Physics (New Book) - 9th Class Physics Chapter 7 Long Question Preparation

Q1. Q no: 5 (A) Derive the formula of Young Modulus.?

Ans 1: 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_o and cross- sectional area A let an external force F is equal to weight stretches it such that the stretched length becomes L.
Mathematically.
Young's Modulus = Y = Stress/Tensile strain
Let $\blacktriangle L = L-L_o$
Since-
Stress = Force/Area =F/A
And
Tensile strain = $L-L_o/L_o = \blacktriangle L/L_o$
As
Young's modulus = Y = Stress/Tensile strain
$=F/A \times L_o/\blacktriangle L$
$= F \times L_o/A \times \blacktriangle L$

Q2. How we can find the density of an object

Ans 1: Density of an object: Archimededs principle is also helpful to determine the density of an object. The ration in the weight of a body wiht an equal volume of liquid is the same as in theri densitites.
Density of object = D
Density of liquid= p
Weight of object = w1
Weight of equal volume of liquid = w= w1-w2
here w2 is the weight of the solid in liquid. According to archimedes principle, w2 is less than its actual weight w1 by an amount w.

Q3. State and explain Hook's law

Ans 1: Hook's law: the strain produced in a body by the stress applied to it is directly proportional to the stress with in the elastic limit of the body

Ans 2: Explanation; Hook's law is applicable to all kinds of deformation and all type of matter i.e. solids, liquids or gases within certain limit. This limit tells the maximum stress that can be safely applied on a body with out causing permanent deformation in its length volume or shape.
In other words, it is a limit with in which a body recovers its original length, volume or shape after the deforming force is removed. When a stress crosses this limit, called the elastic limit, a body is permanently deformed and is unable to restore its original state after the stress is removed

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Q4. Q no: 7B) State Archimedes principle and prove it and derive equation of up thrust of liquid.

Ans 1: Archimedes Principle:
When 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 h1 and h2 be the depth of the top and bottom surfaces of the liquid.
Then
h2-h1= h
If P1 and p2 are the pressures at the depth h1 and h2 p is its density, then
P1= pgh2
P2= fgh2
Let the force F1 is exerted the cylinder top by the liquid due to pressure P1 and the force F2 is exerted at the bottom of the cylinder due to P2
So
F1=pgh1A
F2=pgh2A
F1 and F2 are acting on the opposite faces of the cylinder. Therefore, the net force F will be F2- F1 in the direction of F2
F2 - F1 = pgh2A -pgh1A
=pgA(h2-h1)
=pghA
= pgV

Q5. Explain the application of atmospheric pressure in daily life

Ans 1: Application of atmospheric pressure: the applications of atmospheric pressure in daily life are following

1. The fan in vacuum cleaner lower s air pressure in its bucket. The atmospheric air rushes into it carrying dust and dirt with tit through its intake port. The dust and dirt particles are blocked by the filter while air escapes out.
2. When air is sucked through straw with its other end dipped in a liquid, the air pressure in the straw decrease. this causes the atmospheric pressure to push the liquid up the straw
3. The air pressure inside the bubble and balloon is equal to atmospheric pressure
4. The piston of the syringe is pulled out. This lowers the pressure in the cylinder . The liquid from the bottle enters into the piston through the needle.

Q6. Define pressure. explain it with examples

Ans 1: Pressure; the force acting normally per unit area on the surface of a body is called pressure.
unit: its S.I unit is Nm-2 or pascal(Pa). Thus 1 Nm-2 =1Pa
Dependence; it depends upon area and applied force

Ans 2: Examples;

1. press a pencil from its ends between the palms. The palm pressing the tip feels much more pain than the palm pressing its blunt end.
2. we can push a drawing pin into a wooden board by pressing it by out thumb. It is because the force we apply on the drawing pin is confined just at a very small area under its sharp tip. A drawing pin with a blunt tip would be very difficult to push into the board due to the large area of its tip.

Q7. State and explain Young's modulus.

Ans 1: Young' modulus; the ratio of stress to tensile strain is called young's modulus.

Ans 2: Explanation; consider a long bar of length l and cross sectional area A. Let an external force F equal to the weight stretches it such that the stretched length become L. According to Hook's law, the ratio of the stress to tensile strain is constant within the elastic limit of the body.

Q8. What is density? explain

Ans 1: Density; density of a substance is defined as its mass per unit volume
Unit: its S.I unit is kilogram per cubic meter (kgm^{-3})

Ans 2: Explanation; if we take equal volume of iron and wood, then we can easily declare that iron is heavier than wood. it means that density of iron is heavier than wood

Q9. Explain breaking system in vehicles

Ans 1: Breaking system in vehicles: the braking system of cars, buses , etc. also work on Pascals law. The hydraulic breaks allow equal pressure to be transmitted throughout the liquid. When break pedal is pushed, it exerts a force on the master cylinder, which increases the liquid pressure in it. The liquid pressure is transmitted equally through the liquid in the metal pipes to all the pistons of other cylinder s. Due to the increase in liquid pressure, the piston in the cylinders move outward pressings the break pads with the brake drums. The force of friction between the brake pads and the brake drums stops the wheels.

Q10. Q no:6 (A) State the Pascal's law. What are its applications in our daily life?

Ans 1: Pascal's Law:
Pressure applied at any point of liquid anclosedin a containeris transmitted without the loss 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 to 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 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 pistonof large cross-sectional areea 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.