

Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Mark Schemes

Q1.

- (a) random
accept in all directions 1
description must be of random motion
- (b) heating increases the temperature of the gas 1
temperature is proportional to kinetic energy 1
if kinetic energy increases speed increases 1
- (c) energy is needed to change the state of the water 1
to break the bonds 1
- (d) $1000 = m / 2.5 \times 10^{-5}$ 1
 $m = 2.5 \times 10^{-5} \times 1000$ 1
 $m = 0.025 \text{ (kg)}$ 1
 $E = 0.025 \times 2\,260\,000$ 1
 $E = 56\,500 \text{ (J)}$ 1
allow 56 500 (J) without working shown for 5 marks
0 marks awarded for $E = m \times L$
- (e) any **four** from:
- because the water is preheated) the change in temperature of the water is less
 - so less energy is used to heat the water ($E=mc\Delta\theta$)
 - therefore they (condensing boilers) are more efficient
 - so less energy is wasted
 - less gas is burned to heat the same amount of water
 - less waste gas (CO_2) is produced by the boiler **or** (because less gas

Q2.

- (a) surface area
or
duration of experiment
accept shape of beaker
size of beaker is insufficient 1
- (b) any **two** from:
- takes readings automatically
ignore easier or takes readings for you
 - takes readings more frequently
 - reduces / no instrument reading error
ignore human error
 - higher resolution
allow better resolution
 - don't need to remove probe to take reading
 - more accurate 2
- (c) (i) 0.07 ($^{\circ}\text{C/s}$)
allow 1 mark for obtaining a temperature drop of 7 ($^{\circ}\text{C}$)
allow 1 mark for an answer between 0.068 and 0.069 ($^{\circ}\text{C/s}$) 2
- (ii) rate of temperature change is greater at the start
accept rate of evaporation is greater at the start

or
rate of temperature change decreases
allow rate of evaporation decreases
allow temperature decreases faster at the start 1
- (iii) A
reason only scores if A is chosen

lower temperature decrease (over 200 seconds)
accept lower gradient 1
- (iv) no effect (as rate of evaporation is unchanged)
allow larger temperature change (per second as mass of liquid is lower) 1
- (d) particles with more energy
accept particles with higher speeds 1

leave the (surface of the) liquid

1

(which) reduces the average (kinetic) energy (of the remaining particles)

allow reference to the total energy of the liquid reducing

1

[11]