INDIAN SCHOOL SOHAR **No of Printed Pages: 02**

UNIT TEST II (2023-24)

PHYSICS(THEORY)

CLASS: XI **Max Marks: 20**

DATE: 14/01/2024 **SET-1** **Duration: 40 Minutes**

General Instructions:

(i) There are 10 questions in all. All questions are compulsory.

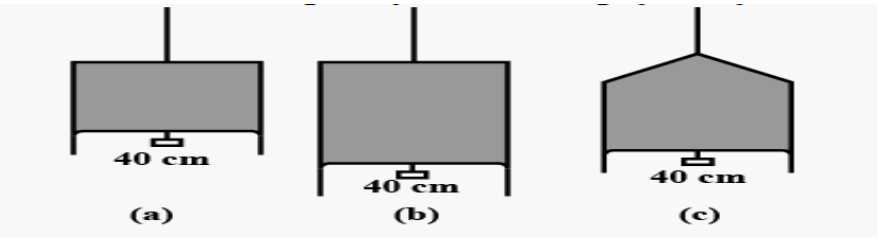
(ii) This question paper has five sections: Section A, Section B, Section C, Section D and Section E.

(iii) Section **A** contains six questions of one mark each, Section **B** contain one question of two mark, Section **C** contain one question of three mark, Section **D** contains one case study- based question of four mark and Section **E** contain one question of five mark.

(iv) There is no overall choice. However, an internal choice has been provided in one question of five mark. You have to attempt only one of the choices in such questions.

(v) You may use log tables if necessary but use of calculator is not allowed.

	Section - A **All questions are compulsory. In case of internal choices, attempt any one of them.**	
1	An iron bar of length L, cross-section area A and Young's modulus Y is pulled by a force F from ends so as to produce an elongation *l*. Which of the following statements is correct? (a) $l \alpha 1/L$ (b) $l \alpha A$ (c) $l \alpha L/A$ (d) $l \alpha Y$	1
2	A soap bubble of radius r is formed within soap solution. The excess pressure inside the bubble is (a) 4S/r (b) 2S/r (c) $p_o + 2S/r$ (d) $p_o - 2S/r$	1
3	The clouds float in the atmosphere because of their low_____ (a) Pressure (b) Velocity (c) Temperature (d) Density	1
4	An ideal fluid flow through a pie of circular cross-section made of two section with diameters 2.5 cm and 3.75 cm. The ratio of the velocities in the two pipes is (a) 9 : 4 (b) 3 : 2 (c) √3 :√2 (d) √2 : √3	1
	Two statements are given-one labelled Assertion **(A)** and the other labelled Reason **(R)**. Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. a) Both A and R are true and R is the correct explanation of A b) Both A and R are true and R is not the correct explanation of A c) A is correct but R is incorrect d) A is incorrect and R is also incorrect.	
5	**Assertion(A):** Stress is the internal force per unit area of body. **Reason(R):** Rubber is more elastic than steel.	1
6	**Assertion(A):** The water rises higher in a capillary tube of small diameter than in the capillary tube of large diameter **Reason(R):** Height through which liquid rises om capillary tube is inversely proportional to the radius of the capillary tube.	1
	Section – B	
7	When a weight W is hung from one end of a wire of length L (other end being fixed), the length of the wire increases by *l*. If the same wire is passed over a pulley and two weights W each are hung at the two ends, what will be the total elongation in the wire?	2
	Section – C	
8	i) A hydraulic automobile lift is designed to lift cars with a maximum mass of 3000 kg. The area of cross-section of the piston carrying the load is 425 cm2. What maximum pressure would the smaller piston have to bear? ii) A U-tube contains water and methylated spirit separated by mercury. The mercury columns in the two arms are in level with 10.0 cm of water in one arm and 12.5 cm of spirit in the other. What is the specific gravity of spirit?	3

	Section - D (CASE STUDY)	
9	**Read the given passages and answer the questions that follow.** **Hooke's law and Modulus of Elasticity:** From the experimental investigations, Roberts Hooke, and English physicist, formulated in 1676, a law known after him as hook's law which state that the extension produce in a wire is directly proportional to the load applied. In 1807, Thomas Young pointed out that the strain is proportional to the extension on the wire and the stress is proportional to the load applied. He, therefore, modified Hooke's law and stated that with in the elastic limit, the stress is directly proportional to strain. Thus within the elastic limit, Stress α strain or stress/strain = Constant. The constant of proportionality is called modulus of elasticity or coefficient of elasticity of the materials. Its value depends on the nature of the material of the body and the manner in which it is deformed. (i) According to Hooke's law of elasticity, if stress is increased, then the ratio of stress to strain (a) becomes zero. (b) remains constant. (c) decreases. (d) increases. (ii) Which of the following affects the elasticity of a substance? (a) Impurity of substance (b) Hammering and annealing (c) Change in temperature (d) All of these (iii) A wire whose cross – sectional area is 2 mm^2 is stretched by 0.1 mm by a certain load and of a similar wire of triple the area of cross - section is stretched by the same load, then the elongation of the second wire is _____ (a) 3.3 mm (b) 0.033 mm (c) 0.33 mm (d) 0.0033 . (iv) A wire of length L and cross-sectional area A is made of a material of Young's modulus Y. If the wire is stretched by an amount x, the work done during the stretching is (a) $YAx^2/2L$ (b) YAx^2/L (c) YAx^2L (d) $YAx/2L$ **OR** Which of the following has no dimension? (a) angular Velocity (b) momentum (c) stress (d) strain	4
	Section - E **In case of internal choices, attempt any one of them.**	
10	State and prove Bernoulli's principle for the flow of non-viscous, imcompressible liquid in streamline flow. Give its limitations. **OR** i) Figure (a) shows a thin liquid film supporting a small weight = 4.5×10^{-2} N. What is the weight supported by a film of the same liquid at the same temperature in Fig. (b) and (c)? Explain your answer physically.  ii) What is the pressure inside the drop of mercury of radius 3.00 mm at room temperature? Surface tension of mercury at that temperature (20^0C) is 4.65×10^{-1} Nm^{-1}. The atmospheric pressure is 1.01×10^5 Pa. Also give the excess pressure inside the drop.	5