Thermal Properties and Temperature

Mark Scheme 2

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Thermal Physics
Sub-Topic	Thermal Properties and Temperature
Paper Type	Alternative to Practical
Booklet	Mark Scheme 2

Time Allowed: **52 minutes**

Score: **/43**

Percentage: **/100**

1 **(a) (i)** 88 (°C) [1]

(ii) s, °C [1]

(b) axes correctly labelled with quantity and unit [1]

suitable scales on both axes, occupying more than half the grid [1]

all plots correct to ½ small square [1]

good line judgement, not through all points [1]

thin, continuous line and neat plots (penalise large 'blobs') [1]

(c) (i) statement to match candidate's graph line (expect curve) [1]

(ii) statement to match candidate's graph line (expect (rate) decreases) [1]

(d) description or diagram to show one from:

- perpendicular line of sight
- reading to bottom of meniscus [1]

[Total: 10]

2 **(a)(b** 87 and 89, both correct answer only [1]

(c) units correct in symbols or words, s, °C, °C [1]

t values correct 0, 30, 60, 90, 120, 150, 180 [1]

(d) appropriate pattern which fully matches results
e.g. rate of temperature drop greater at start than at e
NOT stated pattern which partly matches results [1]

(e) statement matching temperature changes
(expect 'Yes' but accept 'No' or 'no significant difference' if ecf) [1]

justification referring to results and involving comparative change in temperature with specific mention of in the same time [1]

(f) any two from:

- room temperature / external temperature (but not outside temperature) / environmental factor such as draughts / sunshine
- initial water temperature / start temperature
- same amount of stirring / wait same time before reading
- keep thermometer at same depth
- same size/thickness / material / surface area of beaker
- same volumes of water [2]

[Total: 8]

3 **(a)** 19 (°C) cao [1]

(b) table:
cm^3, °C [1]
NOT C°, centigrade

correct *V* values 10, 20, 30, 40, 50 [1]

(c) lid / insulation / polystyrene cup / minimal time delay [1]

(d) R_1 = 2.(00) R_2 = 1.4(3) [1]
note: do not give the mark if using incorrect stopwatch reading e.g. 35.5 rather than 35.05

cm^3 / s [1]

(e) rate / flow is not constant [1]

(f) any two from:
room temperature / air conditioning
initial / hot water temperature
volume / quantity / amount of hot water
cold water temperature
intervals / time between adding volumes of water [2]
ignore draughts / humidity / pressure

[Total: 9]

4 **(a)** θ_R = 23(°C) [1]

(b) table:
d values 11.9, 11.3, 10.8, 10.4, 10.2, 10.0, 9.9 [1]
all *d* values to nearest mm [1]
s, °C, cm or mm [1]

(c) **(i)** does not go through the origin [1]

(ii) *d* not measured from 0 °C mark (o.w.t.t.e.) [1]

(d) any *l* divided by any number of divisions [1]
l value between 89 and 119 [1]
x = 0.98 mm to 1.00 mm (with unit) [1]

[Total: 9]

5 **(a** θ_C = 19 (°C) [1]

(b) s, °C, symbols or words [1]

(c) 12 cm^3 (unit needed) [1]

(d) 40–50 (cm^3), (expect 42 cm^3 e.c.f. **(c)**) [1
estimate given to nearest 1 cm^3 only and sensible method [1]

(e) two from:
room / surrounding temperature / other environmental condition
initial hot water temperature
initial cold water temperature
volume / mass / amount of hot water
time delay on adding cold water / same time for cooling [2]

[Total: 7]