to long and repeated use of bridge it lost elastic nature Or Due to elastic fatigue.</p>	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ 1	
	SECTION C	$1 \times 5 = 5$	
12	<p>(i) C (ii) B (iii) Any option (iv) D (v) D</p>		