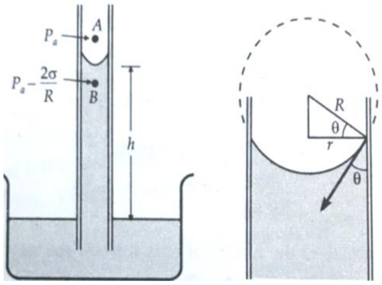
Roll Number		

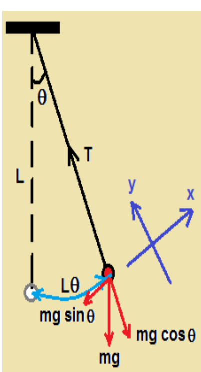
INDIAN SCHOOL MUSCAT
SECOND TERM - EXAMINATION
PHYSICS (042)

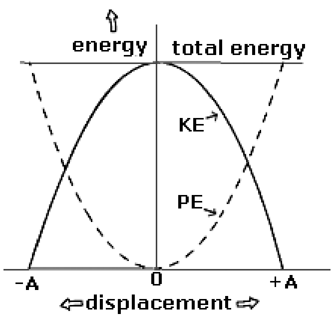
CLASS: XI | **TERM 2** | **Max. Marks: 35**

SET-C

MARKING SCHEME			
SET C	**QN. NO**	**VALUE POINTS**	**MARKS SPLIT UP**
		SECTION A	**3 x 2 = 6**
	1	(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
	2	Any four differences between Isothermal and adiabatic process.	4 x ½ = 2
	3.	(a) No change in velocity of sound (b) The distance between consecutive nodes is $\lambda/2$	1 1
		SECTIN - B	8 x 3 = 24
	4.	Statement of Bernoulli's theorem. Diagram Proof of Bernoulli's theorem.	1 ½ 1½
	5.	(a) Modulus of elasticity is defined as ratio of the stress to the corresponding strain produced, within the elastic limit. N/m^2 (b) Definition of Young's modulus and Bulk modulus of elasticity. (c) Due to long and repeated use of bridge it lost elastic nature Or Due to elastic fatigue.	½ +½ ½ + ½ 1
	6.	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,** $p = \frac{2\sigma}{R}$ where R = radius of curvature of the	½

		concave meniscus Due to this excess pressure, the liquid rises In the capillary tube to height h, p $\frac{r}{R}$ = cos ; R = $\frac{r}{\cos\theta}$; p = $\frac{2\sigma\cos\theta}{r}$= hρg hρg = $\frac{2\sigma\cos\theta}{r}$; **h** = $\frac{2\sigma\cos\theta}{r\rho g}$ 	 ½ ½ 1 ½ dig.
	7.	(a) According to first law of thermodynamics: - The change in the internal energy of a closed system is equal to the amount of heat supplied to the system, minus the amount of work done by the system on its surroundings. ΔQ = ΔU + ΔW Where: ΔQ is the heat supplied to the system by the surroundings ΔW is the work done by the system by the surroundings ΔU is the change in internal energy of the system. (b) Internal energy is sum of KE and PE of particles of thermodynamic system	1 1 1
	8.	(a) The number of independent ways in which a molecule of gas can move is called the degree of freedom. (b) (i) Monoatomic gas is made of a single atom. i.e., N = 1, so K = 0, therefore f = 3 x 1 – 0 = 3. Degrees of freedom of monoatomic gas molecule is 3. (ii) Diatomic gas molecule is made of two atoms. i.e., N = 2, So K = 1, Degrees of freedom, f = 3N – K, f = 3 x 2 – 1 = 5	1 1 1
	9.	$PV = nRT$ $V = \frac{nRT}{P}$ For one mole of a gas at STP we have $V = \frac{1 \times 8.314 \times 273}{1.013 \times 10^5}$ $V = 0.0224 m^3$ $V = 22.4\ litres$	1 1 1

	10.	From pascal's law $P_1 = P_2$ $\frac{F_1}{A_1} = \frac{F_2}{A_2}$ $\frac{F_1}{\pi r_1^2} = \frac{F_2}{\pi r_2^2}$ $F_1 = \frac{F_2 r_1^2}{r_2^2}$ $F_1 = \frac{1350 \times 9.8 \times (5 \times 10^{-2})^2}{(15 \times 10^{-2})^2}$ $F_1 = 1470\,N$ $F_1 = 1.47 \times 10^3\,N$ $P_1 = F_1 / A_1$ $P_1 = 1.9 \times 10^5$ Pa (OR) H = 2T Coso / rdg Substitution of values = 2.8×10^{-2} N / m	½ ½ ½ ½ ½ 1 1 1
	11.	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., $a = -\omega^2 x$  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 .	1 dig. ½ ½ ½

		so, $\{2\pi/T\}^2 = g/L$ $\Rightarrow T = 2\pi\sqrt{\{L/g\}}$ Hence, for pendulum time period is $T = 2\pi\sqrt{\{L/g\}}$ **(OR)** Derivation for total energy of the particle executing simple harmonic motion. Expression for KE Expression for PE The variation of kinetic energy and potential energy with displacement. 	½ ½ 1½ 1
		SECTION C	1 x 5 = 5
	12	(i) B (ii) C (iii) D (iv)C and D (any one) (v) D	
		THE END OF MARKING SCHEME	