Edexcel International GCSE (9-1) Physics
Answers to end of chapter questions in the Student Book

CHAPTER 19

1 ▶ a

Property	Solids	Liquids	Gases
Spacing of particles	Very close	Very close	Far apart
Pattern	Regular pattern	Random	Random
Forces between particles	Very strong	Strong	Weak

b The spacing between particles explains why solids and liquids are very difficult to compress, but gases can easily be compressed.

The forces between particles explain why solids have a fixed shape, but liquids and gases do not.

The very weak forces between particles in a gas explain why gases expand to fill their containers.

2 ▶ particles, motion, particles, faster, particles, colliding, increase, particles, faster

3 ▶ As a substance is cooled, the pressure it exerts gets smaller as the particles move more slowly. Absolute zero is the temperature at which the particles are not moving/ the gas is exerting zero pressure.

4 ▶ a i 273 K **ii** 373 K **iii** 293 K

b i –23 °C **ii** –4 °C **iii** 32 °C

5 ▶ a The piston moves out. The particles will move faster when they are heated, so there will be more, and harder, collisions with the walls of the container and the piston, increasing the pressure. The increased force on the piston will make it move.

b As the beaker is pushed down, pressure from the water will tend to compress the air trapped in the beaker, so the particles in the air will be closer together.

c As the container is heated the particles inside will move faster. The pressure will increase, and may increase enough to force the cork out of the opening.

6 ▶ **a** $p_1V_1 = p_2V_2$

so $V_2 = \frac{p_1V_1}{p_2} = \frac{100\,\text{kPa} \times 500\,\text{m}^3}{125\,\text{kPa}} = 400\,\text{m}^3$

b The temperature remains constant, as the equation used is only valid if there are no changes in temperature.

7 ▶ **a** $\frac{p_1}{T_1} = \frac{p_2}{T_2}$, assume atmospheric pressure is 100 kPa

so $p_2 = \frac{p_1 \times T_2}{T_1} = \frac{100\,\text{kPa} \times 268\,\text{K}}{293\,\text{K}} = 91.5\,\text{kPa}$

b The pressure inside the jar is now less than atmospheric pressure, so there will be a force holding the lid onto the jar.