Self-assessment practice test questions Block 2

1 The kinetic model of matter suggests that matter is made of particles.

- **a** Describe the motion of the particles that make up a solid.
- **b** Most solids expand when they are heated. How does the kinetic model explain this?
- **c** How do the particles in a gas move?
- **d** Use the kinetic model to explain why, when a bottle of perfume is opened, its scent (smell) spreads across the room.

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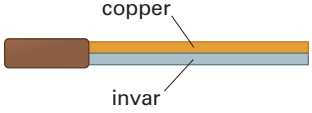
2 Boyle's law relates the pressure and volume of a fixed mass of gas.

- **a** Write an equation to represent Boyle's law.
- **b** What property of the gas (other than its mass) must remain constant if Boyle's law is to be satisfied?
- **c** A cylinder contains 40 dm^3 of methane gas at room temperature and a pressure of 200 kPa. Calculate the volume of the gas if the pressure on it is increased to 500 kPa.

3 The Celsius scale of temperature has two fixed points. 0 °C is the lower fixed point, the freezing point of pure water at atmospheric pressure.

- **a** What is the value of the upper fixed point, and how is it defined?
- **b** Explain why the level of mercury in a liquid-in-glass thermometer changes as the temperature changes.

4 The diagram shows a bimetallic strip made of two metals: copper, which expands on heating, and invar, which expands very little.



- **a** In which direction will the strip bend if it is heated?
- **b** Explain your answer to part **a**.
- **c** Suggest **one** practical use for a bimetallic strip like this.

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5 An electric kettle is filled with 1.2 kg of water at 10 °C. The water is heated until it boils.

a Calculate the amount of energy which must be supplied to the water to bring it to the boil. The specific heat capacity of water = 4200 J / (kg °C).

b If the kettle supplies energy at a rate of 1 kW, how long will it take to boil the water?

c If the kettle's automatic switch does not operate, it will continue to supply heat to the water. What can you say about the temperature of the water? Where does the energy supplied by the kettle go?

6 You are supplied with rods made of different metals. Each rod has the same length and diameter.

a Describe how you would show that heat energy is conducted along a metal rod.

b How would you alter your experiment to determine which metal is the best conductor of heat?

7 An electric heater can be used to heat a room.

a Describe how air, warmed by the heater, spreads around the room.

b Explain why, when air is heated, it tends to rise.

8 In cold climates, it is important to reduce the rate at which heat escapes from a house. Explain how each of the following can be reduced:

a loss of heat by conduction through the floor into the ground below

b loss of heat by conduction through windows

c loss of heat by convection currents in wall cavities.