

Two & Three marks only :-

1. Define Stress and Strain :-

(i) The force per unit area is called as Stress.

$$\text{Stress } \sigma = \frac{\text{Force}}{\text{area}} = \frac{F}{A}$$

(ii) The fractional change in the size of the object when a force is applied, strain measures the degree of deformation.

$$\text{Strain } \epsilon = \frac{\text{change in size}}{\text{original size}} = \frac{\Delta L}{L}$$

2. Hooke's Law :-

Small deformation, when the stress and strain are proportional to each other,

3. Poisson's Ratio :-

The ratio of relative contraction (lateral strain) to relative expansion (longitudinal strain). It is denoted by the symbol μ .

$$\text{Poisson Ratio } (\mu) = \frac{\text{lateral strain}}{\text{longitudinal strain}}$$

4. which one of these is more elastic Steel or Rubber? why?

Steel is more elastic than rubber. If an equal stress is applied to both steel and rubber, the steel produces less strain. So the Young's modulus is higher for steel than rubber. The object which has higher Young's modulus is more elastic.

5. State Pascal Law :-

If the pressure in a liquid is changed at a particular point, the change is transmitted to the entire liquid without being diminished in magnitude

6. A Spring balance shows wrong readings after using for a long time. why?

This is because of continuous usage, the wire loses its elasticity and does not regain its original dimension.

i.e.: Length. Because of this, it shows wrong readings.

7. Archimedes principle :-

When a body is partially or wholly immersed in a fluid, it experiences an upward thrust equal to the weight of the fluid displaced by it and its upthrust acts through the centre of gravity of the liquid displaced.

upthrust or buoyant force = weight of liquid displaced

8. What do you mean by upthrust or buoyancy?

The upward force exerted by a fluid that opposes the weight of an immersed object in a fluid is called upthrust.

9. Law of Floatation :-

The body will float in a liquid if the weight of the liquid displaced by the immersed part of the body equals the weight of the body.

10. Coefficient of viscosity ?

The force is proportional to (i) area of liquid and (ii) the velocity of gradient $\frac{dv}{dx}$.

$$F = -\eta A \frac{dv}{dx}$$

η is a constant of proportionality. It is coefficient of viscosity of the liquid. The negative sign implies that the force is frictional and it opposes the relative motion. Dimensional Formula is $[ML^{-1}T^{-1}]$

11.

Reynold's Number :-

$$R_c = \frac{\rho v D}{\eta}$$

ρ - Density of the fluid ; v - velocity of the flowing fluid,
 D - Diameter of the pipe in which the flow of fluid,
 η - coefficient of viscosity.

12)

Terminal velocity :-

The maximum constant velocity acquired by a body while falling freely through a viscous medium is called the terminal velocity V_T .

13.

Stoke's Law :-

Viscous force F acting on a spherical body of radius r depends on directly on,

- (i) radius of the sphere (r)
- (ii) velocity of the sphere (v)
- (iii) coefficient of viscosity of the liquid (η)

$$F = 6\pi\eta r v$$

14.

State Bernoulli's Theorem :-

The sum of pressure, kinetic and potential Energy per unit mass of an incompressible, non viscous fluid in a streamlined flow remains a constant.

15.

Two Streamlines cannot cross each other? why?

If two streamlines cross each other, the fluid particle at the point of intersection will have two different direction of flow. This will destroy the steady nature of the fluid flow.

16. Surface Tension and Unit :-

The energy per unit area of the surface of a liquid. $\gamma = \frac{F}{L}$

SI unit is Nm^{-1} and dimensions is MT^{-2} .

17. Angle of contact for a given pair of solid and liquid?

The angle between the tangent to the liquid surface at the point of contact and the solid surface inside the liquid is known as the angle of contact between solid and liquid.

18. Capillarity (or) capillary action :-

The rise or fall of a liquid in a narrow tube is called capillarity (or) capillary action.

19. State the principle and usage of Venturimeter?

This device is used to measure the rate of flow of the incompressible fluid flowing through a pipe.

It works on the principle Bernoulli's Theorem.

20. What are the affecting factors of surface tension?

(i) The presence of any contamination (or) impurities. (ii) The presence of dissolved substances. (iii) Electrification (iv) Temperature

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Q1) Distinguish between streamlined flow and Turbulent flow.

Streamlined flow	Turbulent flow.
(i) when a liquid flows such that each particle of the liquid passing through a point moves along the same path with the same velocity as its predecessor then the flow of liquid is said to be a streamlined flow. (ii) The velocity of a particle at any point is constant (iii) It is steady (or) laminar flow. (iv) The actual path taken by the particle of the moving fluid is called streamline which is curve, the tangent to which at any point gives the direction of the flow of the fluid at that point.	(i) when a speed of the moving fluid exceeds the critical speed, V_c the motion becomes turbulent. (ii) The velocity changes both in magnitude and direction from particle to particle. (iii) The path taken by the particles in turbulent flow becomes erratic and whirlpool-like circles called eddy current or eddies.

E. DEVADINESH MSc, BEd, CLP
PG TEACHER IN PHYSICS
DEPARTMENT OF PHYSICS
SARASWATHI VIDYALAYA HR. SEC. SCHOOL
VARISAI PATTI, PERAMBALUR (DT)
CELL : 95 24 22 09 42 .
Email : devadineshphy93@gmail.com.