

FORM FOUR CLUSTER KCSE MODEL 3

PHYSICS PAPER 3 ANSWERS

1. QUESTION ONE.

Part A

b i) $V_R = V + (2.5 \pm 0.2 \text{ cm}^3)$ (1/2 Mark)

$V_D = 2.5 \pm 0.2 \text{ cm}^3$ (1/2 Mark)

ii) Upthrust = Volume of displaced water x density x g (students own value of V_D)

$= 2.5 \times 10^{-6} \times 1000 \times 10$ ✓ 1 mark (substitution into equation of upthrust)

$= 0.25 \text{ N}$ ✓ 1 mark (evaluation)

Accuracy (0.25 ± 0.02) ✓ 1 mark

c i) Position of COG = 50.0 ± 0.5 (1dp a must) ✓ 1 mark

ii) $X = 22.4 \pm 0.2$ (1dp a must) ✓ 1 mark

iii) • Substitution of student's own value of x ✓ 1 mark • Evaluation ✓ 1 mark

iv) • Substitution of student's own value of x ✓ 1 mark

• Evaluation 1 mark • Accuracy (0.8 ± 0.2) (no units deny for accuracy if units are stated) ✓ 1 mark

2. Part B

c i) $L_0 = 80 \pm 0.5 \text{ cm}$ (1dp a must)

ii) $d_1 = 0.24 \pm 0.02 \text{ mm}$ (2dp a must) 1/2 mark $d_2 = 0.24 \pm 0.02 \text{ mm}$ (2dp a must) 1/2 mark

iii) $d =$ Showing averaging 1/2 mark, correct evaluation 1/2 mark

iv) Correct calculation of radius in metres using student's value of average diameter ✓ 1 mark

d i) $V_R = 0.5 \pm 0.2$ (1dp) volts ✓ 1 mark

ii) $I =$ Student value ✓ 1 mark

iii) • Correct substitution ✓ 1 mark

• Correct evaluation ✓ 1 mark

- Accuracy ($1.0 \times 10^{-6} \Omega M$) ✓

3. QUESTION TWO.

(a) $T_0 27^\circ C \pm 2$ (in whole number) (1 mark)

c) Table (7marks)

Temperature ($^\circ C$)

Time (t) (min)	2	4	6	8	10	12	14
Temperature (T) $^\circ C$	60	57	54	52	50	48	47
(T - T ₀) $^\circ$	33	30	27	25	23	21	20
Log (T - T ₀)	1.5185	1.4771	1.4314	1.3979	1.3617	1.3222	1.3010

- Values in the table $\pm 2^\circ C$ (Each correct = 1mark , max 5 marks) = 5marks.
- (T-T₀)
- Correct subtraction of T₀ from the values of T (6-7 points correctly subtracted = 1mark, < 5 = 0)
- Log (T-T₀)
- Correct values of Log (T - T₀) from students values of (T - T₀) to four significant figures T (6-7 points correctly = 1mark, < 5 = 0)

(d) Graph (5marks)

- Label axis — 1 mark (with unit on X-axis only)
- Scale (Simple, uniform and accommodative) — 1 mark
- Plotting — 2 marks ($\frac{1}{2}$ mark for every correct Plotted point ($\frac{1}{2} \times 4$) Straight line –
passing through at least 3 points obtained. ✓ 1 mark

i) Calculation of K (2marks)

- K = gradient (realization) $\frac{1}{2}$ mark
- Correct substitution $\frac{1}{2}$ mark

Correct evaluation $\frac{1}{2}$ mark

- Accuracy (1.56 ± 0.2) $\frac{1}{2}$ mark ii) Calculation of N (3marks)
- N = antilog of the Y- intercept ✓ 1 mark

- Reading of the Y- intercept ✓ 1 mark

- Finding the antilog of Y-intercept ✓ 1 mark

(e) Calculation of heat lost (2marks)

- Substitution $\frac{1}{2}$ mark
- Evaluation $\frac{1}{2}$ mark
- Accuracy ($42.64 \text{ KJ} \pm 2.0$)

