Simple Kinetic Molecular Model of Matter

Question Paper 1

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 1

Time allowed: **25 minutes**

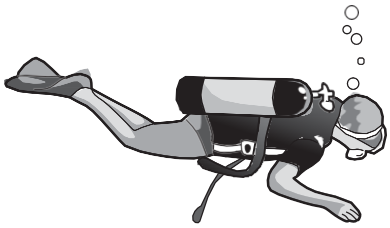
Score: **/20**

Percentage: **/100**

Grade Boundaries:

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

A diver under water uses breathing apparatus at a depth where the pressure is 1.25×10^5 Pa.



A bubble of gas breathed out by the diver has a volume of 20 cm^3 when it is released. The bubble moves upwards to the surface of the water.

At the surface of the water, the atmospheric pressure is 1.00×10^5 Pa.

The temperature of the water is the same at all depths.

What is the volume of this bubble when it reaches the surface?

A 15 cm^3 B 16 cm^3 C 20 cm^3 D 25 cm^3

14 Which statement about evaporation is correct?

A. Evaporation causes the temperature of the remaining liquid to decrease.

B. Evaporation does not occur from a cold liquid near its freezing point.

C. Evaporation does not occur from a dense liquid, such as mercury.

D. Evaporation occurs from all parts of a liquid.

Smoke particles, illuminated by a bright light, are seen through a microscope. They move about randomly.

What causes this motion?

A attraction between the smoke particles and the molecules of the air

B collisions between the smoke particles and the molecules of the air

C evaporation of the faster-moving smoke particles

D warming of the smoke particles by the lamp

A liquid is at a temperature below its boiling point.

The liquid is then heated so that it becomes a gas at a temperature above its boiling point.

Which row correctly compares the liquid with the gas?

	average distance between the particles	average speed of the particles
A	greater in the liquid	greater in the liquid
B	greater in the liquid	smaller in the liquid
C	smaller in the liquid	greater in the liquid
D	smaller in the liquid	smaller in the liquid

A beaker of liquid is left on a laboratory bench. There is an electric fan in the laboratory causing a draught over the liquid.

The liquid evaporates.

Which row shows two changes that will both cause the liquid to evaporate more quickly?

	change to surface area of the liquid	change to speed of fan
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

What causes the random, zig-zag movement (Brownian motion) of smoke particles suspended in air?

A air molecules colliding with smoke particles

B convection currents as the hot smoke rises

C smoke particles colliding with each other

D smoke particles reacting with oxygen molecules in the air

A sealed bottle of constant volume contains air.

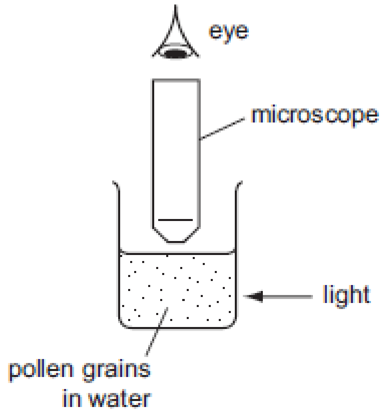
The air in the bottle is heated by the Sun.

What is the effect on the average speed of the air molecules in the bottle, and the average distance between them?

	average speed of air molecules	average distance between air molecules
A	decreases	decreases
B	decreases	stays the same
C	increases	increases
D	increases	stays the same

Very small pollen grains are suspended in a beaker of water. A bright light shines from the side.

Small, bright dots of light are seen through a microscope. The dots move in rapidly changing, random directions.



What are the bright dots?

A. pollen grains being hit by other pollen grains

B. pollen grains being hit by water molecules

C. water molecules being hit by other water molecules

D. water molecules being hit by pollen grains

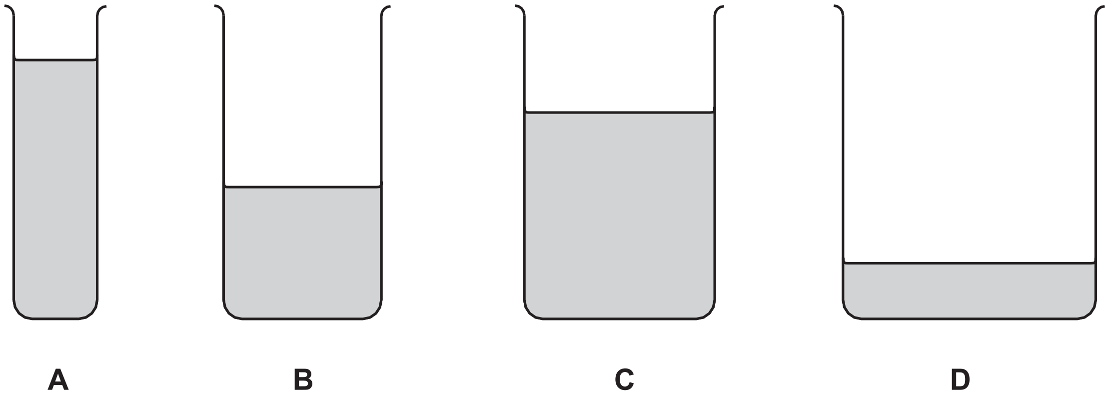
A sealed gas cylinder is left outside on a hot, sunny day.

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

	average speed of gas molecules	pressure of gas in cylinder
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

The diagram shows four beakers A, B, C and D. The beakers contain different amounts of the same liquid at the same temperature. The beakers are left next to each other on a laboratory bench overnight. The diagrams are all drawn to the same scale.

From which beaker does the largest quantity of liquid evaporate?



Two states of matter are described as follows.

In state 1, the molecules are very far apart. They move about very quickly at random in straight lines until they hit something.

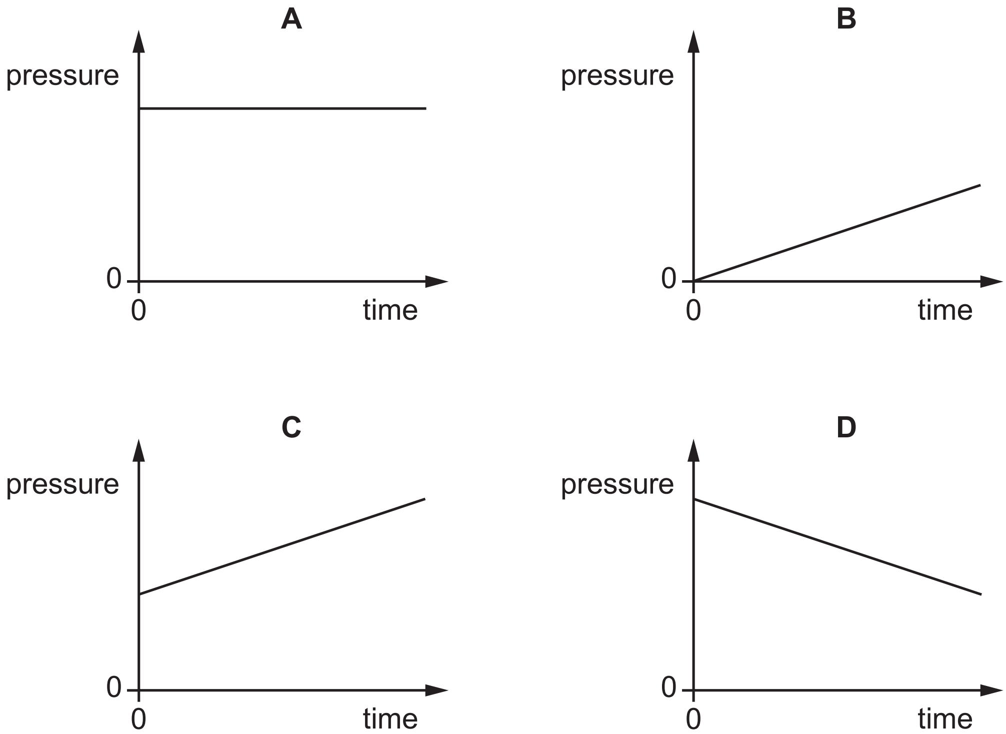
In state 2, the molecules are quite closely packed together. They move about at random. They do not have fixed positions.

What is state 1 and what is state 2?

	state 1	state 2
A	gas	liquid
B	gas	solid
C	liquid	gas
D	solid	liquid

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

Which graph shows the pressure of the gas during this process?

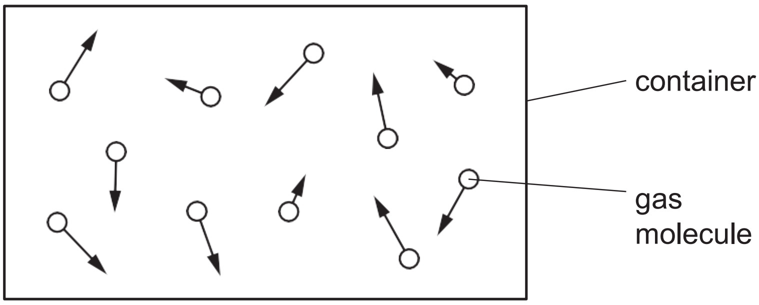


Puddles of rain water remain after a storm. The water in the puddles gradually evaporates.

How does the evaporation affect the temperature of the water remaining in the puddle, and how does it affect the average speed of the remaining water molecules in the puddle?

	temperature of water in puddle	average speed of water molecules in puddle
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

The diagram represents moving gas molecules in a sealed container of fixed volume.



The temperature of the gas is now increased.

What happens to the pressure of the gas, and what happens to the speed of the gas molecules?

	pressure of gas	speed of molecules
A	increases	increases
B	increases	unchanged
C	unchanged	increases
D	unchanged	unchanged

Small smoke particles suspended in air are viewed through a microscope.

The smoke particles move randomly.

What does this show?

A. The air consists of fast-moving molecules.

B. The pressure of the air is increasing.

C. There are convection currents in the air.

D. The temperature of the air is increasing.

Molecules escape from a liquid during evaporation. The temperature of the remaining liquid changes.

Which molecules escape and how does the temperature change?

	molecules escaping	temperature of remaining liquid
A	least energetic	decreases
B	least energetic	increases
C	most energetic	decreases
D	most energetic	increases

A cylinder of constant volume contains a fixed mass of gas. The gas is cooled.

What happens to the pressure of the gas and what happens to the kinetic energy of the gas molecules?

	pressure of gas	kinetic energy of molecules
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

A swimmer feels cold after leaving warm water on a warm, windy day.

Why does she feel cold even though the air is warm?

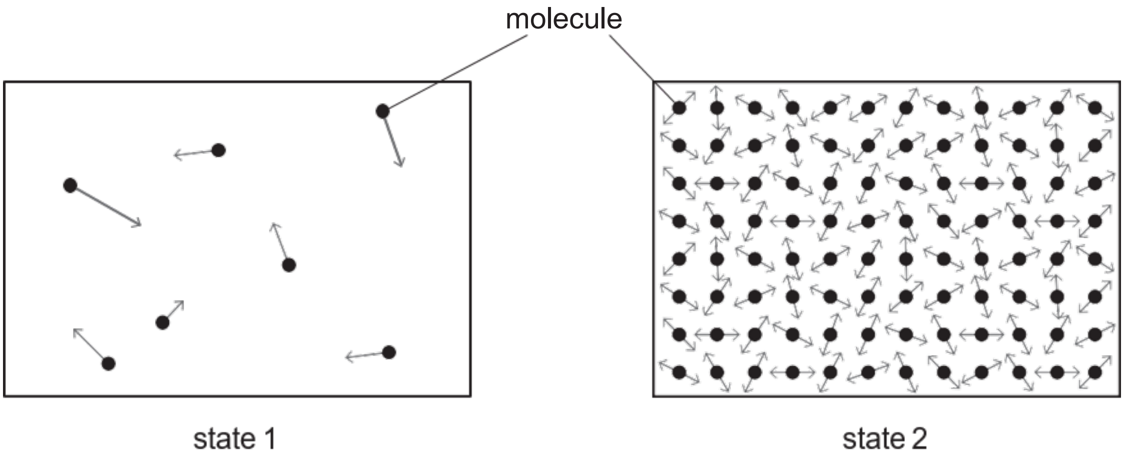
A. The less energetic water molecules on her skin escape quickly.

B. The more energetic water molecules on her skin do not escape quickly.

C. The water on her skin does not evaporate quickly enough to keep her warm.

D. The water on her skin evaporates quickly and cools her skin.

The diagrams represent the molecules in two different states of matter. The arrows show the motion of the molecules.



What is state 1, and what is state 2?

	state 1	state 2
A	gas	liquid
B	gas	solid
C	liquid	gas
D	liquid	solid

A car tyre has a constant volume.

Why does the pressure of the air in the tyre increase when its temperature increases?

A. The air molecules hit each other less often.

B. The air molecules hit the inside of the tyre less often.

C. The average speed of the air molecules in the tyre is greater.

D. There are more air molecules in the tyre.