Changes of State & Particle Model

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.3 Particle Model of Matter
Sub-Topic	Changes of State & Particle Model
Difficulty Level	Bronze Level
Booklet	Mark Scheme

Time Allowed: **24 minutes**

Score: **/23**

Percentage: **/100**

Grade Boundaries:

M1.(a) **Level 3 (5–6 marks):**
A clear, logical explanation containing accurate ideas presented in the correct order with links between ideas.

Level 2 (3–4 marks):
Key ideas presented with some linked together to form a partial explanation.

Level 1 (1–2 marks):
Fragmented ideas, some may be relevant, insufficient links to form an explanation.

0 marks:
No relevant content.

Indicative content

- current in the wire causes heating
- increases temperature of the metal wires / ice

Solid

- arrangement of particles is regular
- particles vibrate about a fixed position

Melting

- internal energy of the ice increases, increasing the temperature to melting point
- so (as the temperature increases) particles vibrate faster
- eventually particles vibrate fast enough to break free from the (strong) bonds
- therefore the arrangement of particles becomes irregular

Liquid

- arrangement of particles is irregular
- particles movement (translational) is random

6

(b) The current in the heating element

1

The mass of ice

1

(c) latent heat of fusion

1

45 / 120 = 0.375

1

0.38

*allow 0.38 with no working shown for **2** marks*
*allow 0.375 with no working shown for **1** mark*

1

[11]

M2.(a) (i) Z

1

(ii) X

1

(b) (i) moving randomly

1

(ii) stronger than

1

(c) (i) evaporation

1

(ii) any **one** from:

- becomes windy
- temperature increases
  accept (becomes) sunny"the sun" alone is insufficient
- less humid

1

[6]

M3. (a) (i) random distribution of circles in the box with at least 50 % of circles touching

1

random distribution of circles occupies more than 50 % of the space

judged by eye

1

(ii) (large) gaps between particles

accept particles do not touch

accept particles are spread out

1

(so) easy to push particles closer (together)
or
forces between particles are negligible / none

an answer in terms of number of particles is insufficient

1

(b) (i) (both are) random

accept a correct description of random eg unpredictable or move around freely or in all directions

they take up all the space is insufficient

they are spread out is insufficient

they move in straight lines is insufficient

1

(ii) (speed also) increases

1

[6]