

# Simple Kinetic Molecular Model of Matter

## Question Paper 2

|            |  |
|------------|--|
| Level      | IGCSE                                      |
| Subject    | Physics (0625/0972)                        |
| Exam Board | Cambridge International Examinations (CIE) |
| Topic      | General Physics                            |
| Sub-Topic  | Simple Kinetic Molecular Model of Matter   |
| Booklet    | Question Paper 2                           |

**Time allowed:** 23 minutes

**Score:** /18

**Percentage:** /100

### Grade Boundaries:

|      |     |     |     |     |     |     |     |      |
|------|-----|-----|-----|-----|-----|-----|-----|------|
| 9    | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1    |
| >85% | 75% | 68% | 60% | 55% | 50% | 43% | 35% | <30% |

## Question 1

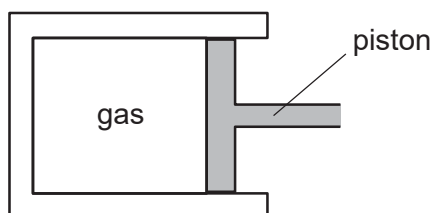
Extremely small pollen grains in water are viewed through a microscope. The grains are seen to move continually and randomly.

What is the reason for this random movement?

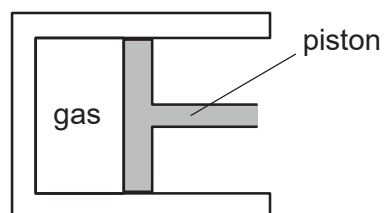
- A. The grains are moved by randomly moving water molecules.
- B. The grains are moved by random convection currents in the water.
- C. The grains are moved by random rays of light reflecting off them.
- D. The grains are moved by the random motion of their own atoms.

## Question 2

A gas is compressed in a sealed cylinder by moving a piston.



initial position



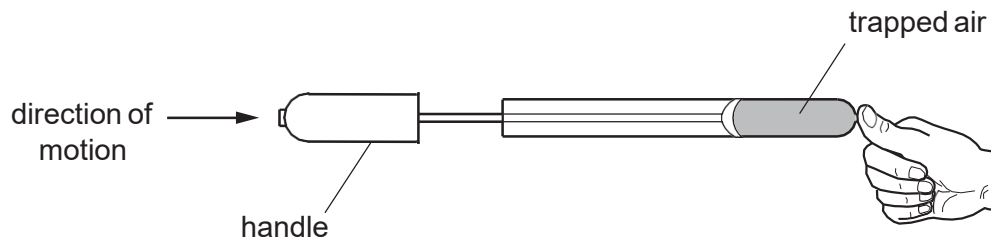
after gas has been compressed

Which row in the table states what happens to the density of the gas and to the pressure of the gas when it is compressed?

|   | density   | pressure  |
|---|-----------|-----------|
| A | decreases | decreases |
| B | decreases | increases |
| C | increases | decreases |
| D | increases | increases |

### Question 3

A student places his thumb firmly on the outlet of a bicycle pump, to stop the air coming out.



What happens to the pressure and what happens to the volume of the trapped air as the pump handle is pushed in?

|   | pressure  | volume           |
|---|-----------|------------------|
| A | decreases | decreases        |
| B | decreases | remains the same |
| C | increases | decreases        |
| D | increases | remains the same |

## Question 4

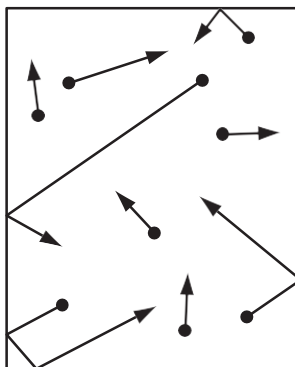
During evaporation, molecules escape rapidly from the surface of a liquid.

What happens to the average energy of the molecules of the remaining liquid and what happens to the temperature of the remaining liquid?

|   | average energy of remaining molecules | temperature of remaining liquid |
|---|---------------------------------------|---------------------------------|
| A | decreases                             | decreases                       |
| B | decreases                             | increases                       |
| C | stays the same                        | decreases                       |
| D | stays the same                        | increases                       |

## Question 5

The diagram represents molecules of gas moving in a container.



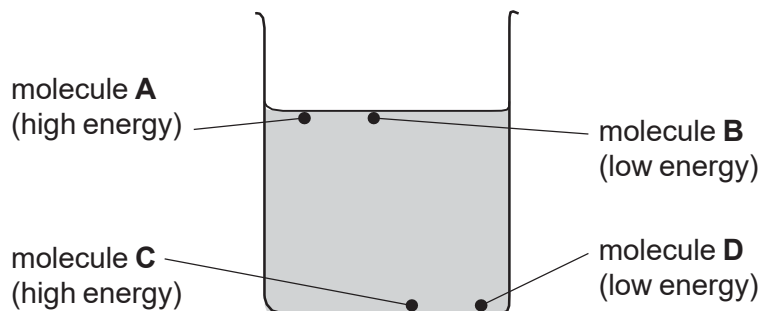
What happens to the gas molecules when the temperature of the gas increases?

- A They move more quickly.
- B They move more slowly.
- C They vibrate more quickly.
- D They vibrate more slowly.

## Question 6

The diagram shows a beaker of water. Four molecules are labelled. The relative amount of energy of each molecule is shown.

Which molecule is most likely to escape from the liquid?

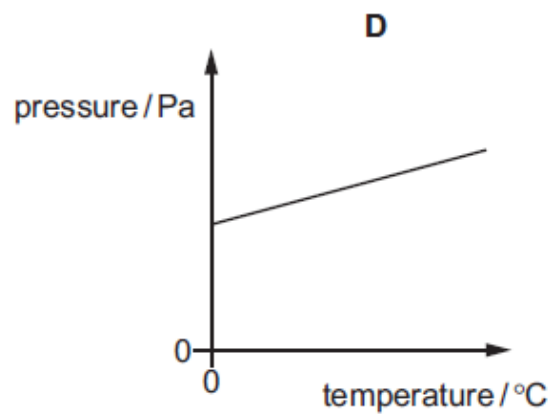
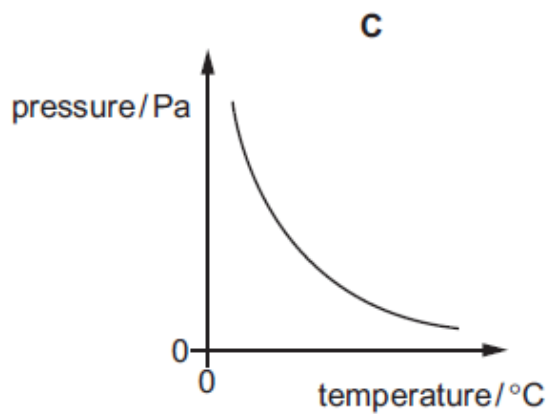
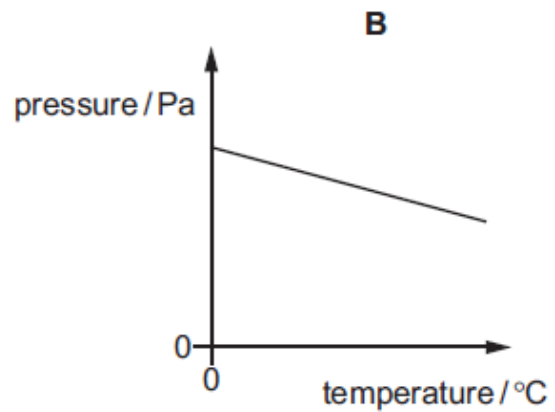
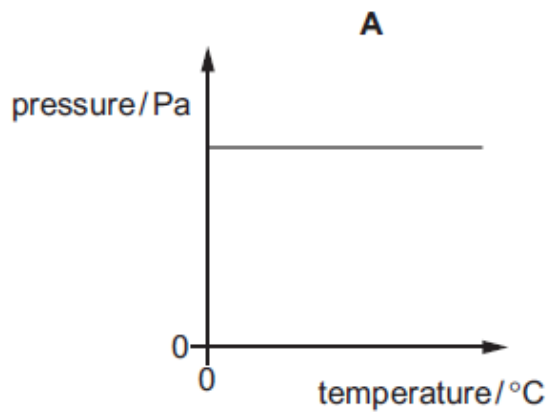


## Question 7

Some gas is trapped in a container of fixed volume.

The temperature of the gas increases.

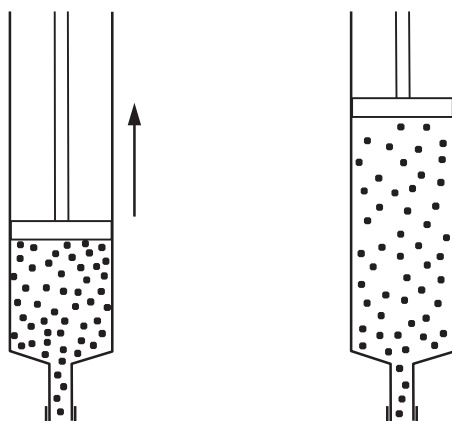
Which graph shows how the pressure of the gas changes with temperature?





## Question 8

The volume of a gas in a sealed syringe is increased. The temperature of the gas does not change.



before change

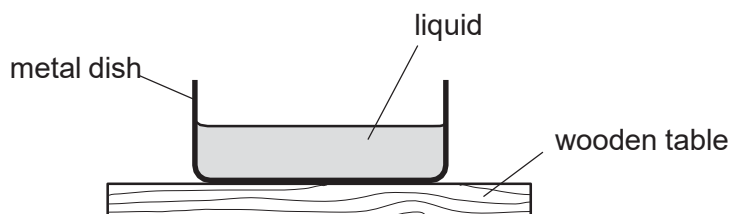
after change

After this change is made, what has happened to the gas molecules in the syringe?

- A. They move more quickly.
- B. They move more slowly.
- C. They hit the syringe walls less often.
- D. They hit the syringe walls more often.

## Question 9

Some liquid is poured into a metal dish on a wooden table. The dish, the liquid, the table and the air around the dish are all at the same temperature.



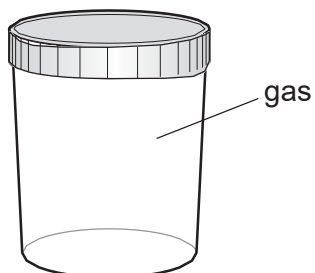
The temperature of the liquid now starts to decrease.

What could cause this temperature decrease?

- A. convection currents in the liquid
- B. conduction of heat through the metal dish
- C. evaporation of the liquid
- D. heat radiation from the liquid

## Question 10

The diagram shows a sealed jar containing a gas.



Which statement about the gas in the jar is correct?

- A. The gas molecules collide with the inside of the jar more often as the temperature increases.
- B. The gas molecules move more slowly as the temperature increases.
- C. The pressure of the gas decreases as the temperature increases.
- D. The pressure of the gas is higher at the top of the jar than at the bottom of the jar.

## Question 11

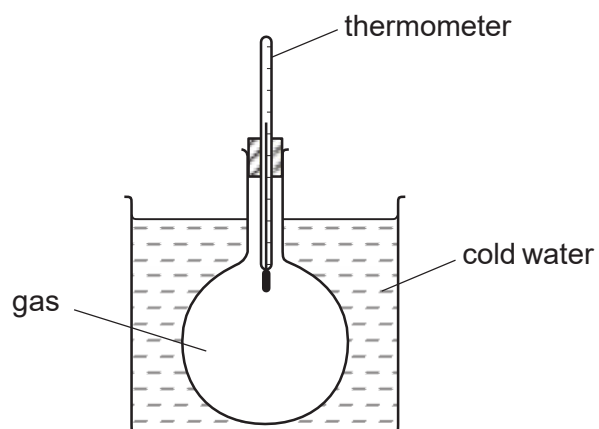
A block of ice cream is prevented from melting by wrapping it in newspaper soaked in water. The water evaporates from the newspaper.

Which molecules escape from the water and what happens to the average speed of the water molecules that remain in the newspaper?

|   | escaping molecules      | average speed of the remaining water molecules |
|---|-------------------------|--|
| A | the less energetic ones | decreases                                      |
| B | the less energetic ones | increases                                      |
| C | the more energetic ones | decreases                                      |
| D | the more energetic ones | increases                                      |

## Question 12

A closed flask of gas is placed in a cold-water bath.



As the flask cools, the temperature of the gas decreases.

What happens to the molecules of the gas?

- A. They contract.
- B. They expand.
- C. They move more quickly.
- D. They move more slowly.

## Question 13

Brownian motion is observed when looking at smoke particles in air using a microscope.

What causes the smoke particles to move at random?

- A. Smoke particles are hit by air molecules.
- B. Smoke particles are moved by convection currents in the air.
- C. Smoke particles have different weights and fall at different speeds.
- D. Smoke particles hit the walls of the container.

## Question 14

The molecules of a substance become more closely packed and move more quickly.

What is happening to the substance?

- A. A gas is being heated and compressed.
- B. A gas is being heated and is expanding.
- C. A liquid is boiling.
- D. A liquid is evaporating at room temperature.

## Question 15

When a liquid evaporates, some molecules escape from it and its temperature changes.

From where do the molecules escape and what is the effect on the temperature of the liquid?

|   | molecules escape from   | temperature of liquid |
|---|-------------------------|-----------------------|
| A | all parts of the liquid | decreases             |
| B | all parts of the liquid | increases             |
| C | only the liquid surface | decreases             |
| D | only the liquid surface | increases             |



## Question 16

A sealed gas cylinder is left outside on a hot, sunny day.

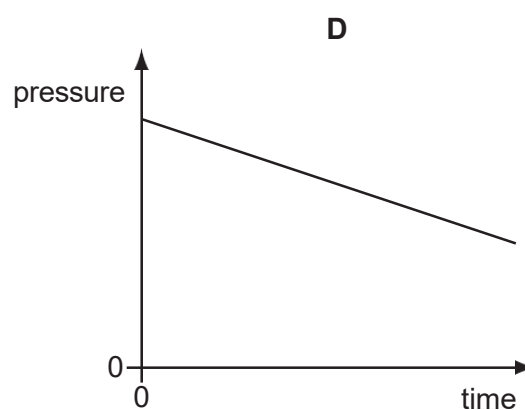
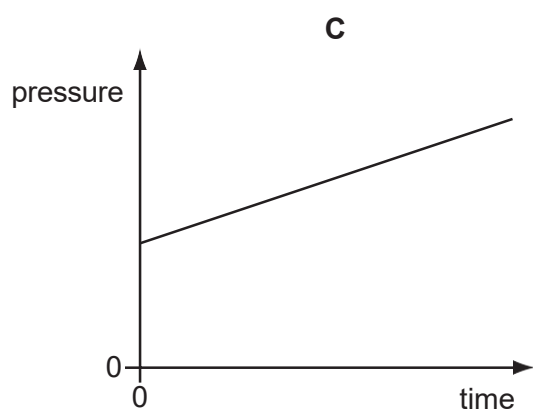
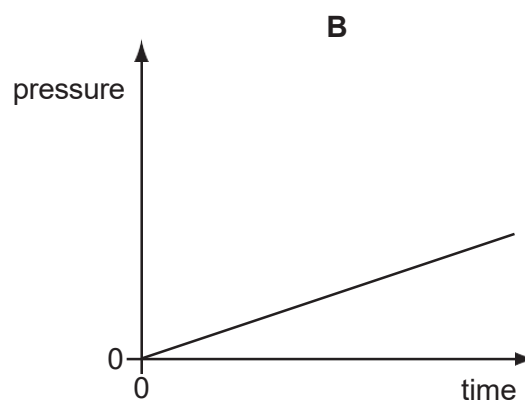
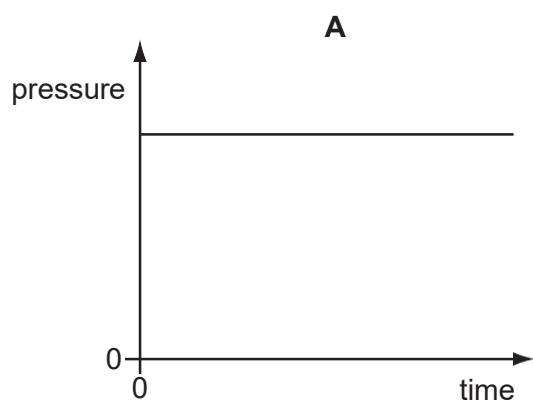
What happens to the average speed of the molecules and to the pressure of the gas in the cylinder as the temperature rises?

|   | average speed of the gas molecules | gas pressure |
|---|------------------------------------|--------------|
| A | falls                              | falls        |
| B | falls                              | rises        |
| C | rises                              | falls        |
| D | rises                              | rises        |

## Question 17

The pressure of a fixed mass of gas in a cylinder is measured. The volume of the gas in the cylinder is then slowly decreased. The temperature of the gas does not change.

Which graph could show the change of pressure of the gas during this process?



## Question 18

Evaporation occurs when molecules escape from a liquid surface into the air above it. During this process the temperature of the liquid falls.

Why does the temperature of the liquid fall?

- A The molecules in the vapour expand because the pressure is less.
- B The molecules left in the liquid have more space to move around.
- C The molecules move more slowly when they escape into the air.
- D The molecules with the highest energies escape into the air.