every 30 seconds and complete the table II below. **(5 marks)**

Time (sec)	0	30	60	90	120	150	180	210	240	270	300
Temperature (°C)											

a) On the grid provided, plot a graph of time (seconds) against temperature (Y -axis) (3 marks)
b) Using your graph determine the change in temperature. show your working. (1½ marks)
c) Calculate the
   i) enthalpy change in Joules for the reaction when 1.5g of solid P was used (specific heat capacity of the solution is $4.2Jg^{-1}k^{-1}$, density of solution is $1.0gcm^{-3}$) (2 marks)
   ii) Molar enthalpy change for the reaction in Kilojoules per mole. (1½ marks)

2. You are provided with solid F. You are required to carry out the tests, write observations and inferences in the table below.
a) Place a spatula end full of solid F into a clean dry test tube. Heat it gently followed by strong heating, while the mouth of the test tube faces away from you. Test for any gases produced (if any) with red an blue litmus papers.
b) Place another spatula end full of solid F into a clean boiling tube and shake thoroughly for about one minute. Retain and divide the result into four 2mls portions for future use in (c) to (f) below
c) To the first portion add 3 drops of sodium carbonate solution
d) To the second portion add aqueous ammonia dropwise until in excess.
e) To the third portion, add six drops of lead (II) nitrate solution. Shake the contents well and filter.
f) To the fourth portion, add three (3) drops of calcium nitrate solution followed by five drops of dilute hydrochloric acid.

3. You are provided with an organic compound solid K. You are required to carry out tests,, write the observations and the inferences in the spaces provided.
Place a spatula endfull of solid K into a clean boiling tube. Add about $15cm^3$ of distilled water and shake the mixture thoroughly.
a) Place about $2cm^3$ portion into a clean test-tube add 2 drops of acidified potassium manganate (VII) solution.
b) To another $2cm^3$ portion in a different clean test-tube add 2 drops of acidified potassium dichromate (VI) solution.
c) To the third portion add half spatula of solid sodium hydrogen carbonate.

CONFIDENTIAL INSTRUCTIONS

Each candidate should be provided with the following :
- orange / lemon
- DCPIP
- scalpel blade
- a dropper
- a 10ml measuring cylinder
- 2 test tubes
- a beaker
- bone M - lumbar vertebra
  N - cervical vertebra

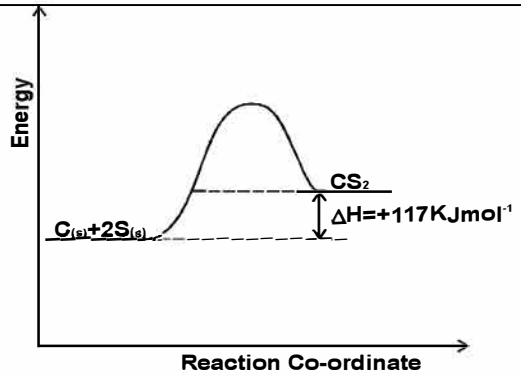
BURETI SUB-COUNTY JOINT EVALUATION TEST
233/1
CHEMISTRY
Marking scheme

1.
a) Fermentation.
b) Ethane remains in molecular form while ethanol forms hydrogen bonds with water.

2.
a) Reversible reaction / temporary chemical change.
b) Hydrated copper (II) sulphate, hydrated cobalt (II) chloride, hydrated copper (II) chloride.

3.
a) Bromine : At room temperature (25°C), bromine is liquid since its melting and boiling points is below -7 and 59.
b)
- Atomic mass of iodine is higher than that of chlorine.
- Van der Waals forces are stronger in Iodine than chlorine hence iodine's boiling point is higher than that of chlorine.

4.



5. a) Water /H_2O

b) It is slightly soluble in water OR not soluble is water.

c)

- In hospitals to resuscitate patients
- In welding when mixed with acetylene in the oxy-acetylene flame.
- Used by divers and mountaineers.

6.

- crush the seeds in a mortar using a pestle.
- Add a suitable solvent (acetone, propanone, ethanol)
- Filter out the solid matter.
- Evaporate the filtrate to obtain oil.

7. a) $Cu^{2+}_{(aq)} + Fe_{(S)} \rightarrow Cu_{(S)} + Fe^{2+}_{(aq)}$

b) $\Delta H = MC\Delta T$
$= 75 \times 4.2 \times 56$
$= -1764$

Moles of copper $= \frac{5.83}{63.5} = 0.0918$

ΔH per mole $= \frac{1764}{-0.0918} = -19215.7J$
$= -19.2kJmol^{-1}$

8. a)

	C	H	O
% by mass	69.42	4.13	26.45
Moles	$\frac{69.42}{12} = 5.785$	$\frac{4.13}{1} = 4.13$	$\frac{26.45}{16} = 1.653$
Simplification	$\frac{5.785}{1.653} = 3.5$	$\frac{4.13}{1.653} = 2.5$	$\frac{1.653}{1.653} = 1$
Whole no.	7	5	2

E.F = $C_7H_5O_2$ ✓½

b) $7(12) + 5(1) + 2(16) = 121$
$(C_7H_5O_2)_n = 242$
$121n = 242$

$n = \frac{242}{121}$
$n = 2$
m.f. = $C_{14}H_{10}O_4$

9.

a) 2.8

b) $3V_{(S)} + Q_{2(g)} \rightarrow V_3Q_{2(S)}$
OR
$3Mg_{(S)} + N_{2(g)} \rightarrow Mg_3N_{2(S)}$

c) T has a lower ionisation energy than M. T has on extra energy level hence electrons are less attracted by the positive nucleus.

10. Deliquescent substance absorbs water from the atmosphere to form a solution while a efflorescent substance loses water of crystallization to the atmosphere.

11. a) Zinc blende or calamine

b) $ZnO_{(S)} + C_{(S)} \rightarrow Zn_{(S)} + CO_{(g)}$

$3ZnO_{(S)} + 2C_{(S)} \rightarrow 3Zn_{(l)} + CO_{2(g)} + CO_{(g)}$

c)

dry cells
galvanizing iron sheets
as electrodes
making alloys e.g. brass.

12. a)

Chloroflouro carbons.

b) When ozone is depleted, high energy UV radiations reach the earth, which may cause skin cancer to human beings

c) Global warming
OR Greenhouse effect

13. a) T
b) 15 grams
c) Fractional crystallization

14.- The level of water in glass tube would go down. This is because hydrogen being less dense than air diffuses faster through the porous bag forcing the level of water in the gas tube to go down while the level of water in the beaker rises slightly.

15. a) $N_2H_{4(g)} + O_{2(g)} \rightarrow N_{2(g)} + 2H_2O_{(g)}$

b) Bond breaking energy
= 163 + 4(388) + 496
= 2211kJ

Bond making energy
= 944 + 4(463)
= -2796kJ

Enthalpy
= 2211 + (-2796)
= -585kJ/mole

16. In water, HCl is ionised into H^+ and Cl^- ions. Chloride ions are oxidised to chlorine gas by potassium permanganate. In methylbenzene, HCl is not ionised or remains in molecular form.
The chloride ions are not available for oxidation hence no reaction.

17.

a) The acidified permanganate will be decolourised (purple-colourless)
The permanganate (VII) is reduced to manganate (II) ions.

b) i) A white precipitate forms/ or white solid forms or white suspension forms.

ii) $Ba^{2+}_{(aq)} + SO^{2-}_{3(aq)} \rightarrow BaSO_{3(S)}$

18. a) These are different forms of an element or substance in the same physical state.
b) The hexagonal graphite rings have weak Van der Waals forces between the layers to slide over each other while in diamond the atoms are held by strong covalent bonds.

19.

$Ca(NO_3)_2 \rightarrow Ca^{2+}_{(aq)} + 2NO_{3(aq)}$

$RMM\ of\ Ca(NO_3)_2 = 164$

$Conc.\ of\ Ca(NO_3)_2 = 4.1g/l$

$Molarity = \frac{4.1}{164}$

$= 0.025m$

$1mole\ Ca(NO_3)_2 = 2moles\ nitrates$

$0.025moles = 2 \times 0.025$

$= 0.05m$

20. a) 2.8.8
b) T_2O_3 / T_2O_5 / P_2O_5

21. Product at anode = oxygen
Reasons
- OH^- and SO^{2-}_4 migrate to the anode.
- OH^- ions are preferiantly discharged to form oxygen.

22. a) There is lose of heat. The kinetic energy decrease and the molecules move closer to each other.
b) Solid state.

23. a) Bubble the gases in calcium hydroxide solution.
Carbon (II) oxide does not react while carbon (IV) oxide forms a white precipitate.
b) It cuts the supply of oxygen OR Forms a blanket OR CO_2 is denser than air.

24. a) Ca / Calcium
Reject Calcium ions / Ca^{2+}
b) No observable change ⇒ Silver is below copper in the reactivity series so it cannot displace it.

25.
a) Brine (NaCl) or Rock Salt.
b)
- Sodium is more reactive
- Sodium is more reactive than carbon.

c)
- In sodium lamps.
- As coolant in nuclear reactors
- Manufacture of sodium cynanide, sodium almalgam, sodium peroxide.
- Extraction of titanium

26. Equilibrium shifts to the right (i.e. forward reaction is favoured)
- Carbon (IV) oxide dissolves in the alkali hence $MgCO_3$ decomposes to replace the absorbed carbon (IV) oxide.

27. a) Sample III ⇒ had temporary hardness caused by $Ca(HCO_3)_2$ or $Mg(HCO_3)_2$ which are broken down (removed) by boiling.

b) $CaSO_4$ *or* $CaCl_2$

$MgSO_4$ *or* $MgCl_2$

Chlorides and sulphates of calcium and magnesium.

28. i) $(+1 \times 2) + 2x + (-2 \times 3) = 0$
$-4 + 2x = 0$
$2x = 4$
$x = +2$

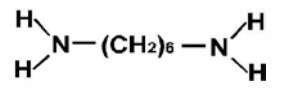
ii) $(+1 \times 2) + x = 0$
$+2 + x = 0$
$x = -2$

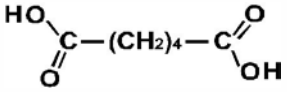
29. i) $Al_2O_{3(S)} + 3H_2SO_{4(aq)} \rightarrow Al_2(SO_4)_{3(aq)} + 3H_2O_{(l)}$

ii) $Al_2O_{3(S)} + 2NaOH + 3H_2O \rightarrow 2NaAlO_3$

ii) $Al_2O_{3(S)} + 2NaOH \rightarrow 2NaAlO_{2(aq)} + H_2O_{(l)}$

30.
a)





b) Condensation polymerization

BURETI SUB-COUNTY JOINT EVALUATION TEST
233/2
CHEMISTRY
Marking scheme

1.

a) i)

A	B	C	D	E	F	G	H	I	J
1	2.5	2.6	2.8.8.1	2.8.5	2	2.7	2.4	2.8.6	2.8.8.2

✓½

ii) I. D, ✓½ , more reactive metal / alkali metal.
II. G, ✓½ most reactive non-metal ✓½ / only halogen

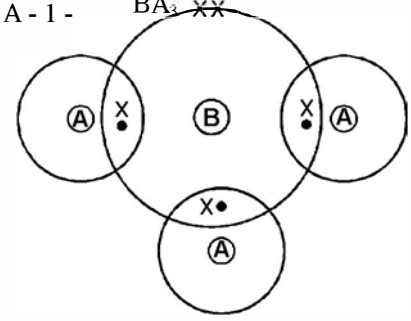
iii) C and I ✓

iv) F ✓½ , Stable/ inert ✓½ / has a stable duplet state.

v) D and G // J and G.

vi) C and I // H and C // C and E

viii) B - 2.5 - X
A - 1 - BA_3 ✗✗



Shared pair of electrons. ✓½
Line pairs ✓½
Drawings of 3A's ✓½
Drawing B ✓½

2.

a) Concentrated sulphuric ✓½ (VI) acid and sodium chloride. ✓½
Equation : $NaCl_{(S)} + H_2SO_{4(l)} \rightarrow NaHSO_{4(aq)} + HCl_{(g)}$

b) Concentrated sulphuric (VI) acid ✓½ and anhydrous calcium chloride ✓½

c) A - Aluminium chloride ✓½
Gas B - Hydrogen ✓½

d) It sublimes when heated ✓

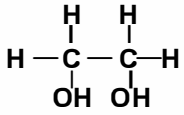
e) $2Al_{(S)} + 6HCl_{(g)} \rightarrow 2AlCl_{3(g)} + 3H_{2(g)}$

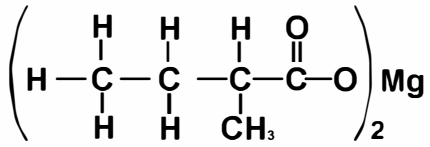
f) Unreacted / excess hydrogen chloride gas dissolves in the water making it acidic. ✓

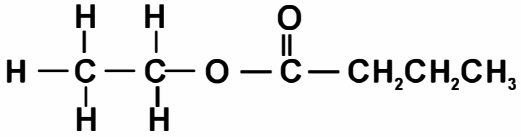
g) Brown copper remains ✓brown - no reaction because copper is below hydrogen in the reactivity series. ✓

h) RFM of $KMnO_4$
K = 1 × 39 = 39
Mn = 1 × 55 = 55
O = 4 × 16 = 64
158 ✓½
From the balanced equation:
2 moles of $KMnO_4$ = 5 moles of Cl_2 ✓½
2 × 158g of $KMnO_4$ = 5 moles of Cl_2
∴ 15.8g $\frac{15.8 \times 5}{2 \times 158} = 0.25 moles\ of\ Cl_2$
1 mole of Cl_2 occupies 22.4dm^3
∴ 0.25 moles
$= \frac{0.25 \times 22.4}{1}$ ✓½
$= 5.6 dm^3 / 5600 cm^3$ ✓½

3. **a)**i)



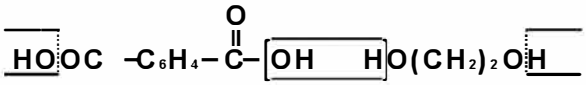
ii) 

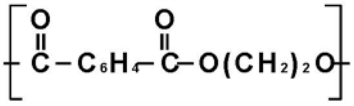
iii) 

b) i) Zymase ✔½
ii) Fractional distillation ✔½
iii) Sodium metal ✔½
iv) Ethene ✔½

c) i) D - Conc H_2SO_4
L - Sodium hydroxide.
ii) The tail is non-polar and dissolves in grease or oil while the head is polar and dissolves in water. ✔
iii) - Highly soluble in water.
- Not affected by hardwater

d) B, ✔forms scum ✔with water containing Mg^{2+} ions, due to format ion of insoluble magnesium salt, $(CH_3(CH_2)_{16}COO)_2Mg$.

e) i) 



ii) Condensation polymerization ✔
iii)
- Long lasting / durable.
- Mass produced cheaply
- Have a range of useful properties.
- Lighter
- Stronger
- Can be moulded to any shape
- Less expensive.
- Less affected by acids, alkalis, water and air. ***any one***

4. a) I. Ammonium chloride ✔½ / Ammonium sulphate.
ii) Ammonium nitrate ✔½

iii) Copper (II) nitrate ✔½

b) i) Nitric (V) acid attacks rubber and cork connections.
ii) Potassium nitrate ✔
iii) Nitric (V) acid is more volatile and is readily displaced from nitrates by the less volatile sulphuric (VI) acid.
iv) Manufacture of fertilizers, explosives, dyes and drugs.
- Purification of metals ***(any two)***

c) $2NH_{3(g)} + 3CuO_{(S)} \rightarrow 3Cu_{(S)} + 3H_2O_{(l)} + N_{2(g)}$

$2 \times 24dm^3\ of\ NH_3 \equiv 3 \times 64g\ of\ Cu$
$\therefore 1.2dm^3\ of\ NH_3 \equiv ?$
$\frac{1.2 \times 3 \times 64}{2 \times 24} = 4.8g\ of\ Cu$

ii)
$2 \times 24dm^3\ of\ NH_3 = 24dm^3\ of\ N_2$
$\therefore 1.2dm^3\ of\ NH_3 \equiv ?$
$\frac{1.2 \times 24}{2 \times 24} = ●.6dm^3 / 6●●cm\ of\ N_2$

5. **a)** Charles law states that, the volume of a given mass of a gas is directly proportional to its absolute temperature at constant pressure.

b) i)

Time (°C)	0	20	40	60	80	100	120
Temp. (k)	273	293	313	333	353	373	393

@½ mark

ii)

iii) Extrapolation ✔½
Value = -271 ± 2 ✔½

iv) Read from the graph
Volume at -225°C = 5cm³ ± 0.1 ✔

c)

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$P_1 = P_2 = Atmospheric\ pressure$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$V_1 = 100cm^3$$

$$T_1 = 25 + 273 = 298K$$

$$T_2 = 40 + 273 = 313K$$

$$V_2 = ?$$

$$V_2 = \frac{V_1 \times T_2}{T_1}$$

$$= \frac{100 \times 313}{298}$$

$$= 105cm^3$$

6. a)

i) Substance A
Structure - Giant ionic ✔
Bonding - Ionic ✔
Substance B
Structure - giant metallic ✔
Bonding - metallic ✔

ii) A - mobile ions ✔½
B - delocalized electrons ✔½

iii) A ✔- Ions are not free and mobile in solid state ✔

iv) Red - brown fumes ✔of bromine vapour would be produced.

v) Aqueous ✔- ***Addiction of water to make aqueous solution make the ions free and mobile.*** ✔

7. a) Water / H_2O

b) Take a sample of liquid X and place in a test tube ✔½ . Heat the liquid in a water bath until it boils. Measure the boiling ✔½ point using a thermometer ✔½ . It boils at 100°C ✔½ at sea level

c) To condense ✔½ the steam formed.

d) White ppt forms. ✔ Calcium hydroxide (lime water) reacts with carbon (IV) oxide to form an <u>insoluble</u> ✔calcium carbonate which is a white ppt.

e) Mass of carbon in CO_2

$$= \frac{12}{44} \times 5.28 = 1.44g$$

Mass of hydrogen in H_2O

$$= \frac{12}{18} \times 2.16 = 0.24g$$

E.F = CH_2

	C	H
mass	1.44	0.24
Moles	$\frac{1.44}{12} = 0.12$	$\frac{0.24}{1} = 0.24$
Simplest mole	$\frac{0.12}{0.12}$	$\frac{0.24}{0.12}$

BURETI SUB-COUNTY JOINT EVALUATION TEST
233/3
CHEMISTRY
Marking scheme

1. Table 1 . . . . . 5 mks - distributed as follows.

a) Complete table . . . . . 1 mark

Conditions

i) Complete table with 3 titrations . . . . . 1 mark
ii) Incomplete table with 2 titrations . . . . . ½ mark
iii) Incomplete table with 1 titrations . . . . . 0 mark

Penalties

i) Wrong arithmetic
ii) Inverted table
iii) Burette readings beyond 50cm³ unless explained e.g. 60cm³ (50 + 10)
iv) Unrealistic titre values i.e. values below 1.0cm³ and hundreds.

Note: **Penalise ½mk ONCE** for each or all of the above.

b) Use of decimals . . . . . 1 mk (Tied to 1st and 2 rows only)

i) Accept either 1st and 2nd decimal places consistently otherwise penalise fully if whole numbers are used.
ii) Accept 2 decimal places if only 2nd dec. place is 0 or 5.
iii) Accept inconsistency of zeros.

c) Accuracy . . . . . (1 mark)

Compare any of the titre values of the candidate with the school value.

Conditions.

i) If any is within ± 0.1 of S.V. . . . .1 mark
ii) If outside ± 0.1 but within ± 0.2 of S.V . . . . .½ mark
iii) If none is within ± 0.2 of S.V. . . . . 0 mark

d) Principles of averaging . . . . 1 mark

- Values averaged must be shown and must be within ± 0.2 of each other.

Conditions.

i) If 3 consistent values averaged . . . . . 1 mark
ii) If 3 titrates done and only 2 possible and averaged . . . .1 mark
iii) If 2 titrations done and are consistent and averaged . . . . 1 mark
iv) If 3 consistent titrations but only 2 averaged . . . . 0 mark
v) 3 inconsistent titrations averaged . . . . 0 mark
vi) 2 inconsistent titrations averaged . . . . 0 mark

Penalties

i) Penalise ½m for arithmetic outside ± 2 units in the second dec. place.
ii) Penalise ½mk if no working is shown but the answer is correct.
iii) Accept rounding off in the 2nd dec. place otherwise penalise ½mk if value is rounded off to the 1st dec. place.

Note:

i) Where values divide exactly to whole number or to 1 dec. place accept for full credit
ii) Section I must be marked before the mark is transferred on the table.

e) Final accuracy . . . . 1 mark (tied to correct averaged titre)

i) If within ± 0.1 of S.V. . . . . 1 mark
ii) If outside ± 0.1 but within ± 0.2 of S.V . . . . ½ mark
iii) If beyond ± 0.2 of S.V . . . . . 0 mark

Note: If wrong values are averaged, pick the correct values, if any (especially the set that gives the candidate maximum credit), average following the principles of averaging and award accordingly.

i) ½mk for wrong or missing units
ii) Rounding off of answer to less than 3 dec. unless figures divide to whole no. 1 dec of a dec.
iii) Accept error of ±2 in the 3rd dec.

Calculations

b) Concentration of R

$$R = \frac{10.5}{84} \times \frac{1000}{250} = 0.5m \text{ or } 0.5mol\ l^{-1}$$

OR

$10.5 \rightarrow 250$

$? \leftarrow 1000$

$$\frac{1000}{250} \times 10.5 = 42gl^{-1}$$

$$Concentration\ of\ R = \frac{gl^{-1}}{RFM} = \frac{42}{84} = 0.5m$$

Conditions / penalties

Note: All the figures above must be used intact otherwise penalise FULLY (0ml<)

c) i) Moles of soln R in 25cm³ $= \frac{25}{1000} \times 0.5 = 0.0125moles$

ii) Mole ratio of Q : R = 1 : 1

∴ Moles of Q in the averaged titre = Ans (c) above

Note:

i) Accept the transfer of answer c(i) to c(ii) intact even if wrong transfer it is wrong answer in (c) otherwise penalise ½ mk for wrong transfer the answer.

d) Molarity of Q $= \frac{1000}{Ans(a)} \times AnsC(i)above = Correct\ ans$

Table II : Procedure II . . . . . 5 mks (Distributed as follows)

a) Complete table . . . . 3 marks

Conditions

10 to 8 readings . . . . . 3 marks

7 to 5 readings . . . . . 2 marks

4 readings . . . . . 1 mark

Less than 4 readings . . 0 mark

Penalty - Penalise ½mk for every reading which is beyond 40°C and ½mk for every reading below 10°C.

b) Decimals . . . . ½ marks

i) Accept whole numbers or decimal to only 1 dec. place consistently used

ii) If 1 dec. place is used it must be (0 or 5)

Penalise FULLY if any of the two conditions are not met.

c) Accuracy . . . . ½ mk (Tied to the first entry)

✓ 1st reading should be within ± 2°C of school value otherwise if outside ± 2 penalise FULLY.

d) Trend . . . . . 1 mk (split into two ½ s)

i) Readings between 0 and 120 seconds must ALL be constant for ½mk otherwise penalise FULLY.

ii) Readings between 180 and 300 seconds must drop continuously or a drop followed by the lowest constant temperature readings.

Graph . . . . . .3 mks (distributed as follows)

a) Scale . . . . . ½ mk

Both axes must cover at least 4½ full squares otherwise penalise FULLY.

b) Labelling of axes . . . . . ½ mark

Both axes must be correctly labelled otherwise if only is correctly labelled or both are incorrectly labelled (interchanged) penalise fully.

c) Plotting . . . .1 mark

i) If at least 7 readings are correctly plotted . . . . .1 mark

ii) If only six readings are correctly plotted . . . . . ½ mark

iii) If less than six readings are correctly plotted . . . 0 marks

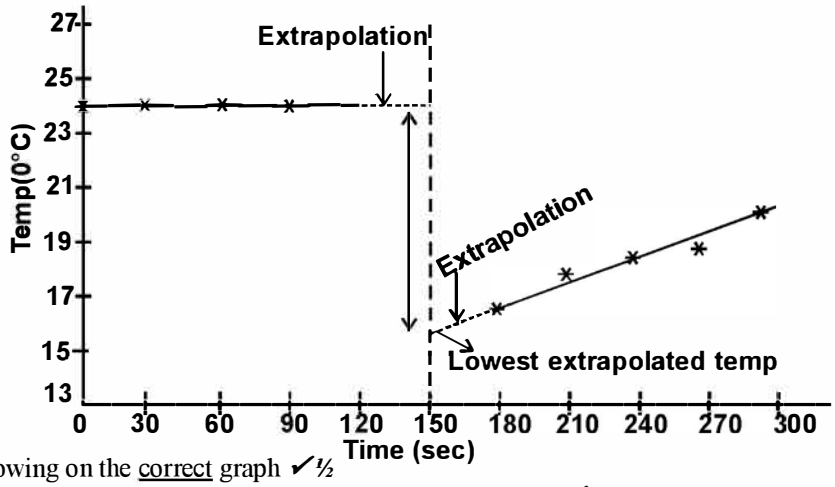
d) Lines : . . . . 1 mark (split into two and s)

i) 1st straight line touching constant points extrapolated to 150 seconds ✓½

ii) 2nd straight line rising and extrapolated to touch 150 seconds. ✓½

Note: penalise ½ mk for each straight line not extrapolated to touch 150 seconds,

GRAPH.



b) Showing on the correct graph ✔½
Change in temperature = lowest extrapolated temp. ✔½ - The constant temp.
= Correct answer ✔½
Conditions and penalties.

i) Ignore the sign on the temperature change, but the expression (Lowest extrapolated temp - constant) must be intact. (As DT = T_{final} - $I_{Initial}$) otherwise penalise fully if that condition is not met.

ii) Penalise ½ mark if wrong or missing unit (°C) 1½ marks

CALCULATIONS

c) i) Mass of solution = $1gcm^{-3} \times 35cm^3 = 35g$ ✔½

(reject answer if wrong working or working not shown but answer is correct)

$\Delta H = 35g \times 4.2Jg^{-1}k^{-1} \times$ ans (b) = correct answer ✔*1* ***2 marks***

Conditions / penalties

i) Accept ans(b) even if it was wrong but used intact.
ii) Ignore the sign but if given must be +ve otherwise reject the negative sign.
iii) Penalise ½mk if no. or wrong unit used.

C (ii) Molar heat changed $\dfrac{\frac{84}{1.5g} \times ans(c)(i)above}{1000} = correct\ ans$

OR
Mole of P used $= \dfrac{1.5}{84} = 0.0179 moles$

$0.0179 moles\ of\ p = \dfrac{Ans(c)(i)above}{1000}$

$1\ mole\ p = \dfrac{1}{0.0179} \times \dfrac{(c)(i)}{1000} = Correct ans$

Conditions / Penalty

i) Penalise ½ mark if -ve sign is shown otherwise ignore if no sign is given
ii) Penalise ½ mark for missing or wrong units ($kJmol^{-1}$)

2.

		OBSERVATION	INFERENCES
a)	i)	Colourless liquid formed on the cooler ✓½ parts / colourless vapour condenses on the cooler parts of test tube Reject colourless solution/liquid condenses	Hydrated / water of crystallisation (Tied to colourless liquid ✓½ / vapour condenses)
	ii)	Gas produced turns litmus paper blue ✓½ and blue litmus remains blue. (Award ½mk if both correct changes in litmus are mentioned) Reject blue litmus remains the same / unchanged	Basic gas /NH_4^+ ✓½ (tied to red litmus turning blue only
	iii)	Brown/black/grey residue. Conditions: Award ½mk each for any two correct to a maximum of two (max 1 mark)	
b		Pale green solution formed✓½	Fe^{2+}, ✓½ Cu^{2+}✓½ Penalise ½ mk for any wrong ion to a max of 1 mk

c		Green precipitate✓½	Fe^{2+}, ✓½ Cu^{2+}✓½ Penalise ½ mk for any wrong ion to a max of 1 mk
d		Pale green precipitate insoluble in excess✓½	Fe^{2+}, ✓1 Penalise 1 mk for any contradictory ion
e		White solid /ppt - as residue	Cl^-, SO^{2-}_4, SO^{2-}_3, CO^{2-}_3 (tied to white ppt) Conditions: All 4 correct - 1 mark only 3 correct - ½ mark less than 3 correct - 0 mark
		Pale green solution as filtrate	Fe^{2+} ✓½ Penalise ½mk for any contradictory ion
f		White ppt ✓½ which <u>does not dissolve on adding HCl</u> ✓½	SO^{2-}_4 ✓½ Penalise fully for any contradictory ion

3.

	OBSERVATION	INFERENCES
a)	Acidified $KMnO_4$ changes from purple to colourless / purple acidified $KMnO_4$ decolourised ✓1 <u>Reject</u> i) Acidified $KMnO_4$ changes to colourless. ii) Acidified $KMnO_4$ decolourlised	$\backslash C=C/$ / $-C\equiv C-$ ✓½ ROH present ✓½ <u>Conditions</u> ROH marked independently for ½ mark Accept either ✓½ $\backslash C=C/$ / $-C\equiv C-$
b)	Orange acidified $K_2Cr_2O_7$ does not turn green <u>Reject</u> i) Acidified $K_2Cr_2O_7$ does not turn green ii) Acidified $K_2Cr_2O_7$ does not changed	ROH absent ✓½ $\backslash C=C/$ / $-C\equiv C-$ Present <u>Condition</u> i) Accept either as present ii) ROH as absent is marked independently $\backslash C=C/$ / $-C\equiv C-$
c)	Effervescence / fizzing sound / bubbles ✓1 <u>Reject:</u> Hissing sound	RCOOH✓1 *Penalise FULLY for any contradictory ion*