Of course. Here are 30 practice questions covering the "Kinetic Particle Model of Matter" chapter, tailored to a 9th-grade standard.

Numerical Questions

Instructions: Show your working for all calculations.

1. [cite_start]Convert a room temperature of $25°C$ to the Kelvin scale. [cite: 316, 318, 320] [1]
2. [cite_start]A scientific experiment is conducted at 150 K. What is this temperature in degrees Celsius? [cite: 330, 331] [1]
3. [cite_start]A fixed mass of gas has a volume of $30\ cm^3$ at a pressure of 1×10^5 Pa. Find its volume if the pressure is increased to 3×10^5 Pa, assuming the temperature is constant. [cite: 278, 290, 291, 292] [2]
4. The air in a syringe has a volume of $20\ cm^3$ at a pressure of 100 kPa. [cite_start]If the temperature is constant, what is the pressure when the volume is compressed to $5\ cm^3$? [cite: 278, 290, 291, 292] [2]
5. A weather balloon contains $100\ m^3$ of helium at $27°C$ and 1.0 atm pressure. [cite_start]When it rises to an altitude where the temperature is $-23°C$ and the pressure is 0.5 atm, what is its new volume? [cite: 391, 397, 398, 401] [3]
6. The air in a sealed car tyre has a pressure of 2.0×10^5 Pa at $17°C$. [cite_start]After a long journey, the pressure rises to 2.2×10^5 Pa. Assuming the volume is constant, what is the new temperature of the air in $°C$? [cite: 379, 397, 398, 401] [3]
7. The pressure of a fixed mass of gas at 100 K is 50 kPa. [cite_start]If the volume is kept constant, what will the pressure be if the temperature is raised to 300 K? [cite: 376, 378, 379] [2]
8. [cite_start]The volume of a fixed mass of gas at constant pressure is $2.0\ m^3$ when its temperature is 273 K. What will its volume be if the temperature is increased to 373 K? [cite: 354, 355, 374] [2]
9. [cite_start]In the cylinder in Figure 2.1.15, the initial length of the trapped air at position X is 10 cm and the pressure is 1.0×10^5 Pa. [cite: 469, 470] [cite_start]Calculate the new air pressure when the piston is pulled out to position Y, where the total length of trapped air is 40 cm. [cite: 471] [3]
10. A gas has a volume of $40\ cm^3$ at $27°C$ and a pressure of 100 kPa. [cite_start]What is its volume at standard temperature and pressure (s.t.p.), which is $0°C$ and 1.0×10^5 Pa? [cite: 403, 409] [3]

Multiple Choice Questions

Instructions: Choose the one correct answer (A, B, C, or D) for each question.

1. **Which statement best describes the particles in a liquid?**

   A. They are in fixed positions and vibrate.

   B. They are far apart and move randomly.

   [cite_start]C. They are close together and can slide past each other. [cite: 31, 32, 85, 86]

   D. They do not move at all.

2. **Absolute zero is the temperature at which...**

   A. water freezes.

   B. water boils.

   [cite_start]C. particle motion ceases. [cite: 132, 314]

   D. particles move at their fastest.

3. **Brownian motion is evidence for...**

   A. the law of gravity.

   B. the existence of pressure.

   C. the states of matter.

   [cite_start]D. the kinetic particle model of matter. [cite: 68, 119, 167]

4. **The pressure exerted by a gas on its container is caused by...**

   A. the weight of the gas particles.

   B. particles sticking to the container walls.

   [cite_start]C. particles repeatedly colliding with the container walls. [cite: 63, 137]

   D. electrostatic forces between particles.

5. **How does the pressure of a fixed mass of gas change if its temperature increases at a constant volume?**

   A. It decreases.

   B. It stays the same.

   [cite_start]C. It increases. [cite: 140, 215]

   D. It depends on the gas.

6. **Boyle's Law states that the pressure of a fixed mass of gas is...**

   A. directly proportional to its volume at constant temperature.

   [cite_start]B. inversely proportional to its volume at constant temperature. [cite: 275, 280]

   C. directly proportional to its temperature at constant volume.

   D. inversely proportional to its temperature at constant volume.

7. **The change of state from a gas to a liquid is called...**

   A. melting.

   B. boiling.

C. solidification.

[cite_start]D. condensation. [cite: 45]

8. **Which of the following is a key property of a solid?**

   A. It is easily compressed.

   B. It takes the shape of its container.

   [cite_start]C. It has a definite shape and volume. [cite: 24]

   D. Its particles are far apart.

9. **A key property of a gas is that...**

   A. it has a definite volume.

   B. its particles are in fixed positions.

   [cite_start]C. it has no definite shape or volume. [cite: 39]

   D. it cannot be compressed.

10. **On the Kelvin temperature scale, the freezing point of water is...**

    A. 0 K

    B. 100 K

    [cite_start]C. 273 K [cite: 317]

    D. 373 K

Subjective Theory Questions

Instructions: Write your answers in complete sentences.

1. [cite_start]Describe the arrangement and motion of particles in a solid. [cite: 25, 77, 78]
2. [cite_start]Explain what Brownian motion is and what it demonstrates. [cite: 67, 68, 167, 169]
3. [cite_start]Using the particle model, explain why a gas is easily compressed but a liquid is not. [cite: 30, 42, 113, 128]
4. [cite_start]State Boyle's Law. [cite: 280]
5. [cite_start]Using the kinetic particle model, explain why heating a gas in a sealed, rigid container increases the pressure inside it. [cite: 139, 140, 214, 215]
6. [cite_start]Name the process for the change of state from (a) a liquid to a solid, and (b) a solid to a liquid. [cite: 11, 35, 52]
7. [cite_start]What is meant by the term 'absolute zero'? [cite: 133, 312]
8. [cite_start]Draw simple particle diagrams to represent the arrangement of particles in a solid, a liquid, and a gas. [cite: 80, 81, 82]
9. [cite_start]Explain why a liquid flows and takes the shape of its container. [cite: 32, 105]
10. [cite_start]What is the relationship between the temperature of a gas and the average kinetic energy of its particles? [cite: 131, 139]