

MARK SCHEME

GCSE

PHYSICS

AQA - COMBINED SCIENCE

P3 - TEST 4

PARTICLE MODEL OF MATTER

Intermediate

Mark schemes

1.

(a) **B**

*no mark for **B** - marks are for the explanation
first two mark points can score even if **A** is chosen*

draught increases (the rate of) evaporation

accept more evaporation happens

accept draught removes (evaporated) particles faster

*do **not** accept answers in terms of particles gaining energy from the fan / draught*

1

evaporation has a cooling effect

accept (average) kinetic energy of (remaining) particles decreases

1

so temperature will fall faster / further

1

(b) larger surface area

1

increasing the (rate of) evaporation

accept more / faster evaporation

accept easier for particles to evaporate

or

for water to evaporate from

accept more particles can evaporate

*accept water / particles which have evaporated are trapped
(in the bag)*

answers in terms of exposure to the Sun are insufficient

1

[5]

2.

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1–2 marks)

Considers either solid or gas and describes at least one aspect of the particles.

or

Considers both solids and gases and describes an aspect of each.

Level 2 (3–4 marks)

Considers both solids and gases and describes aspects of the particles.

or

Considers one state and describes aspects of the particles and explains at least one of the properties.

or

Considers both states and describes an aspect of the particles for both and explains a property for solids or gases.

Level 3 (5–6 marks)

Considers both states of matter and describes the spacing and movement / forces between the particles. Explains a property of both solids and gases.

examples of the points made in the response

extra information

Solids

- (particles) close together
- (so) no room for particles to move closer (so hard to compress)
- vibrate about fixed point
- strong forces of attraction (at a distance)
- the forces become repulsive if the particles get closer
- particles strongly held together / not free to move around (shape is fixed)

any explanation of a property must match with the given aspect(s) of the particles.

Gases

- (particles) far apart
- space between particles (so easy to compress)
- move randomly
- negligible / no forces of attraction
- spread out in all directions (to fill the container)

[6]

3.

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should apply a 'best-fit' approach to the marking.

0 marks

No creditworthy response

Level 1 (1 – 2 marks)

At least **one** relevant statement is made

Level 2 (3 – 4 marks)

Relevant statements are made about two of the states

or

a relevant statement is made about each state

Level 3 (5 – 6 marks)

Relevant statements are made about each of the three states

Examples of the Physics points made in the response:

ignore statements about the states of matter

*a description without mention of particles, but clearly about particles, can gain **max** 4 marks*

solids:

- arranged in a regular pattern
allow closely / tightly packed / compact
- particles vibrate about fixed points
allow cannot move freely / around
- particles have low energy.

liquids:

- pattern is irregular
allow close together
- particles are not fixed in place **or** can move freely / around
- particles have more energy than solids and / or less energy than gases.

gases:

- particles are in a random pattern
allow far apart
- particles move (about) freely / randomly
allow move fast(er)
- particles have high energy.

[6]

4.

- (a) **solid**
particles vibrate about fixed positions

1

closely packed

accept regular

1

gas		
<u>particles</u> move randomly		
	<i>accept particles move faster</i>	
	<i>accept freely for randomly</i>	1
far apart		1
(b) amount of energy required to change the state of a substance from liquid to gas (vapour)		1
unit mass / 1 kg		
	<i>dependent on first marking point</i>	1
(c) 41000 or 4.1×10^4 (J)		
	<i>accept</i>	
	<i>41400 or 4.14×10^4</i>	
	<i>correct substitution of</i>	
	<i>$0.018 \times 2.3 \times 10^6$ gains 1 mark</i>	2
(d) AB		
changing state from solid to liquid / melting		1
at steady temperature		
	<i>dependent on first AB mark</i>	1
BC		
temperature of liquid rises		1
until it reaches boiling point		
	<i>dependent on first BC mark</i>	1

[12]