AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



MARK SCHEME

4.3.2.3 CHANGES OF HEAT AND SPECIFIC LATENT HEAT (PACK 2)

SCORE	PERCENTAGE
/42	%

STEMUP

These questions belong to AQA, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by AQA. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with AQA and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. AQA has not endorsed, approved or been involved in the production of it. AQA and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

AQA publishes its past papers, mark schemes and examiner reports. Always check the current specification at aqa.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Q1.

(a) (approximate same size particles as each other and as liquid and gas) touching

*do **not** accept particles that overlap*

1

regular arrangement (filling the square)

1

(b) condensing

1

(c) solid

1

(d) physical

1

(e) particles have more kinetic energy

1

particles move faster

1

(f) mass of the liquid

1

specific latent heat of vaporisation

1

(g) 2 × 4 200 × 80

1

672 000 (J)

*an answer of 672 000 (J) scores **2** marks*

1

[11]

Q2.

(a) (similarity) same size / shape particles

1

(difference) further apart / fewer in same area

allow none / not many touching

1

(b) any **two** from:

- no movement shown
- atoms / molecules / ions / particles are not solid spheres
- no forces between the spheres
- only 2D

2

(c) • different forces between particles

allow substances have different types of bond

STEMUP.CO.UK

1

- (so) different amounts of energy required (to break forces)

1

(d) high(er) pressure (within fire extinguisher)

1

(e) liquid to gas

1

(f) (change from solid to liquid) 80 seconds

and

(change from liquid to gas) takes 550 seconds

1

(therefore) takes longer so more (thermal) energy is supplied (to change state)

1

(g) $1\,695\,000 = m \times 2.260 \times 10^6$

1

$$m = \frac{1\,695\,000}{2.260 \times 10^6}$$

1

0.75

*an answer of 0.75 scores **3** marks*
allow conversion of kJ to J

1

[13]

Q3.

(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

STEMUP.CO.UK

- 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]

Q5.

(a) (liquid C)

no mark awarded for stating liquid C
no marks awarded if liquid A or B chosen

(causes) biggest temperature decrease

allow cools quicker / the quickest

1

(because it) evaporates quickest

allow evaporates quicker
allow most / more evaporated
ignore references to boiling

1

(b) all of the liquid has evaporated

accept no net energy transfer
allow it was dry

1

(c) particles with most energy / highest speed evaporate

allow hottest particles

1

STEMUP.CO.UK

these particles escape from the (surface of the) liquid

accept overcoming the attractive forces (between particles)

1

decreasing mean energy of particles (left in liquid)

allow some reference to the total energy of the liquid reducing

1

which lowers the temperature

ignore cool down

1

[7]

STEMUP.CO.UK

Q5.

(a) A large number of students gave liquid A as their answer, so gained zero marks. The most common correct answer was that liquid C cooled the quickest. Some thought it was being heated and there were a lot of references to boiling.

(b) Very few students gave a correct response. Most said that the room temperature prevented it cooling further, or that room temperature was 7 °C. There were many incorrect references to boiling or freezing points, condensing and turning to a liquid. A poor understanding of cooling by evaporation and change of state was demonstrated.

(c) Many students did not understand the graph which led to confused responses. It was clear that evaporation is not well understood. Few students realised that the particles with the most energy evaporated. The most common mark gained was for particles escaping from the liquid. Some students gave descriptions referring to the total energy of the liquid reducing but few went on to mention that this lowered the temperature of the liquid. They usually just repeated information given in the question and said the liquid cooled down, which was not enough for the last marking point.

STEMUP.CO.UK