

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Mark Schemes

Q1.

- (a) (air) particles move faster
or
 (air) particles have increased kinetic energy 1
- (so air) particles collide more frequently with the wall / chamber
or
 (so air) particles collide with more force with the wall / chamber 1
- (so) the pressure increases
dependent on MP1 or MP2 1
- (b) (metals) have a high(er) thermal conductivity
allow metals are good/better (thermal) conductors 1
- which allows a greater rate of (thermal) energy transfer
allow (thermal) energy is transferred more quickly 1
- (c) (a low) specific heat capacity 1
- (d) any **one** from:
 • lubrication
allow oil the device/wheel
 • use hotter coffee
 • decrease the temperature of the surroundings 1
- (e) $1.1 \times 10^3 = \frac{\text{mass}}{1.9 \times 10^{-4}}$ 1
- mass = 0.209 (kg)
allow $m = 1.9 \times 10^{-4} \times 1.1 \times 10^3$
the equation density = $\frac{\text{mass}}{\text{volume}}$ must have been used to score subsequent marks 1
- $15\,000 = 0.209 \times 4200 \times \Delta\theta$

allow a correct substitution using their calculated value of mass

1

$$\Delta\theta = \frac{15\,000}{0.209 \times 4200}$$

allow a correct re-arrangement using their value of mass and/or an incorrectly / not converted energy value

1

$$\Delta\theta = 17(.088\dots)$$

allow a correct calculation using their value of mass and / or an incorrectly / not converted energy value

1

final temperature

$$= 76 - 17.088 = 59\ (^{\circ}\text{C})$$

allow 58.9... ($^{\circ}\text{C}$)

allow an answer consistent with their value of mass and / or an incorrectly / not converted energy value

1

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Q2.

(a) 100 (kPa)

allow 10^2 (kPa)

1

(b) range = 0.006 (MPa)

allow mean = 0.118

1

uncertainty = ± 0.003 (MPa)

an answer of uncertainty = 0.118 (MPa) scores **0** marks

1

(c) the relationship is linear

allow the relationship obeys $y = mx + c$

allow the gradient (of the graph) is constant

do **not** accept (directly) proportional

1

(d) (as the amount of steam increases) the number of particles increases

1

and (as the temperature increases) particles move faster

allow (as the temperature increases) the (average) kinetic energy of the particles increases

1

particles collide with the wall of the cooker

if MP3 is not awarded no subsequent marks may be awarded

1

these collisions are more frequent

1

and each collision exerts more force

particles refers to particles in the steam throughout

- (e) the particles spread out
do **not** allow particles expand

1

so the steam / gas takes up a greater volume
allow there is less gas in the same volume

1

and density = $\frac{\text{mass}}{\text{volume}}$ so the density decreases
do **not** allow density of particles decreases

1

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