

TEST NO. 7**CH – 7****PHYSICS****CLASS 9TH – 019****Paper: (Objective Type)****Time Allowed: 15 Minutes****Maximum Marks: 12**

Note : You have four choices for each objective type question as A, B, C and D. The choice which you think is Correct, fill that circles in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q. 1	QUESTIONS	(A)	(B)	(C)	(D)
1.	SI unit of pressure is pascal. Which is equal to.	10^4 Nm^{-2}	1 Nm^{-2}	10^2 Nm^{-2}	103 Nm^{-2}
2.	Mathematical form of Young's Modulus	$P = \frac{F}{A}$	$Y = \frac{F \times L_0}{A \times \Delta L}$	$P = P$	$\frac{F \Delta L}{A}$
3.	Unit of stress	Nm ⁻²	Nm ⁻¹	Nm	None of these
4.	What should be the approximate length of a glass tube to construct a water barometer.	0.5 m	1 m	2.5 m	11 m
5.	Pressure is quantity.	Scalar	Vector	Constant	Dependent
6.	Unit of Pressure is.	N	Nm	J	D(NM ⁻²)
7.	What should be the approximate length of glass tube to construct a water barometer?	0.5 m	1 m	2.5 m	11 m
8.	Stress is equal to	Force /Area	Area/Force	Length/Area	Area/Length
9.	SI Unit of stress.	Nm ⁻²	Nm ⁻¹	Ns	Nm
10.	According to Hooke's law.	Constant = strain x stress	Constant = Stress/Strain	Constant = Strain/stress	Strain = Stress
11.	Density =	Mass/Volume	Weight/Volume	Weight /Mass	Mass /Time
12.	In _____ state the molecules do not leave their position.	Liquids	Gas	Plasma	Solids

A B C D**A B C D****A B C D****A B C D****A B C D**

1	(A) (B) (C) (D)	4	(A) (B) (C) (D)	7	(A) (B) (C) (D)	10	(A) (B) (C) (D)	13	(A) (B) (C) (D)
2	(A) (B) (C) (D)	5	(A) (B) (C) (D)	8	(A) (B) (C) (D)	11	(A) (B) (C) (D)	14	(A) (B) (C) (D)
3	(A) (B) (C) (D)	6	(A) (B) (C) (D)	9	(A) (B) (C) (D)	12	(A) (B) (C) (D)	15	(A) (B) (C) (D)

نوٹ: معروضی سوال نامے کو توجہ سے پڑھیں اور ہر MCQ کی درست آہٹن A, B, C, D کو پین کی سیاہی یا مارکر سے اس طرح پُر کریں کہ سیاہی دائرے سے باہر نہ نکلے۔ ایک سے زیادہ دائروں کو پُر کرنے یا کاٹ کر پُر کرنے کی صورت میں مذکورہ جواب غلط تصور ہوگا۔

(PART – I)**2. Write short answers to any Five (5) questions: 10**

- (i) What are the features of kinetic molecular model of matter?
- (ii) Define plasma. Discuss it as fourth state of matter.
- (iii) Define density and write down its mathematical form and unit.
- (iv) Define pressure and write its formula.
- (v) What is atmospheric pressure? How can we measure the atmospheric pressure?
- (vi) State the principle of floatation.
- (vii) State the Pascal's law.
- (viii) What do you mean by pressure of liquids?

3. Write short answers to any Five (5) questions: 10

- (i) How the working of Hydraulic press.
- (ii) State Archimedes principle.
- (iii) A wooden cube of sides 10 cm each has been dipped completely in water. Calculate the up thrust of water acting on it.
- (iv) What is meant by Elasticity?
- (v) Write the application of Archimedes principles.
- (vi) Define Young's Modulus.
- (vii) Define stress and write its formula and unit.
- (viii) Define Strain and formula of Strain.

4. Write short answers to any Five (5) questions: 10

- (i) State Hooke's law.
- (ii) Can we use a hydrometer to measure a density of milk?
- (iii) A steel wire 1 m long and across-sectional area $5 \times 10^{-5} \text{ m}^2$ is stretched through 1mm by a force of 10,000 N. Find the young's modulus of the wire.
- (iv) What is a barometer?
- (v) Why does a piece of stone sink in water but a ship with a huge weight float?
- (vi) What is effect on atmospheric pressure as we go higher?
- (vii) It is easy to fill air in a balloon but it is very difficult to remove air from a glass bottle. Why?
- (viii) How vacuum cleaner works?

(PART - II)

Note:- Attempt any Two questions.

5. (a) Derive the formula of Young Modulus. 4

(b) How much would be the volume of ice formed by freezing 1 litre of water. 5

6. (a) State the Pascal's law. What are its applications in our daily life? 4

(b) The density of air is 1.3 kgm^{-3} . Find the mass of air in a room measuring 8m x 5m x 4m. 5

7. (a) The Head of the pin is a square of side 10mm. Find the pressure on it due to a force of 20N. 4

(b) State Archimedes principle and prove it and derive equation of up thrust of liquid. 5

PHYSICS

(PART - I)

Question : 2

Write short answers to any five questions.

(i) What are the features of kinetic molecular model of matter?

Matter is made up of particles called molecules.

The molecules remain in continuous motion.

Molecules attract each other.

(ii) Define plasma. Discuss it as fourth state of matter.

Plasma :-

At very high temperature, atoms lose their electrons and become positive ions. This ionic state of matter consisting of ions and electrons is called plasma.

In fourth state gas occurs in its ionic state. Positive ions and electrons get separated in ^{the} presence of electric and magnetic field.

- (iii) Define density and write down its mathematical form and unit.

Density :-

Density of a substance is defined as its mass per unit volume. SI unit of density is kilogram per cubic meter (kgm^{-3}).

$$\text{Density} = \frac{\text{mass of a substance}}{\text{Volume of that substance}}$$

- (iv) Define pressure and write its formula.

Pressure :-

The force acting normally per unit area on the surface of a body is called pressure.

SI unit of pressure is Nm^{-2} also called pascal (Pa).

- (v) What is atmospheric pressure? How can we measure the atmospheric pressure?

Atmospheric Pressure :-

The earth is surrounded by a cover of air is called

atmosphere. It extends to a few hundred kilometers above sea level. Just as certain sea creatures live at the bottom of oceans, we live at the bottom of a huge ocean of air. Air is the mixture of gases. The density of air in the atmosphere is not uniform. It decreases continuously as we go up.

(Vi) **State the principal of floatation.**
Principal of Floatation:-

A floating object displaces a fluid having weight equal to weight of the object.

(Viii) **State the Pascal's law.**
Pascal's Law :-

Pressure applied at any point of a liquid enclosed in a container, is transmitted without loss to all other parts of the liquid.

(Viii) **What do you mean by pressure of ⁿ liquids?**

Liquids exert pressure. The pressure of a liquid acts in all directions. If we take pressure sensor inside a liquid, then the pressure of the liquid varies with the depth of sensor.

Question : 3

Write short answers to any five questions.

(i) How the working of Hydraulic press?

Hydraulic press is a machine which works on Pascal's law.

The force F_2 that acts on the larger piston is greater than the force F_1 acting on the smaller piston. Hydraulic systems working in this way are known as force multipliers.

(ii) State Archimedes principle.
Archimedes Principle :-

When an object is totally or partially immersed in a liquid, an upthrust acts on it

equal to the weight of the liquid it displaces.

- (iii) A wooden cube of sides 10cm each has been dipped completely in water. Calculate the up thrust of water *during* acting on it.

$$L = 10 \text{ cm}$$

$$= 0.1 \text{ m}$$

$$V = L^3 = (0.1 \text{ m})^3 = 1 \times 10^{-3} \text{ m}^3$$

$$\rho = 1000 \text{ kg m}^{-3}$$

$$\begin{aligned} \text{Up thrust of water} &= \rho g V \\ &= 1000 \times 10 \times 1 \times 10^{-3} \\ &= 10 \text{ N} \end{aligned}$$

- (iv) What is meant by elasticity?
Elasticity :-

The property of matter by virtue of which matter resists any force which tries to change its length, shape or volume is called elasticity.

- v) Write the application of Archimedes principles.
Archimedes principle is used

in designing ships and submarines.

The floating of a big ship is based on Archimedes Principle.

(Vi) Define Young's Modulus.

Young's Modulus:-

The ratio of stress and tensile strain is called young's modulus.

(Vii) Define Stress and write its formula and unit.

Stress :-

The force acting on unit area at the surface of a body is called stress.

$$\text{Stress} = \frac{\text{Force}}{\text{Area}} = \frac{F}{A}$$

SI unit of stress is Nm^{-2} .

(Viii) Define strain and formula of strain.

Strain :-

A comparison of change in length^{caused} by the stress with the original length, volume or

shape is called the strain.

$$\text{Strain} = \frac{\text{Change in length}}{\text{Original length}}$$

Question : 4(a)

Write short answers to any five questions:

(i) State Hooke's Law.

Hooke's Law :-

The strain produced in a body by the stress applied to it is directly proportional to the stress within the elastic limit of the body.

(ii) Can we use a hydrometer to measure the density of milk?

Hydrometer is a device which is used to measure the density of liquids. So it can be used to measure the density of milk.

(iii) A steel wire 1m long and across-sectional area $5 \times 10^{-5} \text{ m}^2$ is stretched through 1mm by a force 10000 N. Find young modulus.

$$L_0 = 1 \text{ m}$$

$$A = 5 \times 10^{-5}$$

$$\Delta L = 1 \text{ mm} = 1 \times 10^{-3} \text{ m}$$

$$F = 10000$$

$$Y = \frac{F}{A} \times \frac{L_0}{\Delta L}$$

$$= \frac{10000}{5 \times 10^{-5}} \times \frac{1}{1 \times 10^{-3}}$$

$$= \frac{1 \times 10^4}{5 \times 10^{-8}}$$

$$= 0.2 \times 10^{12} \text{ Nm}^{-2}$$

(iv) What is a barometer?

Barometer:-

The instruments that measure atmospheric pressure are called barometer.

(v) Why does a piece of stone sink in water but a ship with a huge weight float?

The upthrust force on stone is much smaller than its weight because weight of the water displaced under stone is very small. While the ships are designed in

such a way weight of the water displaced by them is greater than their weight. So upthrust force in case of ships is greater than their weights. So ships float on the surface of water.

(Vi) What is effect on atmospheric pressure as we go higher?

As we go high in the atmosphere, the density of the air becomes low. Due to this reason, atmospheric pressure decreases as we go high.

(Vii) It is easy to fill air in a balloon but it is very difficult to remove air from a glass bottle. Why?

Because the atmospheric pressure acts more easily on balloon as compared to glass bottle, so emptying air is easier from balloon than glass bottle.

(VIII) How vacuum cleaner works?

All vacuum cleaner work on the same principle of creating negative pressure using a fan, trapping the sucked-up dirt, cleaning exhaust air and then releasing it.

What is effect on atmospheric pressure as we go higher?

As we go high in the atmosphere the density of the air becomes lower. Due to this reason, atmospheric pressure decreases as we go high.

Q. It is easy to fill air in a balloon but it is very difficult to remove air from a glass bottle. Why?

Ans. Because the atmospheric pressure on the outside of the balloon is equal to the pressure inside the balloon. But in a glass bottle, the pressure inside is less than the pressure outside.

(PART - II)

Question : 5(a)

Young's Modulus :-

The ratio of stress and strain is a constant within the elastic limit, this constant is called the Young's Modulus.

Mathematical Form :-

Consider a long bar of length L_0 and cross-sectional area A . Let an external force F is equal to weight stretches it such that the stretched length becomes L .

Mathematically,

$$\text{Young's Modulus} = Y = \frac{\text{Stress}}{\text{Tensile strain}}$$

Let ΔL be the change in length of the rod, then

$$\Delta L = L - L_0$$

Since

$$\text{Stress} = \frac{\text{Force}}{\text{Area}} = \frac{F}{A}$$

And

$$\text{Tensile Strain} = \frac{L - L_0}{L_0} = \frac{\Delta L}{L_0}$$

As

Young's modulus = $Y = \frac{\text{Stress}}{\text{Tensile Strain}}$

$$= \frac{F}{A} \times \frac{L_0}{\Delta L}$$

$$= \frac{F \times L_0}{A \times \Delta L}$$

Question : 5(b)

Data :

Volume of water = $V_1 = 1$ litre.

Volume of ice on freezing = $V_2 = ?$

Solution :

As we know that

$\frac{\text{Volume of ice}}{\text{Volume of water}} = \frac{\text{density of water}}{\text{density of ice}}$

Volume of ice = $\frac{\text{density of water}}{\text{density of ice}} \times \text{Volume of water}$

$$= \frac{1000}{920} \times 1$$

$$= 1.09 \text{ litres} \quad \text{Ans}$$

Question : 6(a)

Pascal's Law :-

Pressure applied at any point of a liquid enclosed in a container is transmitted without the loss of $\times$ to all other parts of the liquid.

An external force applied on the surface of a liquid increases the liquid pressure at the surface of the liquid. This increase in liquid pressure is transmitted equally in all direction and to the walls of the container in which it is filled.

Applications of Pascal's Law :-

Hydraulic press is a machine which works on the principle of Pascal's law. It consists of two cylinders which are fitted with pistons of cross-sectional area a and A . The object is to be compressed is placed over the piston of large cross-sectional area A . The force is applied on the piston of

cross-sectional area a .

The pressure P produced by small piston is transmitted through the liquid and acts on the large piston and a force F_2 acts on A which is much larger than F_1 .

Question : 6(b)

Data :-

$$d = 1.3 \text{ kg m}^{-3}$$

$$V = 8\text{m} \times 5\text{m} \times 4\text{m}$$

$$= 160\text{m}^3$$

$$m = ?$$

Solution :-

As we know that

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Mass} = \text{Density} \times \text{Volume}$$

$$= 1.3 \times 160$$

$$m = 208 \text{ kg}$$

Ans

Question : 1(a)

Data :-

$$F = 20 \text{ N}$$

$$L = 10 \text{ mm}$$

$$= 10 \times 10^{-3} \text{ m}$$

$$A = L \times L = 10 \times 10^{-3} \times 10 \times 10^{-3}$$

$$= 100 \times 10^{-6}$$

$$= 1 \times 10^{-4} \text{ m}^2$$

$$P = ?$$

Solution :-

As we know that

$$P = \frac{F}{A}$$

$$P = \frac{20}{1 \times 10^{-4}}$$

$$= 20 \times 10^4$$

$$P = 2 \times 10^5 \text{ Nm}^{-2}$$

Ans.

Question : 1(b)

Archimedes Principle :-

When object is totally or partially immersed in a liquid, an up thrust act on it

equal to the weight of the liquid it displaces.

Explanation :-

Consider a solid cylinder of cross-sectional area A and height h immersed in a liquid. Let h_1 and h_2 be the depth of the top and bottom surfaces of the cylinder respectively from the surface of the liquid.

Then

$$h_2 - h_1 = h$$

If P_1 and P_2 are the liquid pressures at the depth h_1 and h_2 respectively and ρ is its density, then

$$P_1 = \rho g h_1$$

$$P_2 = \rho g h_2$$

Let the force F_1 is exerted at the cylinder top by the liquid due to pressure P_1 and the force F_2 is exerted at the bottom of the cylinder due to P_2 .

So

$$F_1 = P_1 A$$

$$F_2 = P_2 A$$

F_1 and F_2 are acting on the opposite faces of the cylinder. Therefore, the net force F will be $F_2 - F_1$ in the direction of F_2 .

$$\begin{aligned} F_2 - F_1 &= \rho g h_2 A - \rho g h_1 A \\ &= \rho g A (h_2 - h_1) \\ &= \rho g h A \\ &= \rho g V. \end{aligned}$$



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