

Q1 (1 mark)

A change where no new substance is formed (1)

Q2 (1 mark)

Solid, Liquid, Gas

Q3 (1 mark)

Liquid changing to gas (1)

Q4 (1 mark)

Gas changing to liquid (1)

Q5 (2 marks)

Solids have a fixed shape (1)

Gases have no fixed shape (1)

Solid particles are closely packed (1)

Gas particles are far apart (1)

Q6 (2 marks)

Particles spreading out (1)

From high to low concentration (1)

Q7 (2 marks)

Mass stays the same (1)

Matter is not lost or gained (1)

Q8 (2 marks)

Random movement of particles (1)

Caused by collisions (1)

Q9 (2 marks)

Energy stored in particles/material (1)

Linked to movement and spacing of particles (1)

Q10 (3 marks)

Physical change reversible (1)

No new substance formed (1)

Chemical change forms new substance (1)

Q11 (3 marks)

Gas particles far apart (1)

Lots of empty space (1)

Solids closely packed (1)

Q12 (3 marks)

- Particles gain energy (1)
- Vibrate faster (1)
- Move past each other (1)

Q13 (3 marks)

- Gas particles move faster (1)
- Particles further apart (1)
- Diffusion quicker (1)

Q14 (3 marks)

- Ice particles arranged differently (1)
- Spread further apart (1)
- Ice less dense than water (1)

Q15 (3 marks)

- Particles gain energy (1)
- Move faster (1)
- Internal energy increases (1)

Q16 (3 marks)

- Closer particles = higher density (1)
- Spread particles = lower density (1)
- Linked to mass in volume (1)

Q17 (3 marks)

- Evaporation / boiling (1)
- Particles gain energy (1)
- Particles spread apart and move freely (1)

Q18 (3 marks)

- Particles move randomly (1)
- Spread from high to low concentration by diffusion (1)
- Eventually evenly spread (1)

Q19 (3 marks)

- $10000/1000 = 10g$
- $10 + 100$ (1)
- 110 (1)

Q20 (3 marks)

Sublimation (1)

Particles gain energy (1)

Particles spread far apart and move freely as a gas (1)

Q21 (3 marks)

Three from:

Solid particles closely packed (1)

Liquid particles close but move past each other (1)

Gas particles far apart (1)

Movement comparison correct (1)

Q22 (4 marks)

Particles gain energy (1)

Move faster (1)

Spread further apart (1)

Gas expands / lower density (1)

Q23 (3 marks)

Particles move randomly (1)

Spread from high to low concentration (1)

Faster in gases (1)

Q24 (3 marks)

Ice less dense than water (1)

Particles further apart in ice (1)

Lower density means floating (1)

Q25 (3 marks)

Three from:

Mass before = mass after (1)

Particles still present (1)

No matter lost (1)

Conservation of mass (1)

Q26 (4 marks)

Particles move randomly (1)

Spread from high to low concentration (1)

Diffusion occurs through water (1)
 Colour eventually spreads evenly (1)

Q27 (4 marks)

The gas particles gain energy when heated (1)
 They move faster because their kinetic energy increases (1)
 They collide more often and with greater force (1)
 The internal energy of the gas increases (1)

Q28 (6 marks)

Marking points (6 marks total)

- Melting is solid to liquid (1)
- Freezing is liquid to solid (1)
- Evaporation/boiling is liquid to gas (1)
- Condensation is gas to liquid (1)
- Sublimation is solid to gas (1)
- Changes of state involve energy transfer causing particles to move faster/further apart or slower/closer together (1)

Levels

Level 1 (1–2 marks)

Basic statements naming some changes of state.

Level 2 (3–4 marks)

Some correct descriptions of changes of state with partial reference to particle behaviour or energy.

Level 3 (5–6 marks)

Clear, complete explanation of all main changes of state linked to energy transfer and particle movement.

Model answer

Melting is when a solid turns into a liquid and freezing is when a liquid turns into a solid. Evaporation or boiling is when a liquid turns into a gas, while condensation is when a gas turns into a liquid. Sublimation is when a solid changes directly into a gas. All these changes of state happen because energy is transferred. When particles gain energy they move faster and spread further apart, and when they lose energy they slow down and move closer together.

Q29 (6 marks)

Marking points (6 marks total)

- Diffusion is movement from high to low concentration (1)
- Particles move randomly (1)

- Diffusion is fastest in gases (1)
- Liquids diffuse more slowly than gases (1)
- Solids have very little diffusion (1)
- Density depends on particle spacing (1)

Level 1 (1–2 marks)

Simple statements about diffusion or density.

Level 2 (3–4 marks)

Some correct explanation of diffusion or density with partial detail.

Level 3 (5–6 marks)

Clear explanation linking particle motion, diffusion rate, and density differences across states.

Model answer

Diffusion is the movement of particles from a high concentration to a low concentration due to random motion. It happens fastest in gases because particles are far apart and move quickly. It is slower in liquids and very slow in solids because particles are closer together and more restricted. Density depends on how closely particles are packed. Solids are dense because particles are tightly packed, while gases have low density because particles are far apart.