MARK SCHEME

GCSE

PHYSICS
AQA - COMBINED SCIENCE

P3 - TEST 6
PARTICLE MODEL OF MATTER
Advanced

Mark schemes

1. (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

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]

2. (a) there are strong forces (of attraction) between the particles in a solid

accept molecules / atoms for particles throughout
accept bonds for forces

1

(holding) the particles close together

particles in a solid are less spread out is insufficient

1

or

(holding) the particles in a fixed pattern / positions

but in a gas the forces between the particles are negligible

> *accept very small / zero for negligible*
> *accept bonds for forces*

1

so the particles spread out (to fill their container)

> *accept particles are not close together*
> *gas particles are not in a fixed position is insufficient*

1

(b) (i) particles are (shown) leaving (the liquid / container)

> *accept molecules / atoms for particles throughout*
>
> *accept particles are escaping*
> *particles are getting further apart is insufficient*

1

(ii) *accept molecules / atoms for particles throughout*
accept speed / velocity for energy throughout

particles with most energy leave the (surface of the) liquid

> *accept fastest particles leave the liquid*

1

so the <u>mean / average</u> energy of the remaining particles goes down

1

and the lower the average energy (of the particles) the lower the temperature (of the liquid)

1

[8]

3. (a) they move in random directions

1

they move with a range of different speeds

1

(b) the (mean) speed of the particles would increase

> *allow kinetic energy increases*

1

(c) (if the temperature increases) the pressure increases

> *allow an explanation in terms of large pressure difference*

1

so it could explode

1

(d) p = 0.1 (MPa)

1

(e) $p = 2.25 \times \left(\dfrac{25}{100} \right)$

>*allow any correct method of determining 25% of 2.25*
>*allow use of 2.2−2.3*

1

p = 0.56

>*allow 0.55−0.575*

1

t = 27 (minutes)

>*allow 26−28 minutes*
>*allow correct value of t using their calculated value of p*

1

>*an answer of 27 scores **3** marks*

(f) (the volume of the air) increases

1

[10]