Simple Kinetic Molecular Model of Mater

Mark Scheme 2

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Thermal Physics
Sub-Topic	Simple Kinetic Molecular Model of Matter
Paper Type	Alternative to Practical
Booklet	Mark Scheme 2

Time Allowed: **54 minutes**

Score: **/45**

Percentage: **/100**

1 **(a** **A** = 87(°C) <u>and</u> **B** = 88(°C)   [1]

   (b) units correct (symbols or words)   [1]
           times correct (<u>0</u>, 30, 60, 90, 120, 150, 180)   [1]

   (c) statement matching temperature changes (accept 'no significant difference' if justified)
           <u>and</u> justification matching statement (comparison of temperature changes)   [1]
           including <u>specific</u> mention of temperature <u>change</u> in <u>same time</u>   [1]

   (d) appropriate condition relating to <u>comparison</u>
           i.e. any one fro
           same size/thickness of beaker
           same volume of water
           same initial temperature
           same room temperature / appropriate environmental condition
           same time for cooling   [1]

   (e) any sensible alteration e.g.
           put lid on/cover top of **A**
           extra experiment without insulation or lid / take lid off **B**   [1]
           matching explanation e.g.
           most thermal energy loss by convection or o.w.t.t.e.
           have only changed one factor or o.w.t.t.e.   [1]

                                                                                      [Total: 8]

2. **(a** 23 ($^{\circ}$C) [1]

(b) t in s, θ in $^{\circ}$C [1]

T$_1$= 14 [1]
T$_2$ = 1 [1]

(c) Graph:
Axes the right way round, both labelled with quantity, ignore unit [1]
Use of the scale temperature 50 – 80 and time 0 – 200 or 0 – 250, using the whole grid [1]
All seven plots correct to ½ small square [1]
Good line judgement [1]
Thin line [1]

(d) Greater rate of cooling in first 30 s (owtte) ecf possible [1]
Decreasing slope of graph (owtte) ecf possible [1]

[Total: 11]

3 **(a** <u>23</u> ($^{\circ}$C) [1]

(b) s, $^{\circ}$C, $^{\circ}$C, words or symbols [1]
30, 60, 90, 120, 150, 180 [1]

(c) Uninsulated (owtte) OR no significant difference [1]
Justified by reference to temperature <u>differences</u> and <u>time</u> [1]

(d) Any two from:
<u>initial</u> temperature/<u>starting</u> temperature/temperature of <u>hot</u> water
(constant) room temperature/ correct <u>named</u> reference to environmental condition
tube size/same test-tube
thickness of glass
volume/amount/level of water
thickness of cotton wool
depth (of immersion) of thermometer
(rate of) stirring [2]

(e) Any two suitable insulators (that can be wrapped around tube) [2]

[Total: 9]

4   **(a**   **(i)** T_1 correct 18   [1]

         (ii) T_2 correct 4   [1]
              unit ^{o}C (either position and not contradicted)   [1]

   (b)   graph:
       y-axis labelled   [1]
       plots occupying at least half of grid on suitable scale   [1]
       all plots correct to ½ square   [1]
       well judged single, smooth curve line, not 'point-to-point'   [1]
       thin line   [1]

   (c)   **(i)** $T_2 < T_1$ (wtte)   [1]

         (ii)   decreasing gradient (wtte)   [1]

                                                        [Total: 10]

5   **(a)**   table:
       t in s, θ in °C (either in words or mixture of symbols and words)
       (NOT degrees/centigrade)   [1]
       times 30, 60, 90, 120, 150, 180   [1]

   (b)   both temperature falls correct (ignore unit or lack of unit) 26, 30   [1]

   (c)   justification matches statement (expect B)
       and by reference to readings (need a comparison – not 'heat' or 'it')
       B <u>&</u> temp fall   [1]
       in same time   [1]

   (d)   any two from:
         same starting temperature
         stir/same thermometer position
         same interval time
         constant room temperature/carry out at same time
         same volume/amount/mass of water
         avoid draughts or wtte   [2]
         (NOT reference to container, insulation, precaution)
         (extra answers: –1 if incorrect, ignore if neutral)

                                                        [Total: 7]