Note: Please attempt any 10 short questions from Question 2. Also, attempt both parts (a and b) of Question 3. Cutting and removal of any content is strictly prohibited.

Q.1: Tick (✔) the correct answer.

1. The density of water is:
   A) 4200 kg/m³   B) 2500 kg/m³   C) 920 kg/m³   D) 1000 kg/m³
2. Mercury is _____ times denser than water:
   A) 10   B) 12.5   C) 13   D) 13.6
3. The SI unit of stress is:
   A) Newton   B) Pascal   C) Joule   D) Watt
4. A spring balance is utilized to measure:
   A) Mass   B) Temperature   C) Weight   D) Length
5. In which state of matter do molecules maintain their positions?
   A) Liquid   B) Solid   C) Gas   D) Plasma
6. The lightest material is:
   A) Copper   B) Mercury   C) Aluminium   D) Lead
7. The ratio of stress to tensile strain is known as:
   A) Elastic Modulus   B) Bulk Modulus   C) Young's Modulus   D) Shear Modulus
8. When force is applied over a smaller area, the pressure will:
   A) Decrease   B) Increase   C) Remain the same   D) Become zero
9. One pascal is equivalent to:
   A) 1 N/m²   B) 1 kg/m³   C) 10 Pa   D) 100 Pa
10. The liquid pressure at a depth "h" is given by:
    A) hρg   B) ρgh   C) Pgh   D) Hgρ

Write short answers to any ten (10) of the following questions:

1. Define pressure and provide its mathematical formula.
2. Differentiate between stress and strain.
3. Why is water unsuitable for use in a barometer?
4. What factors influence the pressure of a liquid?
5. Define Young's Modulus and provide its formula.
6. Provide an overview of hydraulic presses.
7. What is the density of an object? Write its formula.
8. Write two properties of plasma, the fourth state of matter.
9. Why does a wooden block float in water?
10. Define Archimedes' principle.
11. List some key characteristics of the kinetic molecular theory of matter.
12. What is elasticity? Provide a definition.

Answer the following questions:

1. Derive the formula for calculating pressure in liquids.
2. What is the upthrust force? Explain the principle of flotation.