

Of course. Here is a consolidated practice paper with questions jumbled from all four chapters you provided.

## Consolidated Practice Paper

### Instructions:

- Answer all questions.
- For numerical questions, show your working. Use  $g = 9.8 \text{ N/kg}$  where necessary.

### Numerical Questions

1. A car of mass 1000 kg accelerates at  $5 \text{ m/s}^2$ . What is the resultant force acting on the car?  
[cite\_start] [2] [cite: 1801, 1850]
2. A fixed mass of gas has a volume of  $90 \text{ cm}^3$  at a pressure of  $1.0 \times 10^5 \text{ Pa}$ . Find its volume when the pressure is increased to  $3.0 \times 10^5 \text{ Pa}$ , assuming the temperature remains constant.  
[cite\_start] [2] [cite: 601]
3. Calculate the kinetic energy of a 2 kg trolley traveling at a speed of  $3 \text{ m/s}$ . [cite\_start] [2] [cite: 983]
4. A force of 8 N stretches a spring by 4 cm (0.04 m). What is the spring constant? [cite\_start] [2] [cite: 1634]
5. A box weighing 80 N stands on a base with an area of  $4 \text{ m}^2$ . Calculate the pressure it exerts on the floor. [cite\_start] [2] [cite: 19]
6. An electric motor does 600 J of work in 15 seconds. What is its power output? [cite\_start] [2] [cite: 1416]
7. A diver is 15 m below the surface of a lake. Calculate the pressure increase at this depth due to the water. [cite\_start](Density of water =  $1000 \text{ kg/m}^3$ ) [2] [cite: 176]
8. A gas in a sealed container at  $27^\circ\text{C}$  has a pressure of 150 kPa. It is heated to  $127^\circ\text{C}$ . Calculate the new pressure, assuming the volume is constant. [cite\_start] [3] [cite: 724]
9. In a hydraulic jack, a force of 50 N is applied to a small piston of area  $0.1 \text{ m}^2$ . If the large piston has an area of  $2.0 \text{ m}^2$ , calculate the load that can be lifted. [cite\_start] [2] [cite: 126]
10. A power station has a total energy input of 500 MJ and a useful electrical output of 150 MJ. Calculate its efficiency. [cite\_start] [2] [cite: 1367]

# Multiple Choice Questions

1. What is the primary cause of the pressure exerted by a gas?
  - A. The weight of the gas particles.
  - B. The electrostatic forces between particles.
  - C. Particles colliding with the container walls.
  - D. The particles vibrating in fixed positions.
2. Newton's First Law of Motion deals with the concept of...
  - A. action-reaction pairs.
  - B. pressure.
  - C. inertia.
  - D. efficiency.
3. Pressure is defined as...
  - A. force multiplied by area.
  - B. the density of a fluid.
  - C. the rate of doing work.
  - D. force per unit area.
4. Which of the following is a renewable energy source?
  - A. Natural Gas
  - B. Wind
  - C. Coal
  - D. Uranium
5. Which statement best describes the particle arrangement in a liquid?
  - A. They are far apart and move randomly at high speed.
  - B. They are in a regular, repeating pattern and vibrate.
  - C. They are close together but can slide past one another.
  - D. They are held firmly in fixed positions.
6. The force required to keep an object moving in a circle is called the...
  - A. frictional force.
  - B. resultant force.
  - C. gravitational force.
  - D. centripetal force.
7. Food and fuels are examples of which energy store?
  - A. Kinetic energy
  - B. Chemical energy
  - C. Elastic energy
  - D. Nuclear energy

8. Hydraulic machines work as force multipliers because...
  - A. gases are easily compressed.
  - B. liquids are almost incompressible and transmit pressure.
  - C. solids have a definite shape.
  - D. pressure increases with depth.
9. If a spring is stretched beyond its limit of proportionality, it...
  - A. will return to its original length.
  - B. becomes stronger.
  - C. is permanently stretched.
  - D. gets colder.
10. The temperature of  $-273^{\circ}\text{C}$  is also known as...
  - A. the boiling point of water.
  - B. absolute zero.
  - C. the triple point.
  - D. the limit of proportionality.

## Subjective Theory Questions

1. State Newton's Third Law of Motion.
2. Explain what Brownian motion is and what it demonstrates.
3. Why must a dam wall be built much thicker at its base than at the top?
4. State the principle of conservation of energy.
5. Using the particle model, explain why a gas can be easily compressed but a solid cannot.
6. What is a resultant force?
7. Define power and state its SI unit.
8. Explain, using the concept of pressure, why a sharp knife cuts better than a blunt one.
9. What is meant by the efficiency of a device, and why can it never be greater than 100%?
10. Describe the motion and arrangement of particles in a solid.