

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

- (a) the (mean) kinetic energy of the particles increases
allow the (mean) speed of the particles increases
'kinetic energy increases' is insufficient by itself
*do **not** accept particles vibrating*

1

which increases the (internal) energy of the water
ignore description of evaporation

1

- (b) Particles in a gas have more potential energy than particles in a liquid.

1

- (c) Energy given to water $E = mL$ with quantities defined

1

$$\text{power output (of Bunsen burner)} = \frac{\text{energy transferred (to water)}}{\text{time}}$$

$$\text{allow } P = \frac{E}{t} \text{ with quantities defined}$$

1

$$\text{power output} = \frac{\text{change in mass} \times \text{specific latent heat}}{\text{time}}$$

allow $E = Pt$ equated with $E = mL$ or stated in words
or

$$P = \frac{mL}{t} \text{ with quantities defined}$$

1

time should be converted to seconds

or

use a time of 300 seconds

1

[7]

Q2.

- (a) any **two** from:
- calculate a mean
 - reduces the effect of random errors
reduces human error is insufficient
 - identify / remove anomalies
allow to assess the repeatability of the data

(b) random error

allow a parallax error
human error is insufficient

1

(because) eye position would not be the same each time (relative to the liquid)

allow systematic error only if it is clear that the student always viewed liquid level from above meniscus (or below)

1

(c) (a temperature increase would) increase the pressure in the tube
 (even if the volume was constant)

1

(because a higher temperature would mean) higher (average) kinetic energy of molecules / particles

allow higher (average) speed for higher (average) kinetic energy

1

(d) $1.6 \times 10^5 \times 9.0 (= 1.44 \times 10^6)$

1

$$1.44 \times 10^6 = 1.8 \times 10^5 \times V$$

allow for 2 marks

$$V = \frac{1.6 \times 10^5 \times 9.0}{1.8 \times 10^5}$$

1

or

$$V = \frac{1.44 \times 10^6}{1.8 \times 10^5}$$

$$V = 8.0 \text{ (cm}^3\text{)}$$

1

an answer of 8.0 (cm³) scores 3 marks

(e) work is done on the air (in the tyre)

1

so the temperature (of the air) increases

allow the (average) kinetic energy of the particles increases

1

[11]