CHEMISTRY PAPER 3

MARKING SCHEME

QUESTION ONE

Procedure

Step 1

Table 1 2marks

Final temp ^{O}C	18.0
Initial temp ^{O}C	21.0

Conditions

Complete table 1mark

Decimal ½ mark

Accuracy ½ mark ($\pm 2^{O}C$ teachers value)

a) Change in temperature ΔT_1 1mark

18 – 21 ✓½= $-3^{o}C$✓½

Penalize✓½ if –ve sign not shown

b) i) 35x4.2x3 = +441joules ✓1

ii) $\frac{2.2}{126}$ = 0.01746 ✓1

iii) 0.01746 moles 441

1mole ?

= $\frac{1x441}{0.01746}$✓½= 25257.732j

= 25.2577kJ✓½

Step 2

Table II 2marks

Final temp ^{O}C	25.0
Initial temp ^{O}C	20.0

Conditions

Complete table 1mark

Decimal ½ mark

Accuracy ½ mark ($\pm 2^{O}C$ teachers value)

c) ΔT_2 25 – 20 ✓½ = $5^{o}C$ ✓½

d) i) 70x4.2x5 = - 1470 joules ✓1

ii) 0.5 x $\frac{35}{1000}$ = 0.0175 ✓1

iii) 0.0175moles 1470

1mole ?

= $\frac{1x\ 1470}{0.0175}$ = - 84000joules

= -84kJ

d) $\Delta H_3 = \Delta H_1 + \Delta H_2$

= +25.2577 + (-84)

= - 58.7423kJmole^{-1}

Procedure II

a) **Table III** 5marks

Temperature of solution $\Delta^{O}C$	45	55	65	75
Time taken for decolorisation (sec)	165	40	23	16
Reciprocal of time, 1/t (sec-1)	0.0067	0.025	0.043	0.0625

Complete table 1½ marks
Row 2 ½ mark
Row 3 1mark
Decimals ½ mark (accept whole number or /dp used consistently in row two)
Accuracy ½ mark
Trend ½ mark (time decreasing as temperature increases)

b) Graph 3marks

- Labelling ½ mark of both correctly labeled (penalize fully for inverted axes)
- Scale ½ mark (occupy at least ¾ of grid provided on both axes).
- Plotting 1mark (4 correctly plotted)
- Line 1mark (must pass through at least 3 correct plots).

c) i) $35 = 1/t \times 10^3$ ✓½

$1/t = \frac{35}{10^3}$

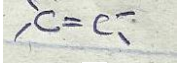
$t = \frac{10^3}{35} = \frac{1000}{35}$ = 28.57seconds ✓½

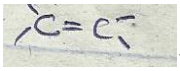
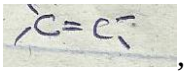
Reject: If no evidence of reading from the graph.

ii) The rate of reaction increase with increase in temperature of solution D.

Or

The rate of reaction is directly proportional to the temperature of solution D.

	OBSERVATION	**INFERENCES**
2. i)	No white ppt✓1 **Reject the following -** No observable change - No color change - No reaction observed - Solution remain colourless - No reaction 1mark	Absence of $Ca^{2+}Mg^{2+}Pb^{2+}$, Al^{3+} Conditions ✓1 - 4 ions mentioned 1mark - 3 ions mentioned 1mark - 2 ions mentioned ½ mark - 1 ion mentioned 0mark ***NB: Penalize any contradictory ionsup to a maximum of 1***
ii)	No white ppt✓1 Reject the following - No observable change - No color change - No reaction observed - Solution remain colourless - No reaction	Absence of $Ca^{2},^{+}Pb^{2+}$✓1 Conditions - Two ions mentioned 1mark - One ion mentioned ½ mark NB: Ignore absence of $Mg^{2+}Al^{3+}$ Zn^{2+} 1mark
iii)	Golden yellow flame ✓1 *Note: Accept yellow flames*	Presence of Na^{2+}✓1 *Note: Penalize fully any contradictory ions*
iv)	No white ppt observed ✓1 Reject the following - No reaction seen - No observable change - No ppt seen 1mark	Absence of $SO^{2-}{}_4$ Condition: - Ignore presence of $SO^{2-}{}_3$ or $CO^{2-}{}_3$if mentioned -Penalize fully for any contradictory ions 1mark
v)	Potassium dichromate colour Changes from orange to green 1mark	Presence of SO_3^{2-}✓1 Note: - Ignore presence of  **Or**- C≡C- **or** ROH**or** aldehydes if mentioned *- Penalize for any contradictory ion*
3.	a) - Solid melts into a colourless liquid ✓½	- Presence of water of crystallization ✓1

	-Colourless liquid formed at the cooler✓½ part of test tube ½ mark -White solid formed at cooler parts of t.t -Colourless fumes produced Reject - Colourless liquid condenses at the cooler Parts of test tube - Colourless solution formed	- Compound sublimes Note: - Water of crystallization tied to correct observations, similar to sublimes
b) i)	Colour of bromine water persist✓^{1} (remains) **Reject** -No observable change -No colour change - No reaction	Absence of  ✓^{1}and - C≡C - **Note** -reject absence of alkenes or alkaneswritten in words.
ii)	Potassium dichromate (VI) solution remains orange 1mark	 , - C≡C - and R – OH Absent 1mark
iii)	PH 5 ✓^{1} **Note** -accept only PH given but not a range of PH like 4-6	Presence of weak acid ✓^{1} **Note** - If presence of H^+ is given No mark

Note

- Symbols for elements, ions should not be joined penalize
- Penalize any contradictory ions and observations