HKDSE Chemistry Practice Papers Briefing Session

(14 & 18 February 2012)

Mr PAU Chiu Wah
HKEAA

Programme Rundown

2:00 – 2:10/ 9:30 – 9:40	Registration
2:10 – 2:30 / 9:40 – 10:00	Question paper requirements of the DSE Chemistry Examination
2:30 – 2:45 / 10:00 – 10:15	Students' performance on multiple-choice questions (Paper 1A)
2:45 – 3:30 / 10:15 – 11:00	Marking scheme interpretation (Paper 2) and students' performance
3:30 – 3:45 / 11:00 – 11:15	Break
3:45 – 4:30 / 11:15 – 12:00	Marking scheme interpretation (Paper 1B) and students' performance
4:30 – 5:00 / 12	Q&A

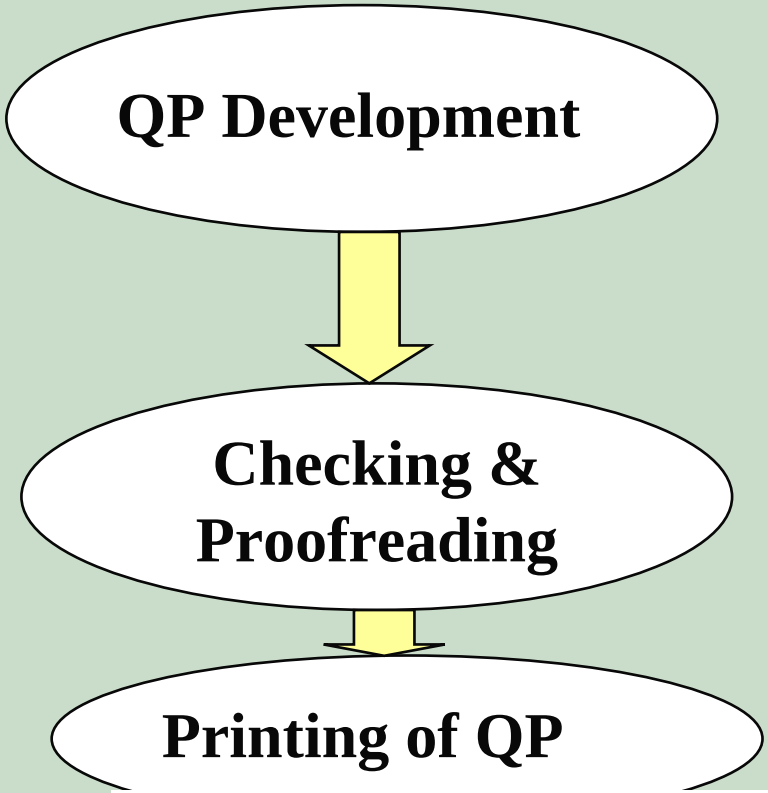
Acknowledgements

- Members of the Moderation Committee for the Practice Papers
- Schools participated in the piloting (7 schools and more than 300 students involved)
- CDI-HKEAA Committee on NSS Chemistry Education
- All those who has contributed to the successful implementation of HKDSE Chemistry and Combined Science (Chemistry)

What can practice papers illustra[illegible]?

- Curriculum emphases
- Question types
- Level of difficulty
- Skills to be tested
- Relationship between Chemistry and Combined Science (Chemistry part)

Development of Examination Papers
(Pre-exam Work)



Moderation Committee

- Chief Examiner(s)
- Moderators
- Setter(s)
- MC Contributor(s)

- Assessors
- Proofreaders

GLD Printing Unit

Marking and Grading
(Post-exam Work)

Marking of scripts

- Examiners' Meeting
- Markers' Meeting
- Checkmarking of scripts

Standards-based Grading

Appeal of examination results

- Rechecking and Remarking

The Marking Scheme

- Preliminary and ‘final’ marking schemes
- Suggested answers cannot be exhaustive (professional judgment)
- Symbols used in the marking scheme

  / **Alternative answers**

  • **Step-mark**

  † **Correct spelling**

- Number of significant figures expected
- Marking chemical equations
-

Structure of DSE Chemistry Examination

Paper	Section	Weighting	Other information
1	A	60%	Part I: 24 MCQs Part II: 12 MCQs
1	B		Part I: 56 marks Part II: 28 marks
2		20%	One question on each of the Elective
SBA		20%	

Structure of DSE Combined Scien (Chem) Examination

Paper	Weighting	Others
Written exam	40%	Section A: 24 MCQs Section B: 56 marks
SBA	10%	

The Chemistry Practice Papers

Paper 1 Section A:
Multiple-choice Questions

- Question type

  Single response type

  Multiple-completion type

  Assertion-reason type
- Chemistry and Combined Science (Chem)

  (Q Nos: 15, 16 and 17)

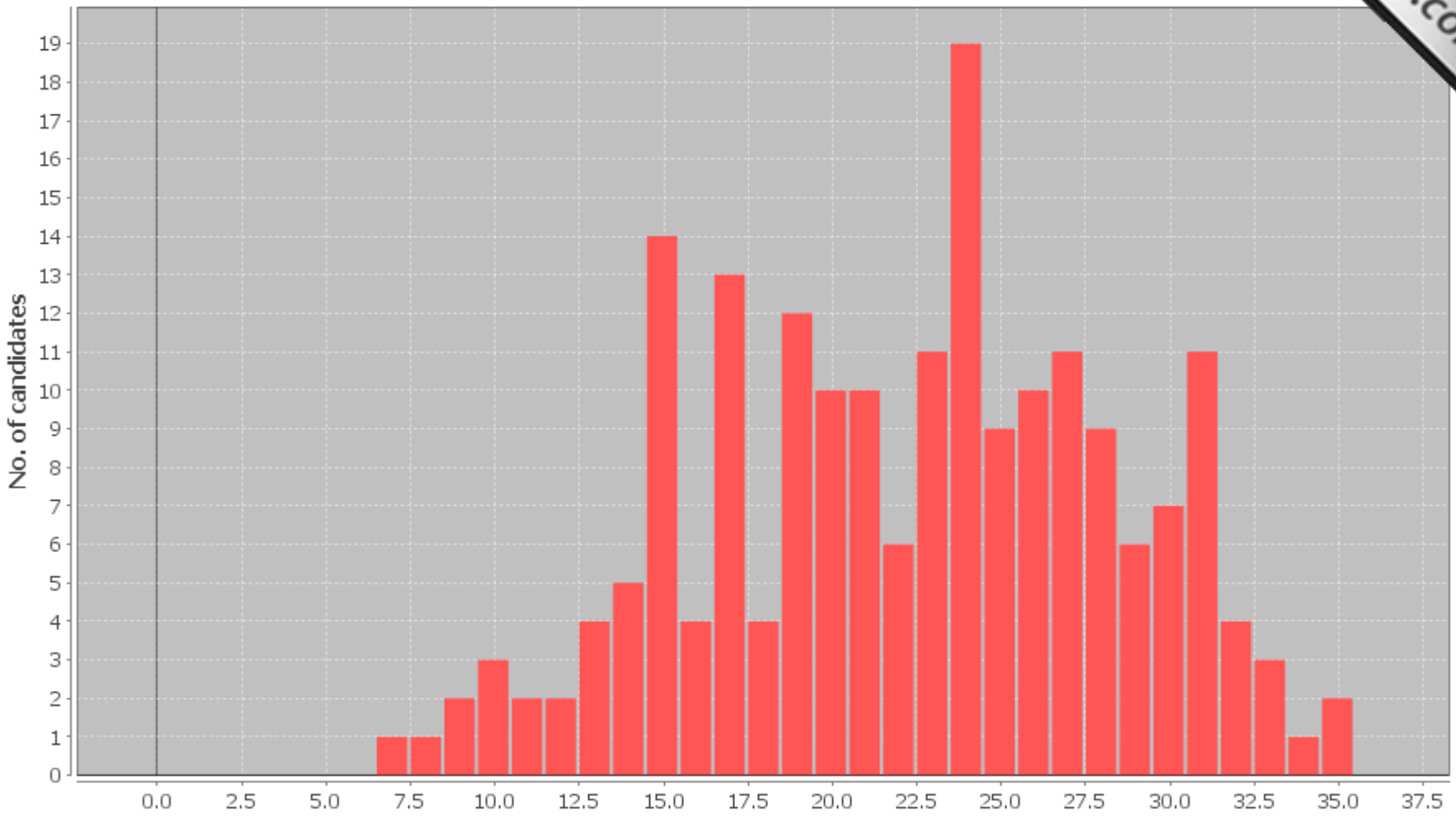
Students' Performance in Pilot
(Paper 1 Section A)

- Number of schools = 5
- No. of participating students = 194
- Mean = 22.2 (61.89%)
- S.D. = 6.18 (17.16%)

Question best attempted:Q.1 (95% correct)

Question worst attempted: Q.7 (31% correct)

Mark Distribution for Chemistry 1A



Q.7 A question on Nature of Scien

A scientist extracted a sample of 'nitrogen' from air by removing the oxygen and carbon dioxide. The scientist then compared the mass of a known volume of the 'nitrogen' sample (m_1) with that of the same volume of pure nitrogen (m_2) under the same set of conditions. The experiment was repeated a number of times. It was found that m_1 was consistently greater than m_2 .

Which of the following gases is likely to be present in the 'nitrogen' obtained to account for the result that m_1 is greater than m_2 ?

A. neon (17%)
B. argon (31%)
C. methane(13%)
D. water vapour (44%)

Qs that are different in the Chemistry and Combined Science papers (Qs. 15, 16 & 17)

Chemistry Q.17

Ammonia is very soluble in water. Which of the following statements best accounts for this phenomenon ?

A. Both ammonia molecule and water molecule are polar.

B. Ammonia molecule and water molecule are of comparable sizes.

C. Ammonia undergoes ionisation in water.

D.* Ammonia forms hydrogen bond with water.

Combined Science (Q.16)

Which of the following gases is least soluble in water ?

A. $H_2(g)$

B. $O_2(g)$

C. $CO_2(g)$

D. $NH_3(g)$

A question on structural isomerism (2006)

First statement	*Second statement*
The structural formula $H_2C=CF_2$ can represent two different compounds.	The rotation of the CF_2 group relative to the CH_2 group in $H_2C=CF_2$ is restricted by the C=C bond.

Students' response pattern:

A. 16 % **B. 11 %**

Conventional Questions

Skills to be tested in the Chemistry p rs

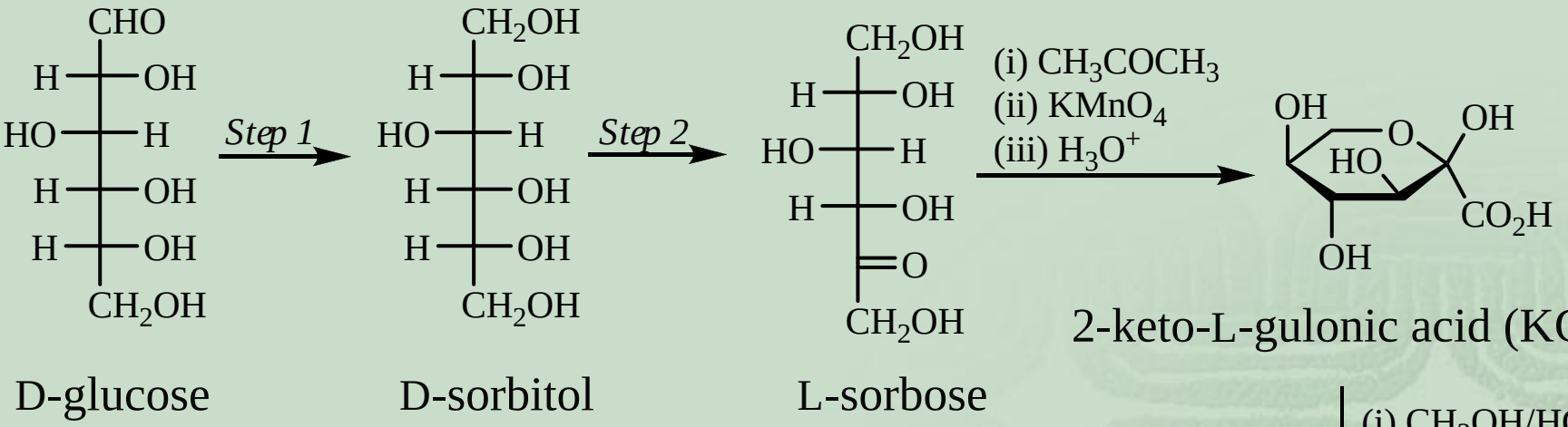
- Understanding of chemical concepts: microscopic and macroscopic properties
- Understanding of the patterns in chemistry
- Appreciation of the relevancy of chemistry to daily life
- Chemistry and sustainable development
- Scientific investigation skills

Question Verbs Used in DSE Chemistry Practice Papers

State / Write	寫出	Suggest	提出 / 建議
Name	寫出..名稱	Explain	解釋
Draw	繪出	Account for	解釋/說明
Sketch	略繪	Calculate	計算
Outline	概述	Determine	測定
Describe	描述	Deduce	推定/推斷

DSE Chemistry Paper 2

Q.1(a) Synthesis of vitamin C



D-glucose D-sorbitol L-sorbose

The Curriculum: Understand the recent progr[illegible] industrial processes such as the production of vit[illegible] C to solve problems of inadequate or shrinking supp[illegible] of natural products

Q.1(a): testing points

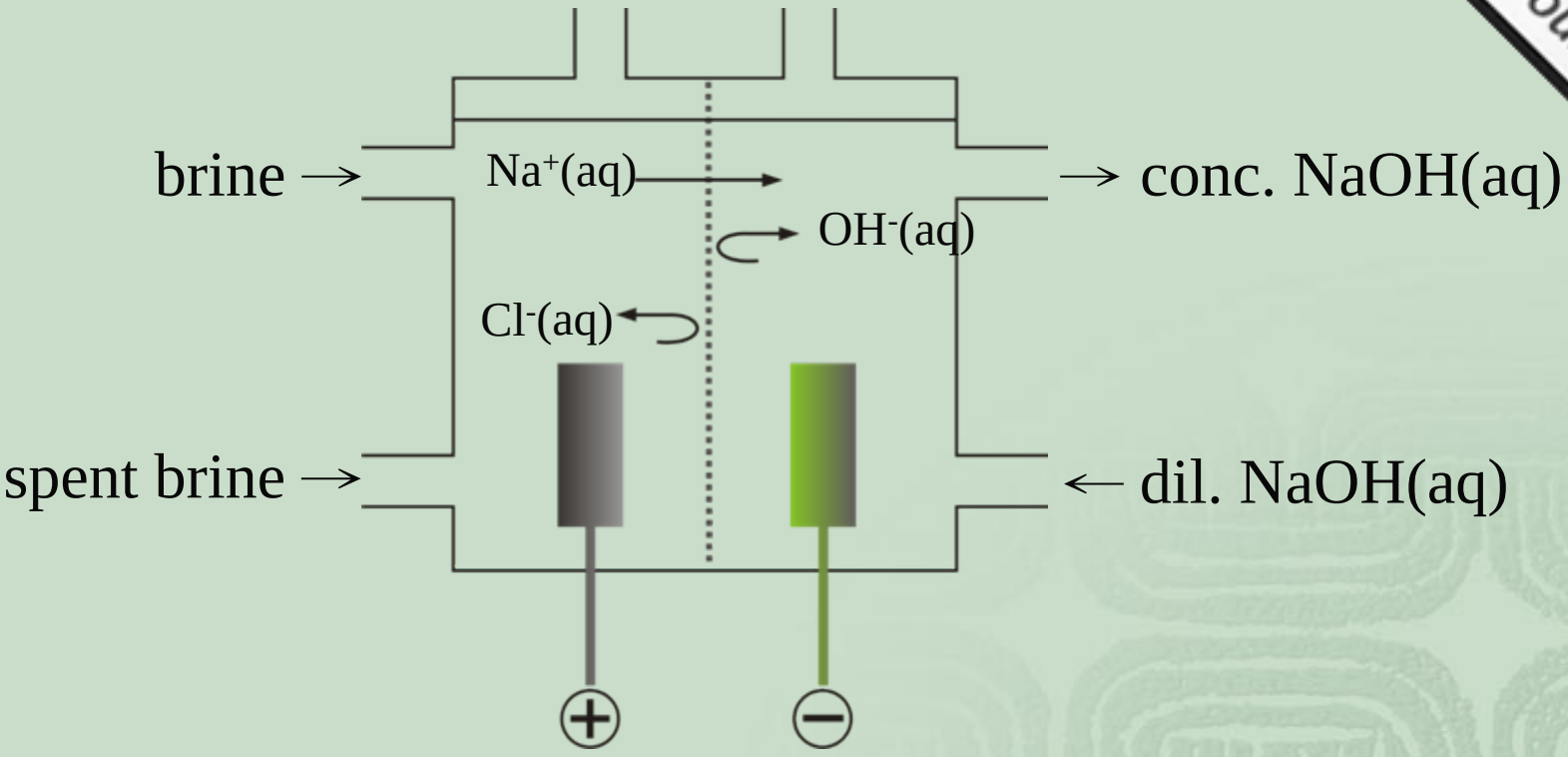
(i) Importance of Reichstein Process

(ii) Type of reaction

(iii) Enzymatic reactions

(iv) Green Chemistry

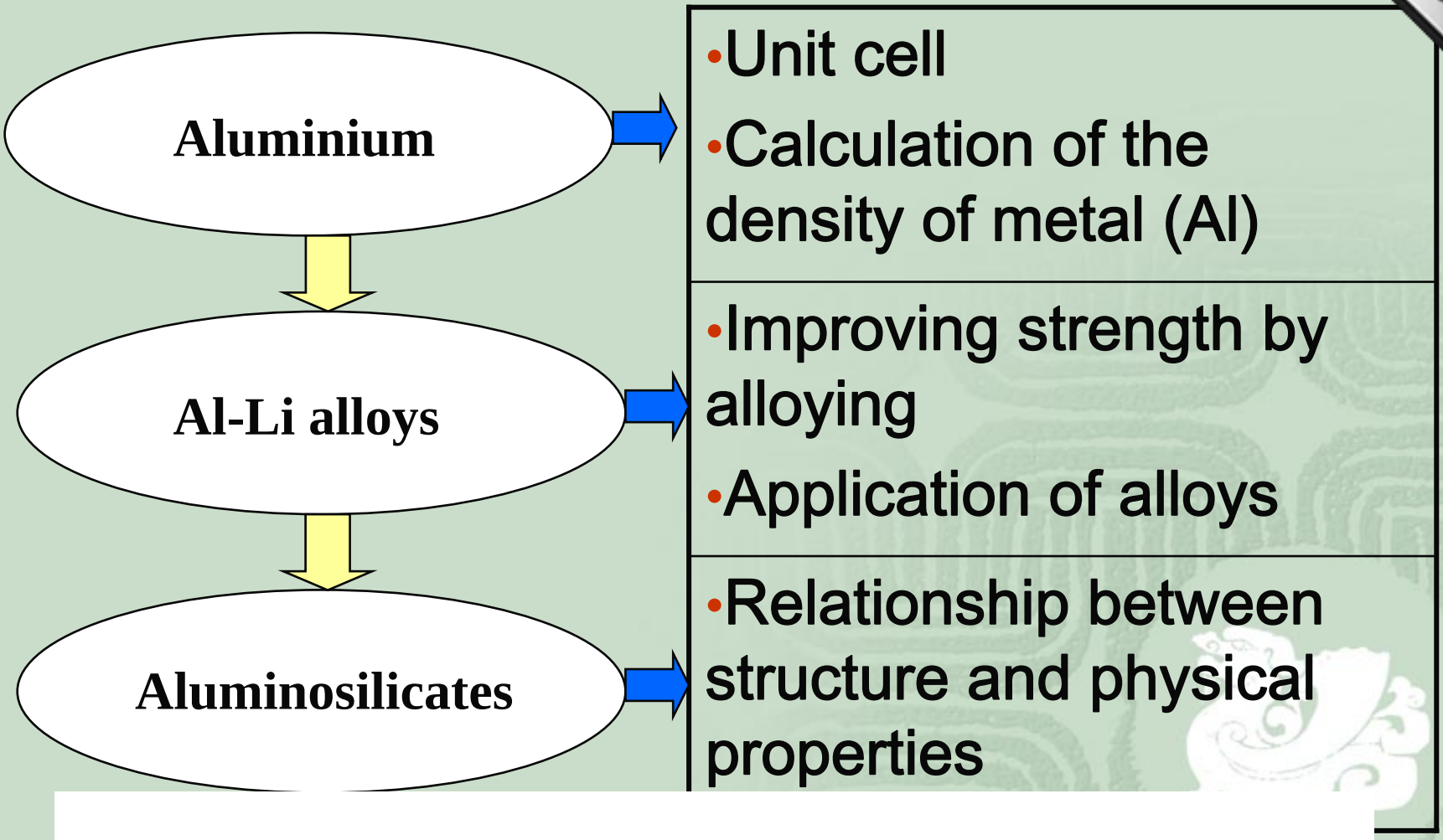
Q.1(c) Membrane cell in chloroalkali indu



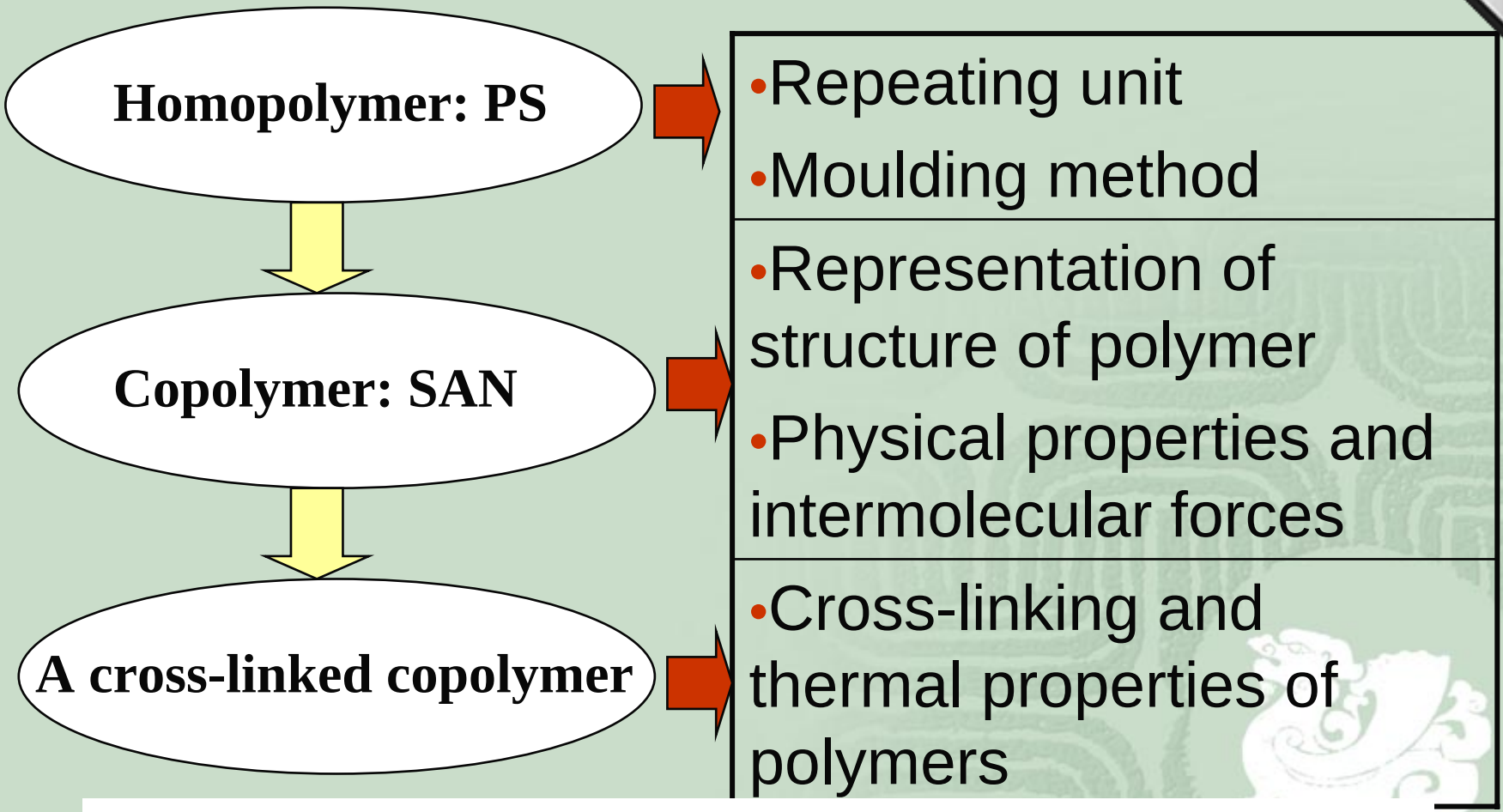
Testing point: (iii) Chemistry in action

'Electrolysis of brine can be used in large scale manufacture of hydrogen to help reduce air pollution pro

Q.2(a) Metals and Alloys



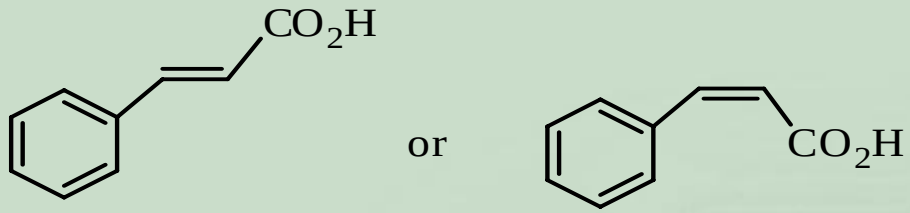
Q.2(b) Synthetic polymers

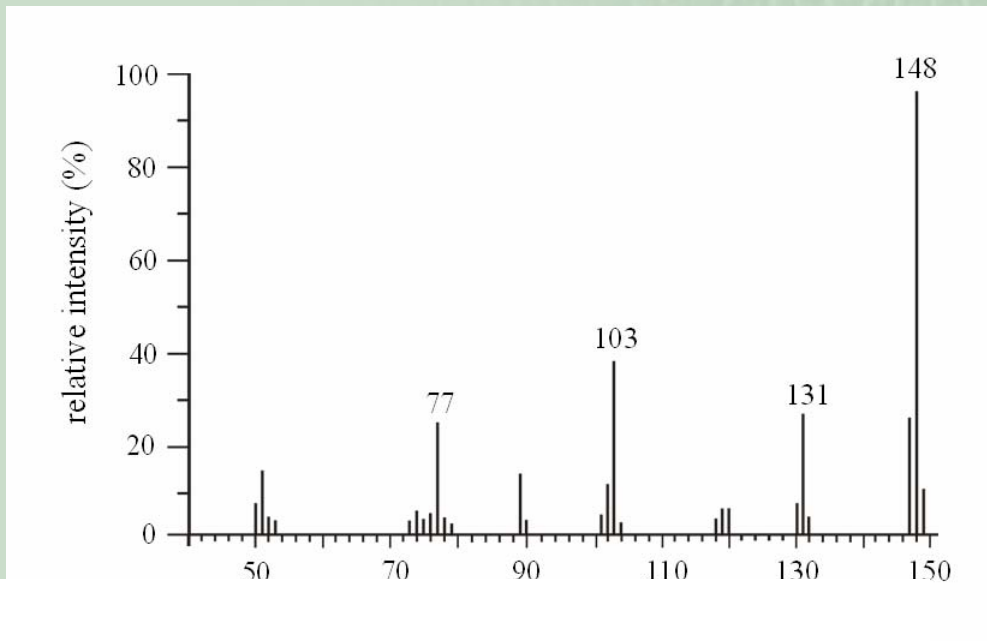


Q.3(a) Extraction of Organic Compounds and Instrumental Analysis

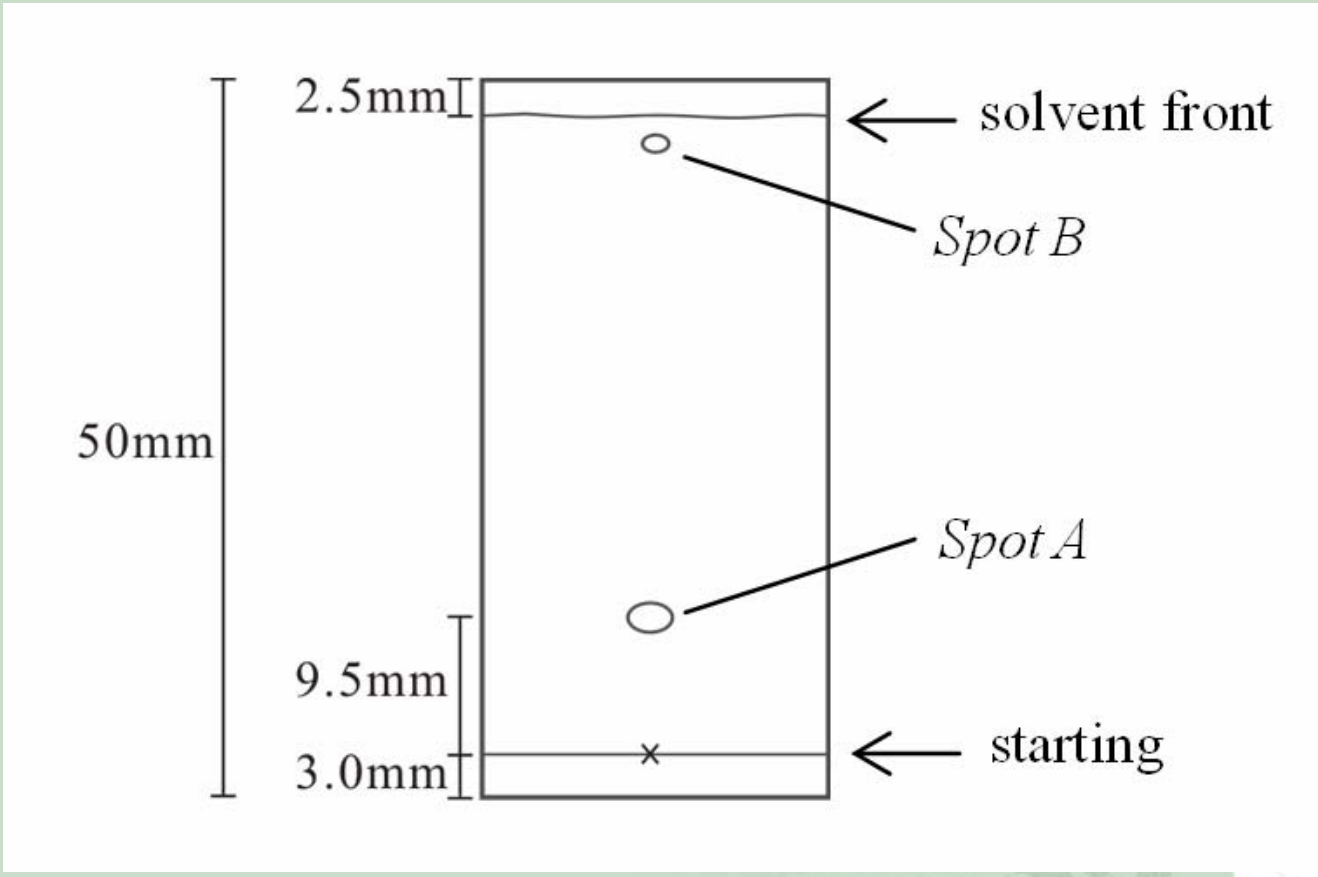
Testing points:

- **Separation method: principle and experimental technique**
- **Interpretation of mass spectrum**
- **Chromatography**





Q.3(a) Small and large scale separati
(TLC and Column Chromatography)



Q.3(b) Gravimetric Analysis

- Gravimetric analysis: Principle and experimental techniques
- Calculation on chemical stoichiometry

Results of the Piloting of Paper 2

Question	No. of students	Mean (out of 20)	S.D.
Q.1	176	8.0	3.0
Q.2	120	5.5	3.3
Q.3	194	6.6	3.7

Students' Performance in Paper 2

Break

DSE Chemistry Paper 1
Section B

Student Performance in the pilo g (Paper 1 Section B)

- No. of schools = 4
- No. of participating students = 148
- Mean = 32.6 (39%)
- Standard deviation = 14.3 (17%)

Student Performance in Section B Part I

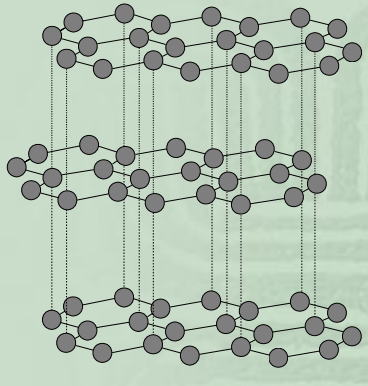
Q. No.	Max. mark	Mean	SD
1	8	3.92	1.90
2	5	1.81	1.12
3	6	3.21	1.58
4	7	2.84	2.32
5	6	2.17	1.32
6	9	3.22	1.90
7	9	4.97	1.97
8	6	1.34	1.17

Student Performance in Section B Part II

Q.No.	Max. mark	Mean	SD
9	8	2.31	2.3
10	5	1.39	1.25
11	3	1.72	1.21
12	4	1.42	1.38
13	8	2.3	1.68

What is Chemistry?

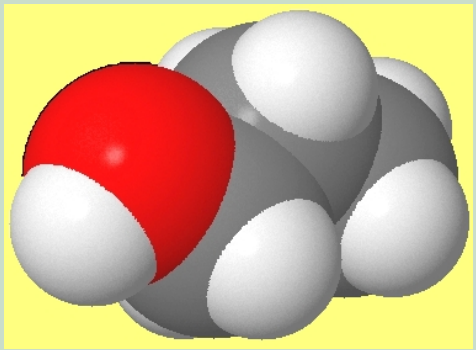
OXIDISING 氧化性

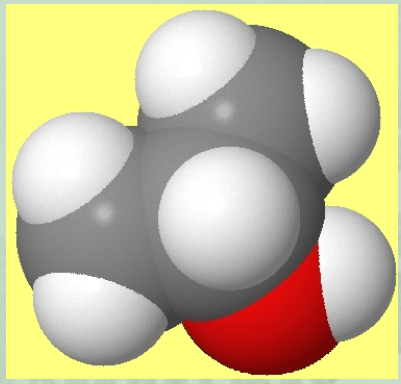


Some Questions to Illustrate Curriculum Emphases and Skills to be tested

Q.6 Interpretation of obs ed phenomenon from molecular level

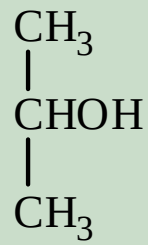
Density of propan-1-ol and > Density of propan-2-ol

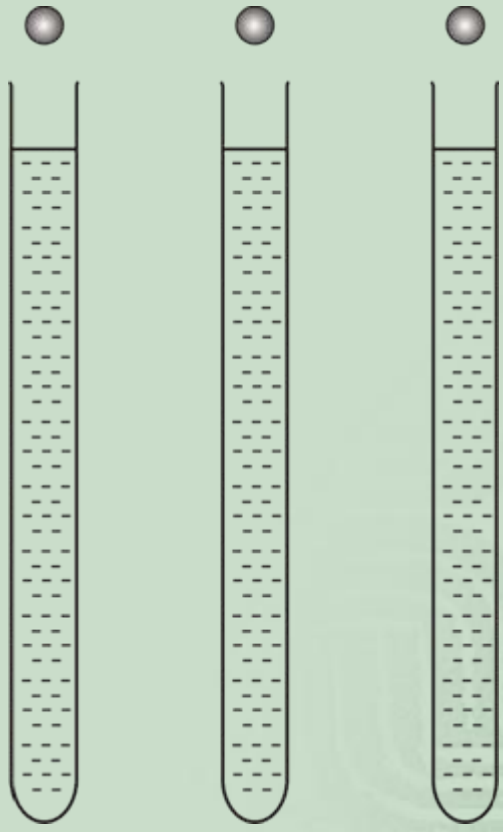




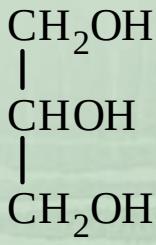
Q.6 Which of the balls falls most slowly

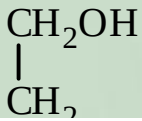
Propan-2-ol





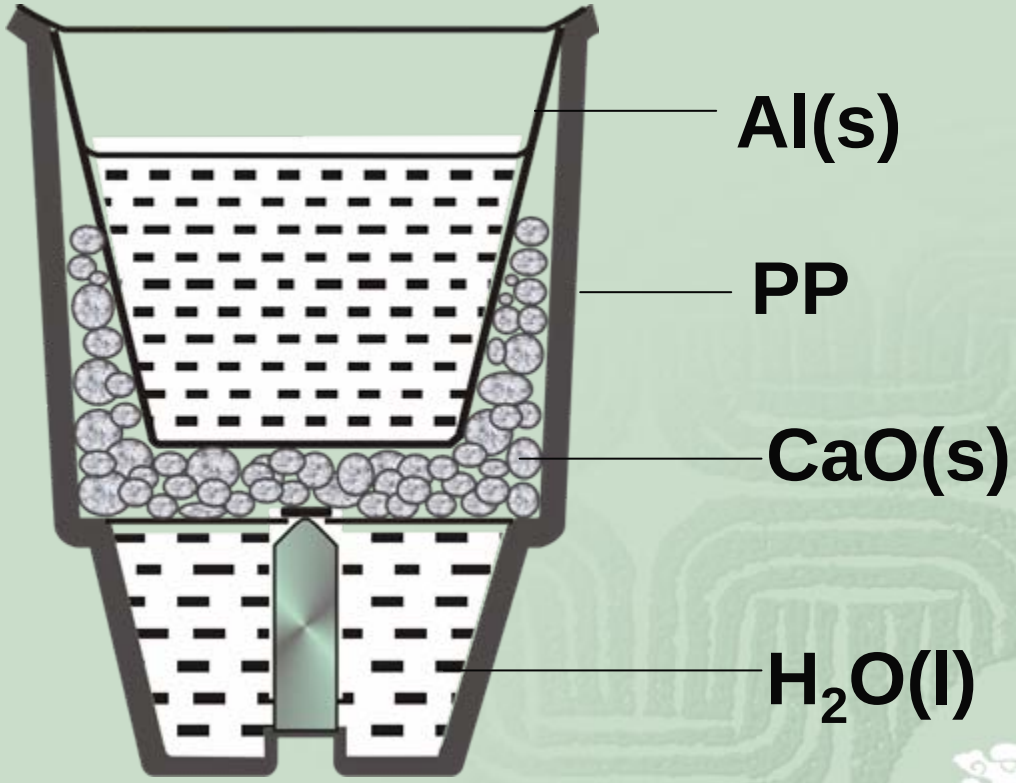
Propane-1,2,3-triol





Chemistry in Daily Life (1)

Q.7 A can of self-heating coffee bevera



Chemistry in Daily Life (2)
Q.8 DMFC powered laptop computer

Testing points:

- **Electrochemical reactions**
- **Safety with chemicals**
- **Prospect of chemistry**

(c) Would you expect DMFC to be widely in powering laptop computers?

The Chemistry and Combined Science Papers

Q.3(b)(ii) VSEPR theory

Q.4 Colour change of indicator

Q.6 (d) Account for the observed phenomenon based on the given physical properties

Paper 1 Section B Part II

Q.9 Patterns in Chemistry

PERIODIC TABLE 周期表

GROUP 族

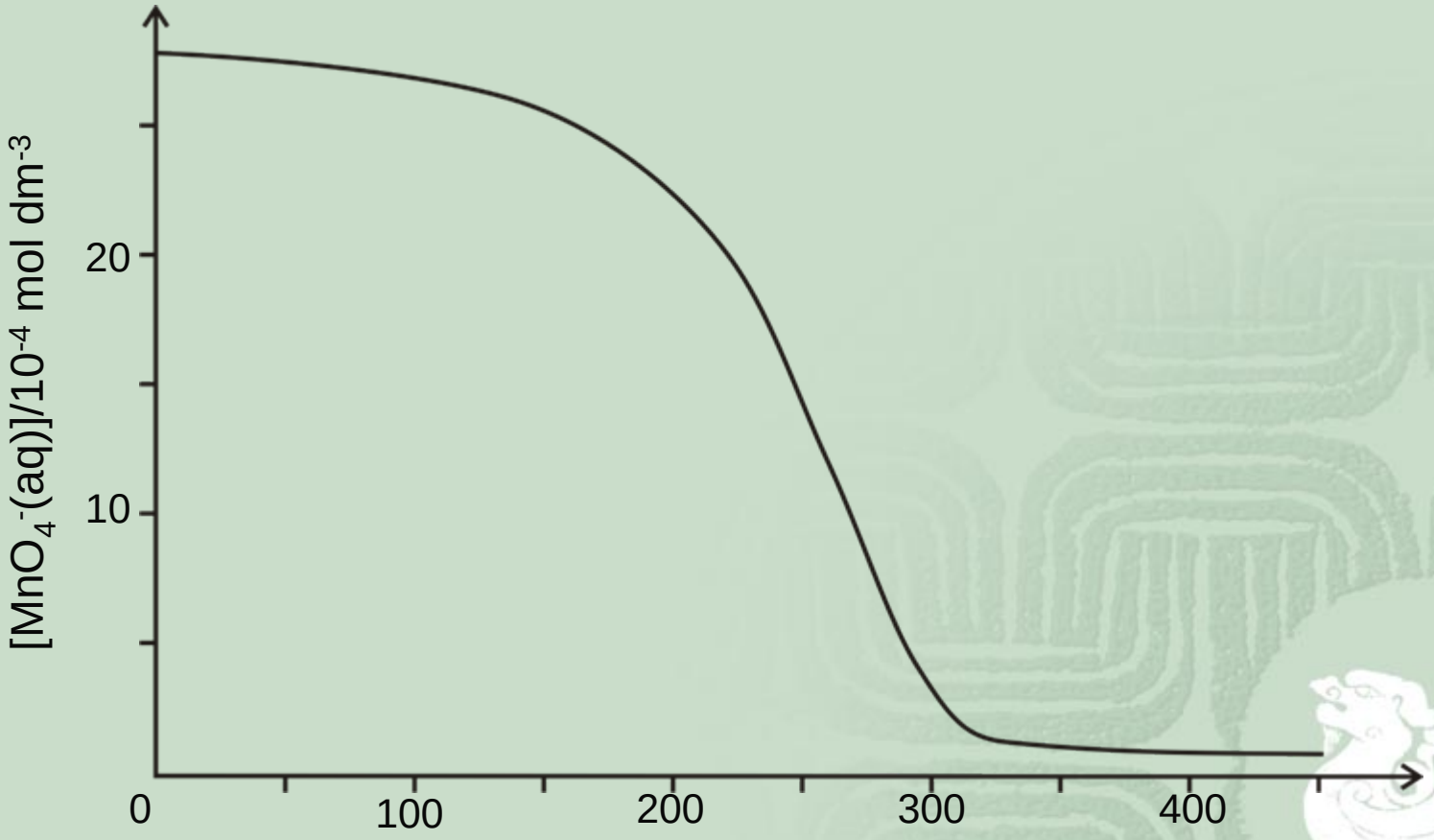
atomic number 原子序

relative atomic mass 相對原子質量

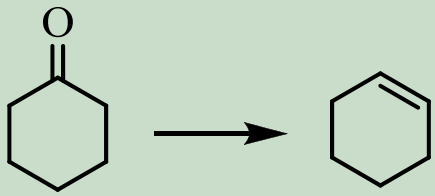
I	II										III	IV	V	VI	VII	2 He 4.0
3 Li 6.9	4 Be 9.0										5 B 10.8	6 C 12.0	7 N 14.0	8 O 16.0	9 F 19.0	10 Ne 20.2
11 Na 23.0	12 Mg 24.3										13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.5	18 Ar 40.0
19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8
37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 * La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 ** Ac (227)	104 Rf (261)	105 Db (262)													

*	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
**	90 Th 232.0	91 Pa (231)	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

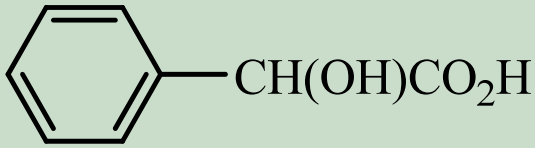
Q.10 Interpretation of experimental results and controlled experiment



Q.11 Organic synthesis



Q.12 Optical isomerism and polymers



Q.13 Chemical equilibrium: shifting of equilibrium position

$$Cu^{2+}(aq) + 4NH_3(aq) \rightleftharpoons Cu(NH_3)_4{}^{2+}(aq)$$

Student Performance in Paper 1 Section B

Standards Setting in 2012

- Level descriptors
- Panel judges
- Making reference to standards of AL and CE exams
- Statistical data - Group Ability Index (GAI) to reflect overall performance (ability) in the core subjects for all candidates taking a subject (group) to be used as reference by the panel judges to determine cut scores for elective subjects
- HKEAA internal meeting

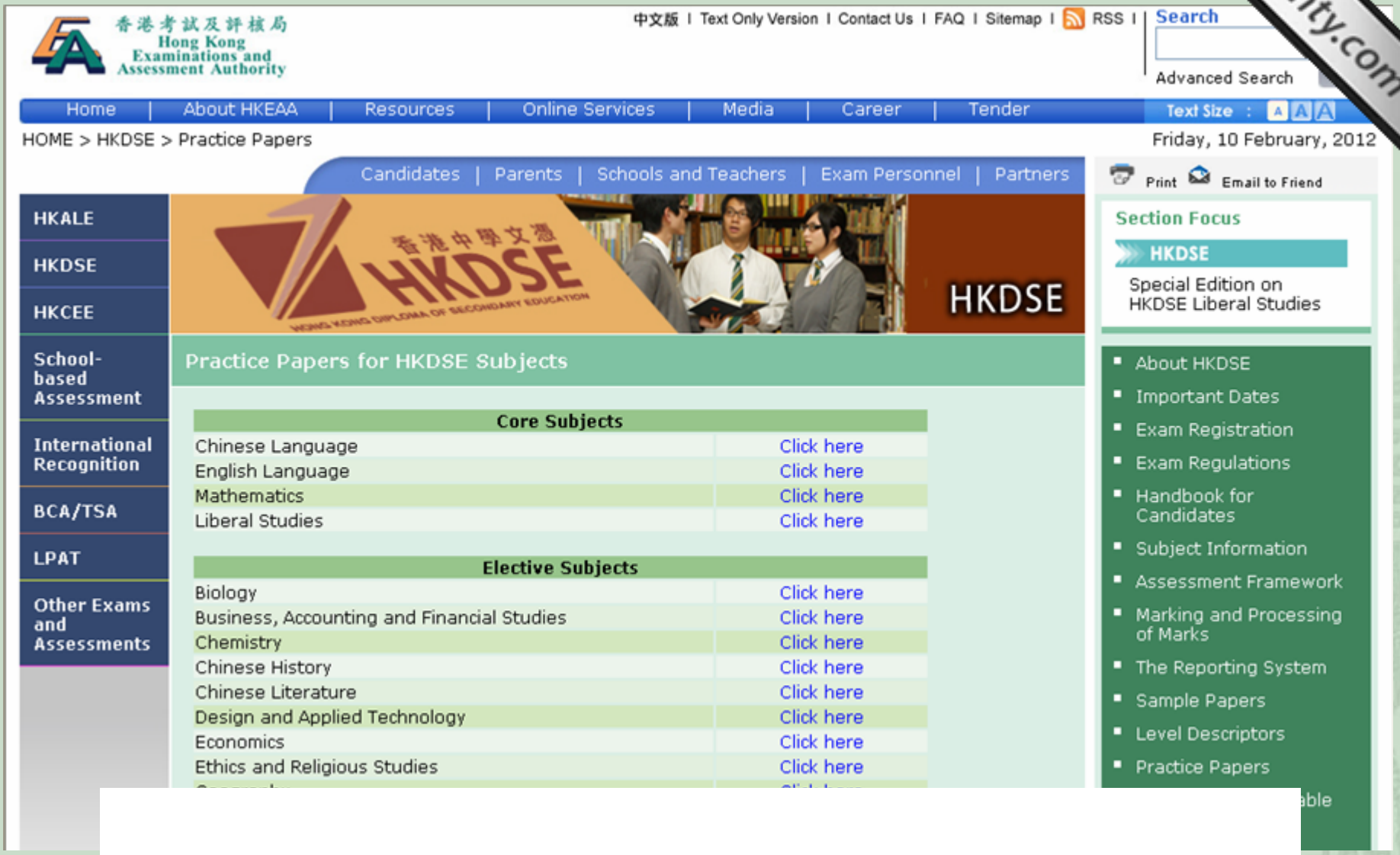
Cut scores for Combined Scien

- Cut scores of each half-elective to be determined with reference to the cut scores of the corresponding full-elective subjects using a statistical method that serves to equate the standard between the two
- Cut scores of the two half-elective subjects to be added up to form the cut score of Combined Science

Levels 5* and 5**

- Level 5** will be awarded to the highest-achieving 10% (approximately) of Level 5 candidates
- Level 5* will be awarded to the next highest-achieving 30% (approximately) of Level 5 candidates

http://www.hkeaa.edu.hk/en/hkdse/Practice_Pa



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HKDSE

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Section Focus

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Category A - HKDSE Elective Subjects: ...pers

- Practice Papers
- Marking Schemes (Provisional)
- Report on Student Performance in the Practice Papers
- Samples of Student Performance in the Practice Papers

Available in March

Q & A

THANK YOU

Chemistry Practice Papers

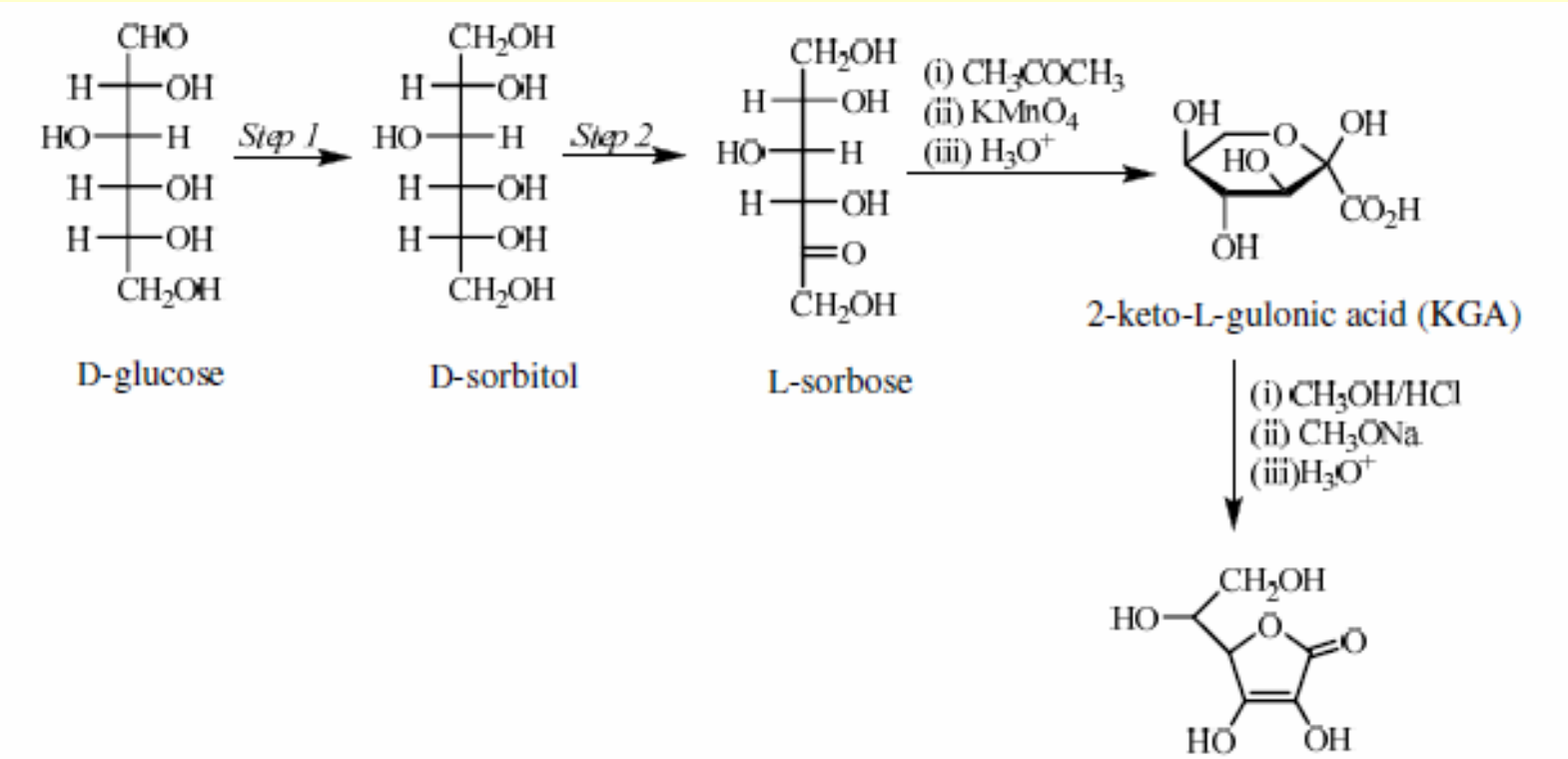
Students' Performance in Paper 2

Industrial Chemistry (Q.1) Theme

- (a) Vitamin C synthesis
- (b) Kinetics:
- (c) Membrane cell: Manufacture of chlorine, hydrogen and sodium hydroxide

Industrial Chemistry (Q.1) Theme

- (a) Vitamin C synthesis

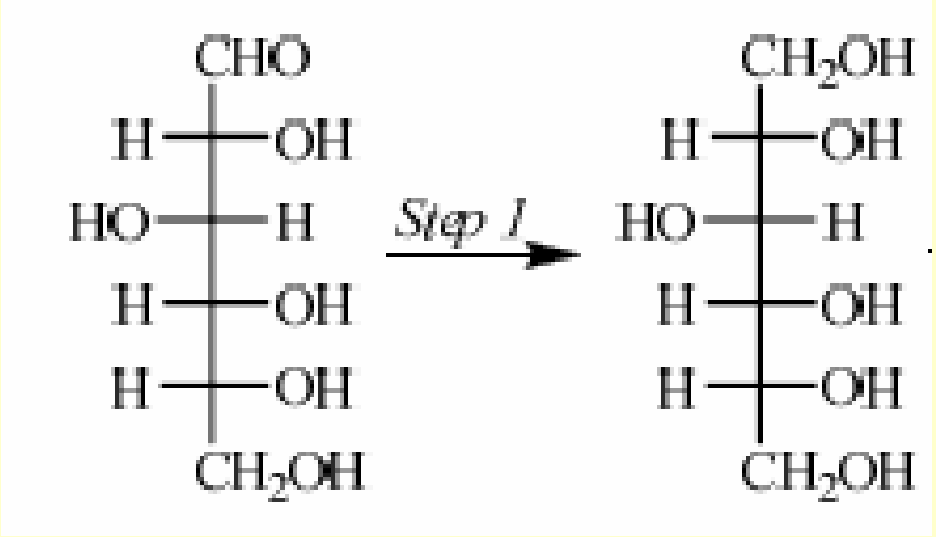


Comments on students' performa

- **(i) ONE importance of the process**
- Some students failed to pinpoint the importance of this process. They simply copied from the question that the process is for the synthesis of vitamin C.
- Expected answer:
  - Meet the demand
  - Producing something more useful to mankind
  - …

Comments on students' performa

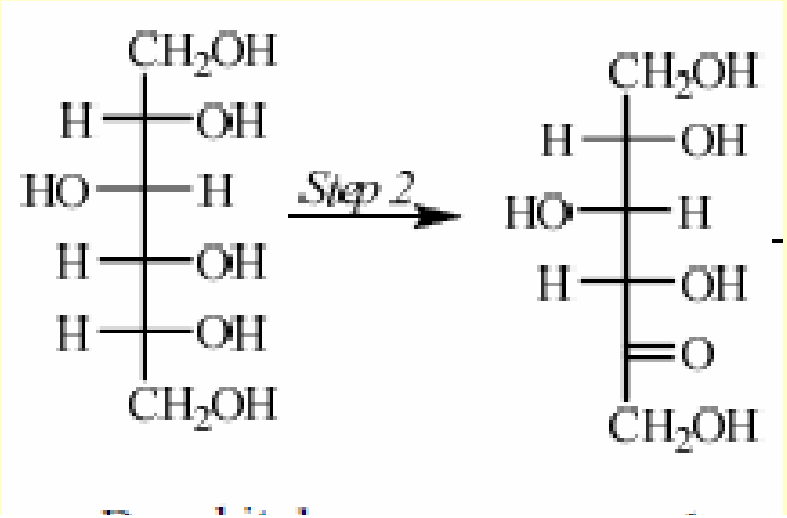
- (ii) Type of reaction involved
- Well answered.



D-glucose D-sorbitol

Comments on students' performa

- (i) Step 2
  - (I) NOT carried out with commonly used oxidising agents?
  - (II) Carried out at pH 4 to 6



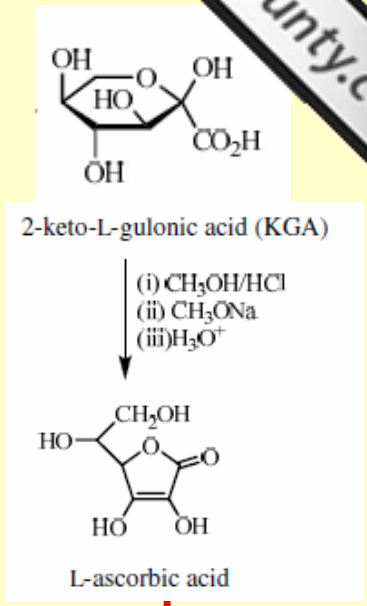
Comments on students' performa

- (iii) Students should note that enzymes
- are selective
- denature at low pH

Comments on students' performa

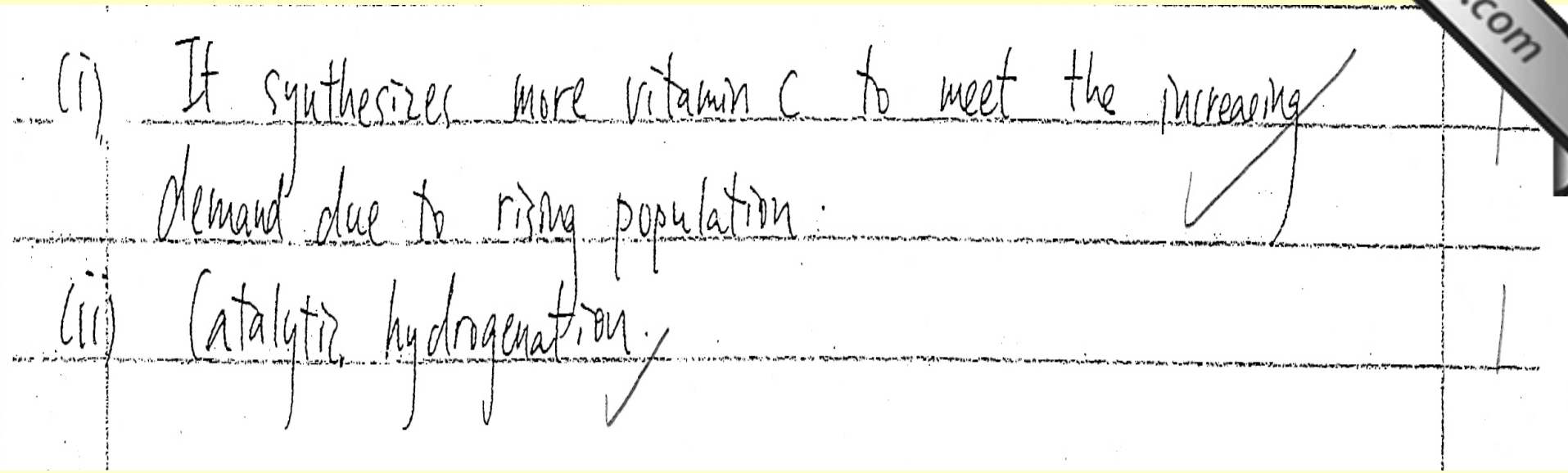
- (iv) Why greener?

KGA —*gluconolactonase*→ L-ascorbic acid



- Expected answers must be context-based
  - Toxicity of reagents used
  - Enzyme as catalyst

Sample: high performance


(i) It synthesizes more vitamin C to meet the increasing demand due to rising population. ✓

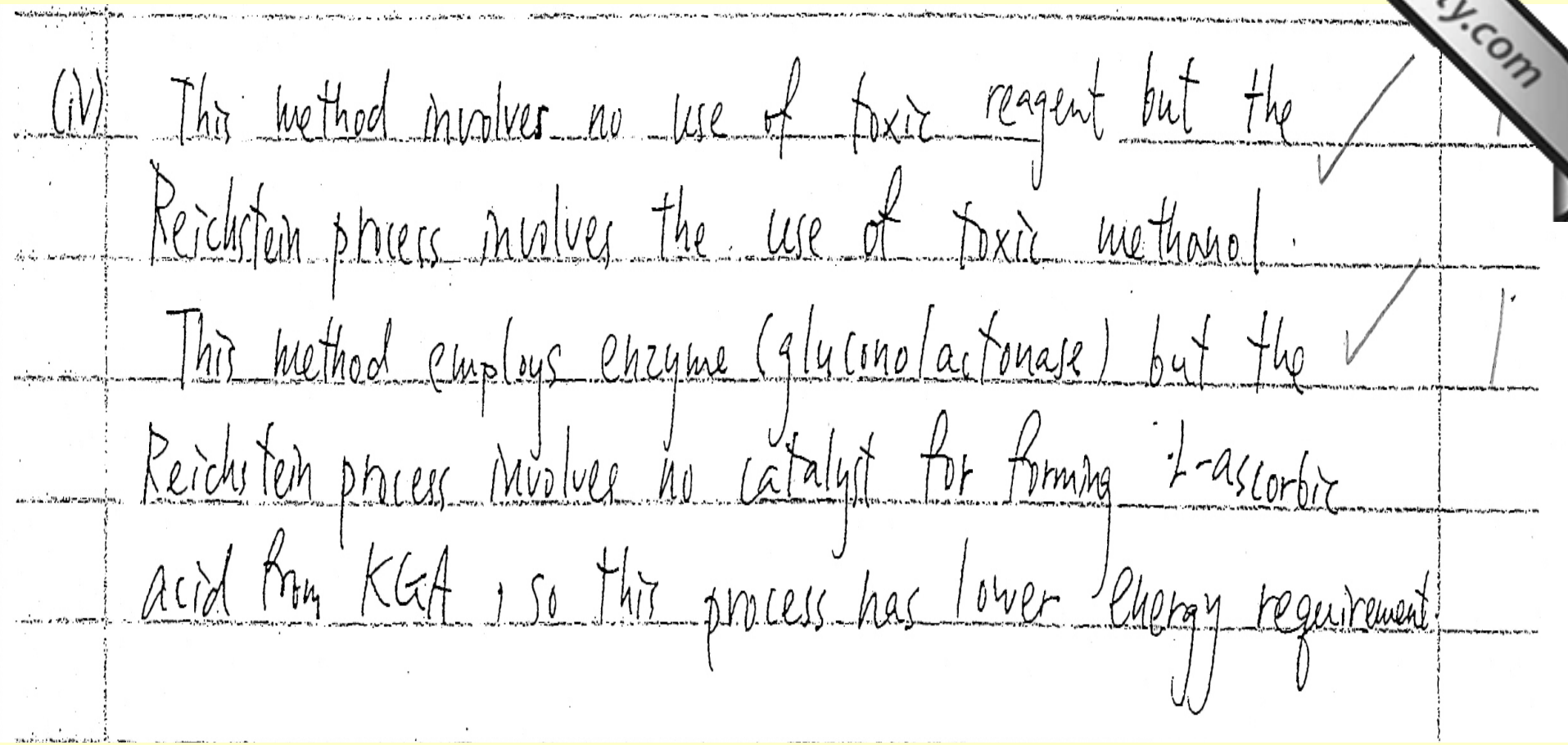
(ii) Catalytic hydrogenation. ✓

Sample: high performance

(iii) (I) commonly oxidising agents can oxidize any hydroxyl group (-OH) in D-sorbitol so the product will involve a mixture of compound which may not be L-sorbose.

(II) pH 4 to 6 are the optimum temperature for sorbitol dehydrogenase to work the best (highest reaction rate)

Sample: high performance



(iv) This method involves no use of toxic reagent but the Reichstein process involves the use of toxic methanol. ✓ 1

This method employs enzyme (gluconolactonase) but the Reichstein process involves no catalyst for forming L-ascorbic acid from KGA, so this process has lower energy requirement. ✓ 1

Industrial Chemistry (Q.1) Theme

- (a) Vitamin C synthesis
- (b) Kinetics:
- (c) Membrane cell: Manufacture of chlorine, hydrogen and sodium hydroxide

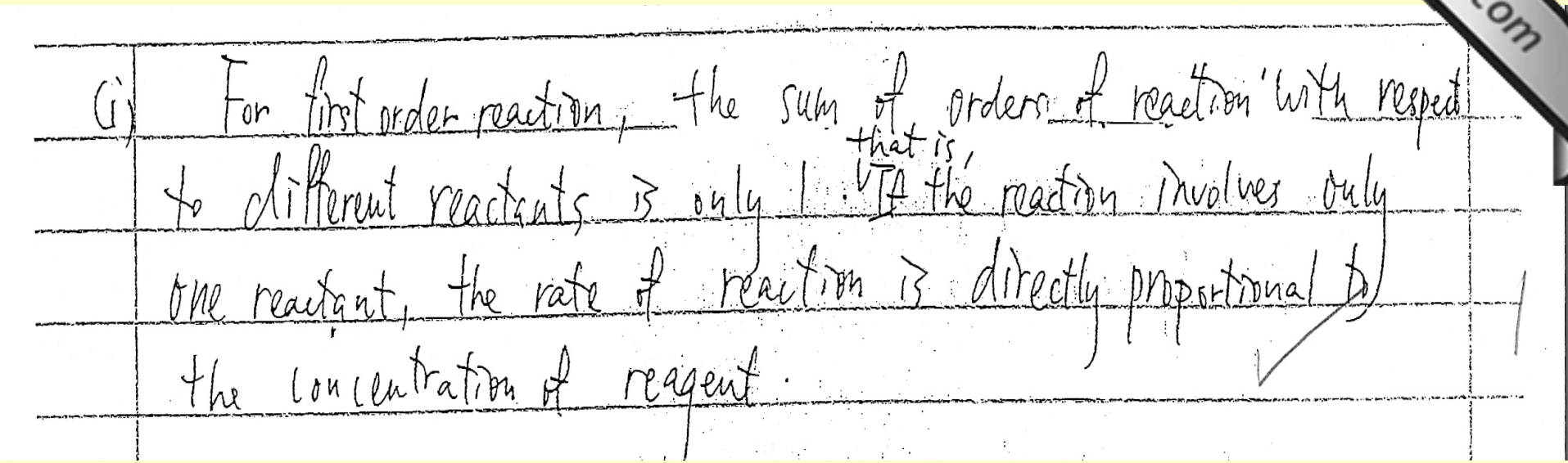
Comments on students' performa

- (i) First order reaction?
- Some failed to point out the characteristics / meaning of a first order reaction.
  - Constant half-life
  - Rate = k [A]

Comments on students' performa

- (ii) Determination of activation energy using a graphical method.
- Some students
  - did not use graph paper to plot the graph.
  - gave unit after taking logarithm, or did not give an appropriate unit to 1/T
  - added 273 to the absolute temperatures given

Sample: high performance



(i) For first order reaction, the sum of orders of reaction with respect to different reactants is only 1 ✓ (that is, If the reaction involves only one reactant, the rate of reaction is directly proportional to the concentration of reagent. ✓

Sample: high performance

(ii) $\ln k = \ln A - \frac{E_a}{RT}$

we can plot a graph of $\ln k$ against $\frac{1}{T}$, from the graph, the slope represents $-\frac{E_a}{R}$ ✓

Tabulation:

$\frac{1}{T}/10^{-3}\,K^{-1}$	3.20	3.10	3.00	2.92
$\ln k$	-3.61	-3.34	-2.99	-2.73

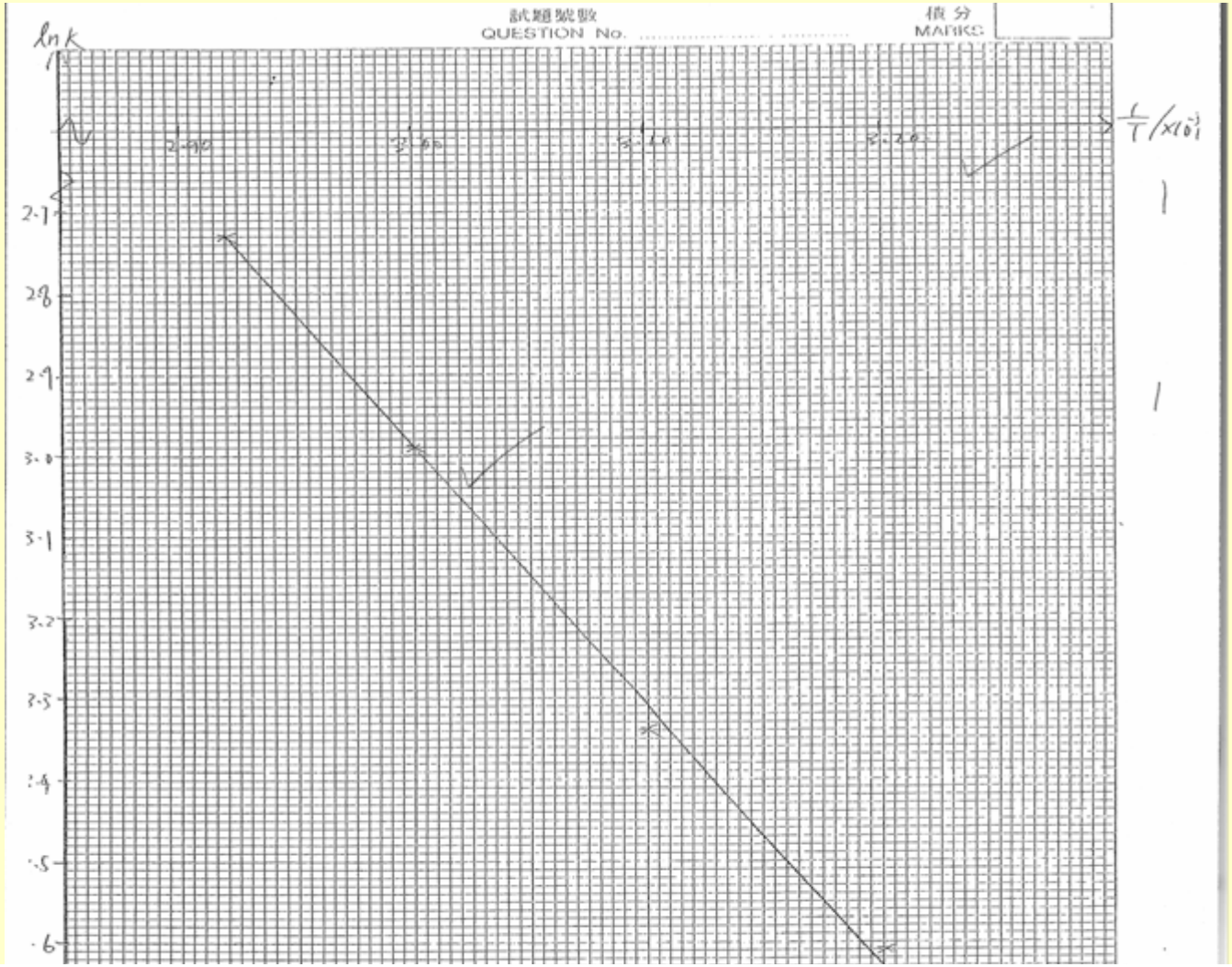
From the graph, slope $= \frac{-2.99-(-2.73)}{(3.00-2.92)\times 10^{-3}}$ ✓ 1

$= -3250 = -\frac{E_a}{R}$

$E_a = -(-3250) \times 8.31$ ✓ 1

$= +27007.5\ J\,mol^{-1}$

Sample: high performance



Industrial Chemistry (Q.1) Theme

- (a) Vitamin C synthesis
- (b) Kinetics:
- (c) Membrane cell: Manufacture of chlorine, hydrogen and sodium hydroxide

Comments on students' performa

- (i) Give half-equations for cathodic and anodic reactions, and account for the formation of H_2, Cl_2 and NaOH
- Some students did not give an explanation for the formation of H_2, Cl_2, NaOH
  - Preferential discharge
  - Concentration
  - Membrane being selective

Comments on students' performa

(ii) Equation for Cl_2 + NaOH

- Well answered

(iii) Electrolysis of brine for large scale manufacture of hydrogen – Agree?

- Some failed to recognise that
  - large scale manufacture of $H_2(g)$ by electrolysis of brine would bring about surplus $Cl_2(g)$, and
  - the disposal of which could pose other environmental problems

Sample: high performance

(i) At anode, Cl^- and OH^- ions move to it, the concentration of Cl^- is much higher than OH^- ✓, it is discharged due to concentration effect to form Cl_2:

$$2Cl^- \longrightarrow Cl_2 + 2e^-$$

Excess Na^+ ion remains because Cl^- is discharged.

At cathode, Na^+, H^+ ions move to it, the H^+ ion will be preferentially discharged because it has lower position than Na^+ in the electrochemical series, thus H_2 is formed. ✓ 1

$$2H^+ + 2e^- \longrightarrow H_2$$ ✓ 1

As H^+ is discharged, excess OH^- remains.

The membrane only allows Na^+ to move from anode compartment to cathode compartment ✓ (but not gases, water and anions), excess Na^+ can ✓ 1

Sample: high performance

(ii) $Cl_2 + 2NaOH \rightarrow NaClO + NaCl + H_2O$ ✓

(iii) I disagree with him because large amount of electrical ✓ energy is required to form a small amount of H_2 because the enthalpy of decomposition of H_2O into H_2 and O_2 is large. Manufacture of H_2 is done by steam-methane reforming process instead.

Comments on students' performa

- (i) Unit cell, and simple calculations
  - Name type of unit cell
  - Number of atoms in a unit cell
  - Density of solid aluminium
- Well answered. Some were not good in unit conversions in part (III)

Comments on students' performa

- (ii) (I) Why strength of Al can be improved by alloying?
- (II) Advantage of using aluminium-lithium alloys?
- Generally well-answered except some stated that the advantage is that the resulting alloy (Al and Li) is 'lighter'.

Comments on students' performa

- (iii) (I) Why biotite flake off easily?
- (II) one application?
- Some
  - did not make use of the given information about the layered structure OR
  - simply explained by just stating that the structure is layered without further elaboration

Sample: mid performance

a i) Face-centre cubic ✓

ii) The number of atoms in one unit cell $= \frac{1}{2} \times 6 + \frac{1}{8} \times 8 = 4$ ✓ ✓

iii) The mass of a unit cell of aluminium $= \frac{27}{6.02 \times 10^{23}} \times 4 = 1.79 \times 10^{-22}$ g ✓

The density $= \frac{1.79 \times 10^{-22}}{(4.05 \times 10^{-10})^3} = 2.7 \times 10^{6}$ g m^{-3} $= 2.7$ g cm^{-3} ✓

Sample: mid performance

(i) I) The atom of another metal place in the empty of space of a aluminium cubic which increase the coordination number of atom. The strength of aluminium alloy will increase.

II) The alloy is light

Sample: mid performance

(ii) I).	Since the intermolecular force between layer is weak that can be easily broke down	1
II).	For making chips	

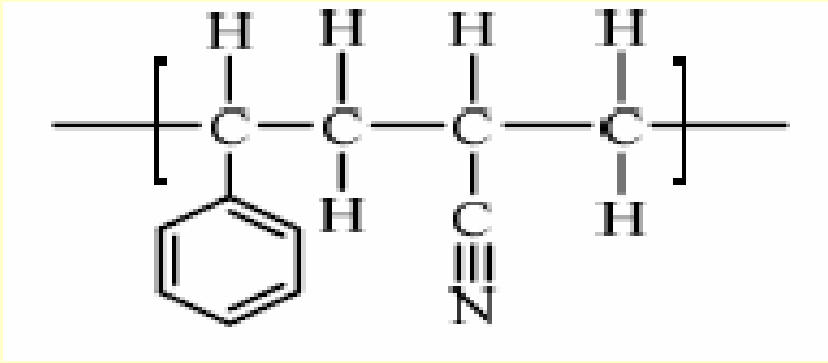
Comments on students' performa

- (b) (i) (I) PS monomer?
- (II) moulding method?
- Well answered.

Comments on students' performa

- (ii)

  (I) Why the following structure cannot be the repeating unit?



  (II) SAN can withstand higher temperatures than PS. Why?

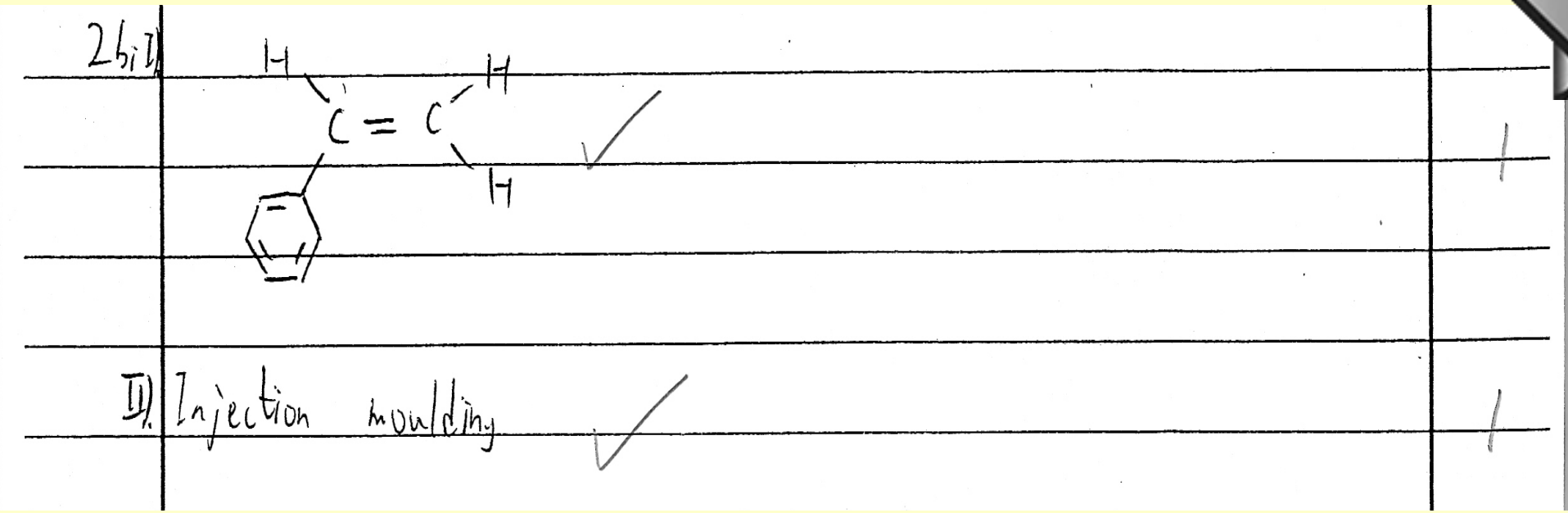
Comments on students' performa

- (ii) (I) Failure to recognise
  - Random arrangement of the monomers
  - 1:1 stoichiometric ratio
- (II) Being unable to recognise the different interactions involved
  - Dipole-dipole interaction vs. van der Waals forces

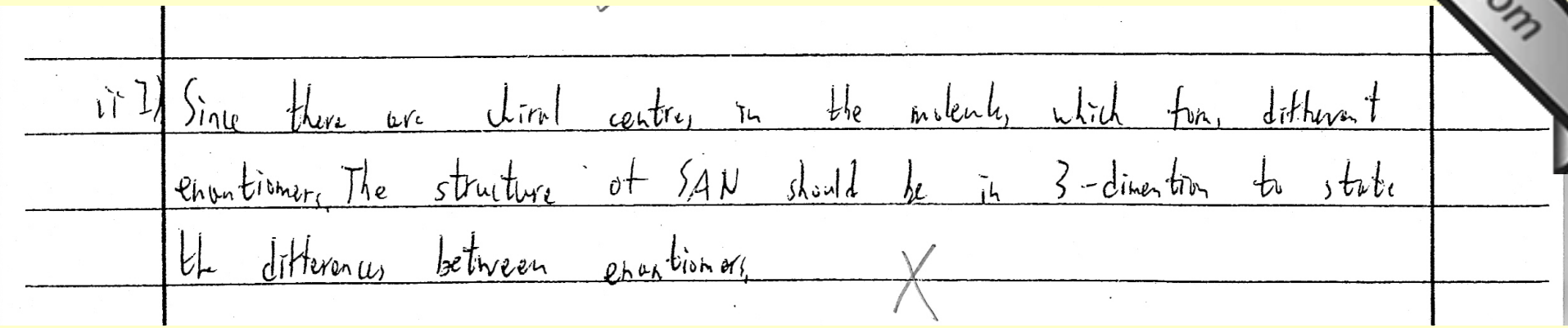
Comments on students' performa

- (iii) … produces a plastic material which is hard, rigid and does not melt upon heating. Explain, in terms of bonding and structure.
- Failure to read the question carefully
- Expected answers
  - Thermoset or similar meanings in sentences
  - Cross-links with diagram showing how the cross-linkages can be formed

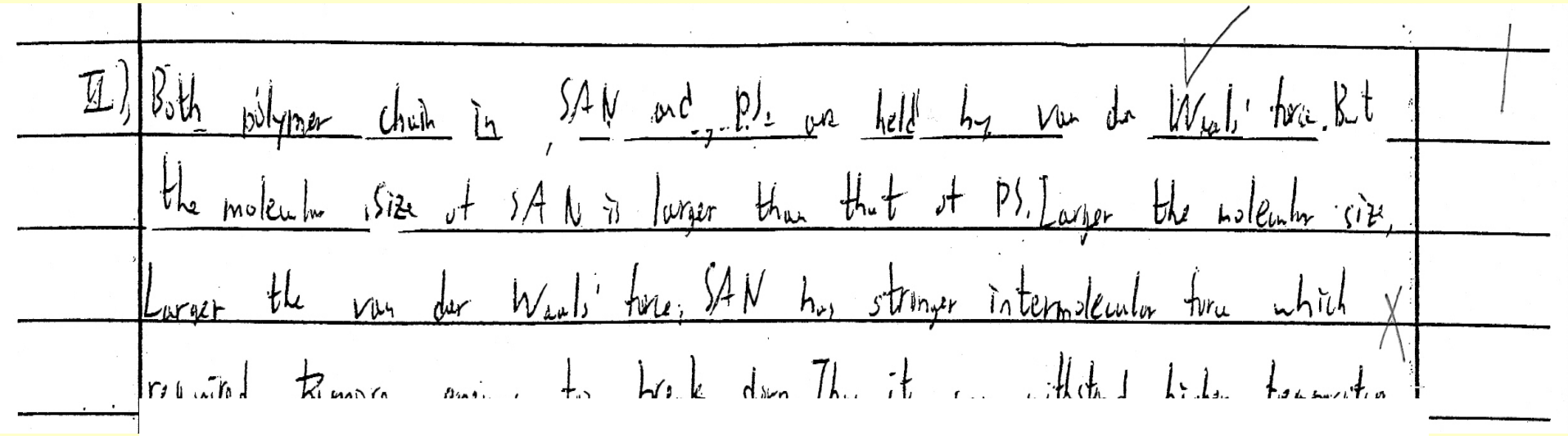
Sample: mid performance



Sample: mid performance



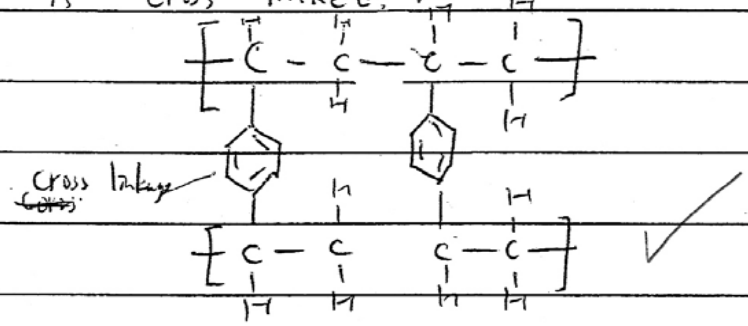
iii) Since there are chiral centres in the molecule, which form different enantiomers. The structure of SAN should be in 3-dimension to state the differences between enantiomers.



iv) Both polymer chain in SAN and P.S. are held by van der Waals' force. But the molecular size of SAN is larger than that of PS. Larger the molecular size, Larger the van der Waals' force; SAN has stronger intermolecular force which required [illegible] to break down. Thus it [illegible]

Sample: mid performance

b(iii) After polymerization of 1,4-divinylbenzene, it forms polymer chains which is cross linked. ✓ 1



✓ 1

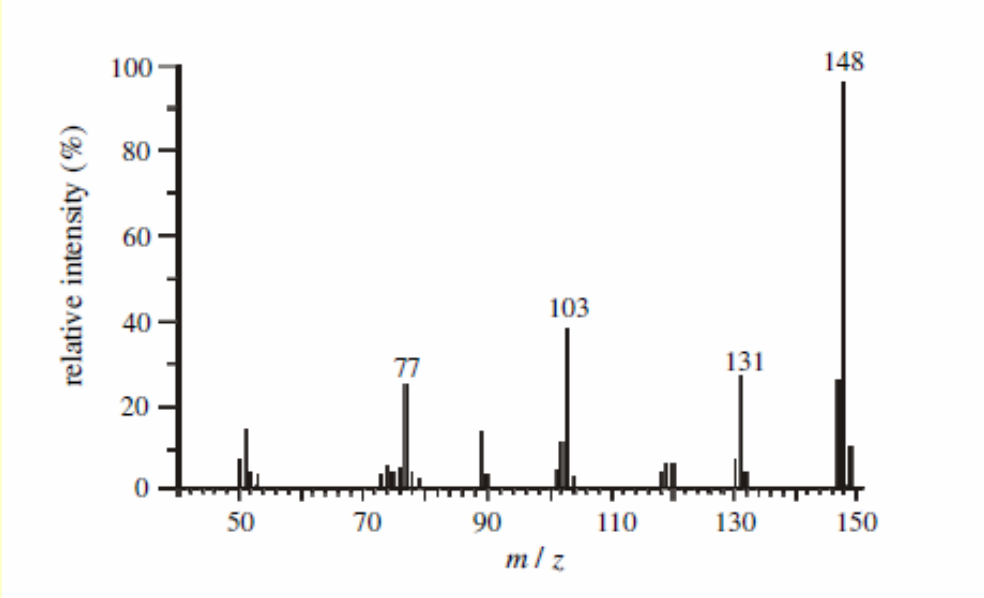
The cross linkage is a strong bond which do not break down even in high temperature. Also, the bulky effect on the cross link make the plastic material hard and rigid. ✓ 1

Thus the plastic not melt upon heat.

The hard and rigid properties are due to the cross-link between

Analytical Chemistry (Q.3) Theme

- (a) Extraction and structure determination of an organic compound



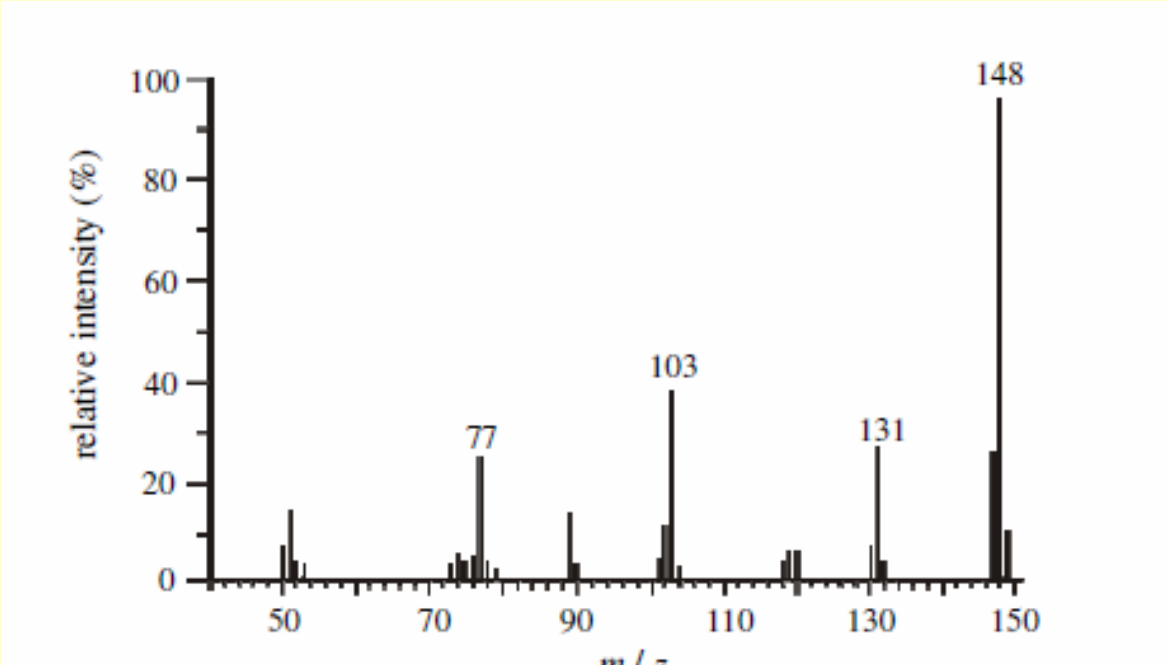
- (b) Gravimetric analysis

Comments on students' performa

- (a)
- (i) ONE functional group present?
- (ii) Name the apparatus used.
- (iii) Purposes of Steps 1, 2 and 3.
- Generally well-answered.

Comments on students' performa

- (iv) Given: Decolorise Br_2 in CH_3CCl_3 and mass spectrum.



Comments on students' performa

- Able to deduce the presence of C=C bond and to identify the molecular-ion

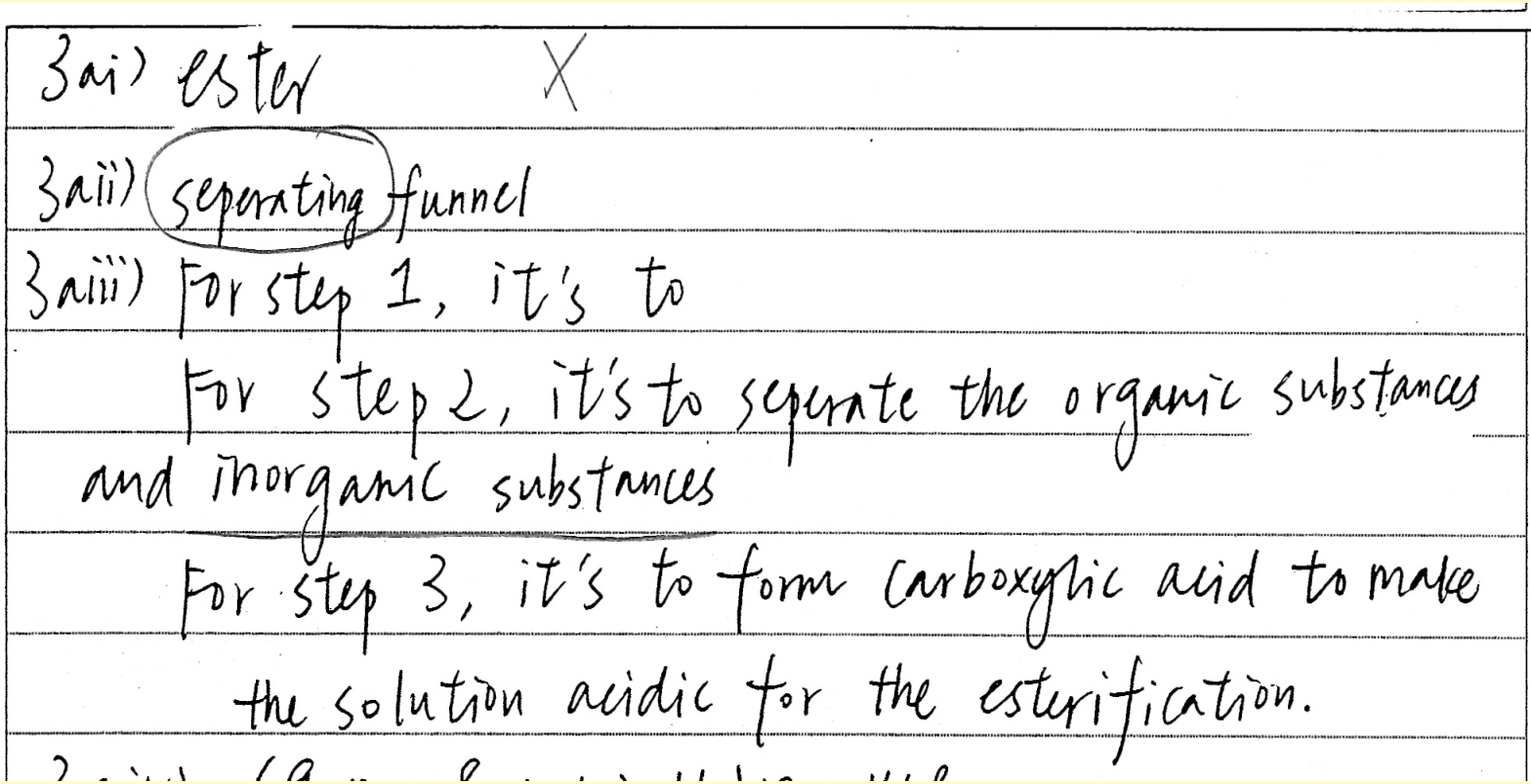
BUT

- Some students wrongly perceived **X** to be an ester and were unable to deduce a possible structure of **X.**

Comments on students' performa

- (v) Given results of TLC, ask for (I) how to make the spots visible, (II) R_f determination, and (III) one method to separate X from the sample
- (I) Should note that one may detect the spots by using UV or by using iodine vapor
- (II) Well answered
- (III) Many did not recognise the use of column chromatography for separation

Sample: low performance



3ai) ester X

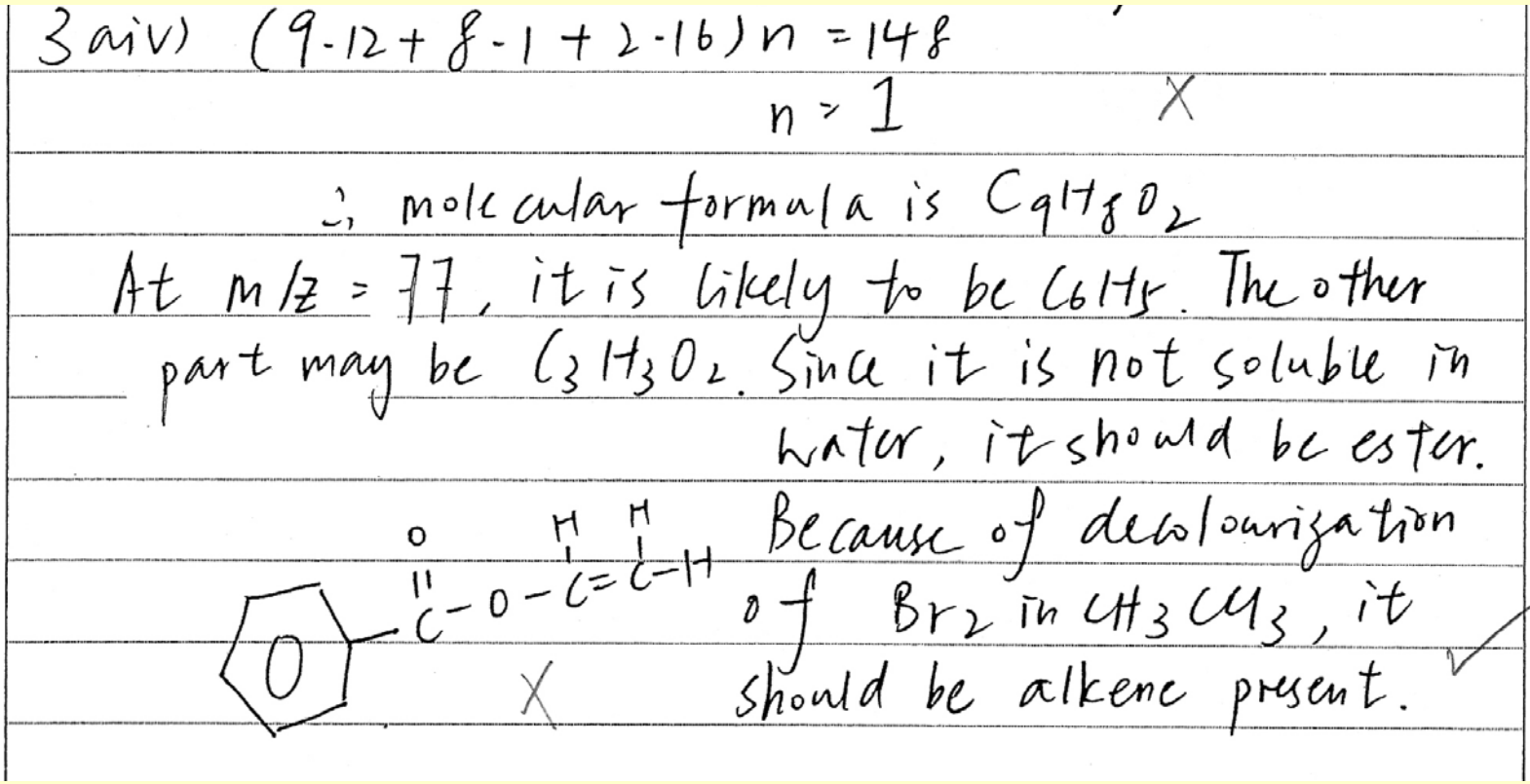
3aii) seperating funnel

3aiii) For step 1, it's to

For step 2, it's to seperate the organic substances and inorganic substances

For step 3, it's to form carboxylic acid to make the solution acidic for the esterification.

Sample: low performance



Sample: low performance

3a(v)(I) add dye to the organic compound to make it visible ✗

3a(v)(II) $R_f = \frac{9.5}{(10-2.5-3)} \Rightarrow 0.2135$ " ✓

(III) add alcohol to the sample in order to remove the colourless organic compound because the compound's more soluble in the alcohol-water solvent. ✗ [illegible]

Analytical Chemistry (Q.3) Theme

- (a) QA of an organic compound

- (b) Gravimetric analysis

Comments on students' performa

- (i) Two necessary treatments before mass determination.
- Should note that:
  - The sample must not be contaminated with other impurities – wash with deionised water
  - The sample must be thoroughly dried – in oven

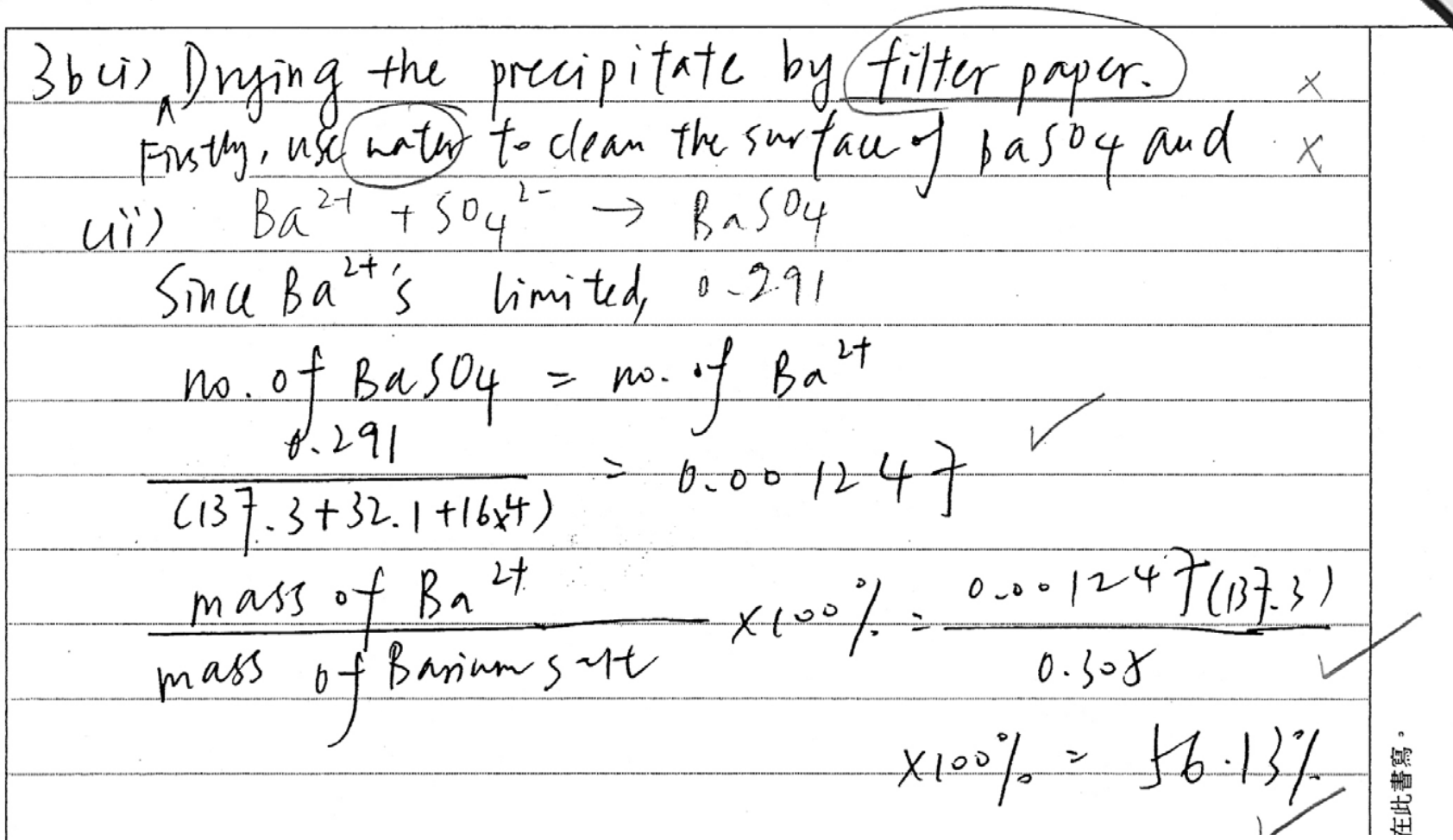
Comments on students' performa

- (ii) percentage by mass of barium in the sample.
- Quality of answers depends on the understanding of chemical stoichiometry

Comments on students' performa

- (iii) TWO conditions for gravimetric method suitable for quantitative analysis
- Expected answers
  - Complete reaction
  - Product should have a definite composition
  - Rate of reaction fast enough to be practical

Sample: low performance



3b(i) Drying the precipitate by filter paper. ✗
Firstly, use water to clean the surface of $BaSO_4$ and ✗
(ii) $Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$
Since Ba^{2+}'s limited, 0.291
no. of $BaSO_4$ = no. of Ba^{2+}
$\frac{0.291}{(137.3+32.1+16\times4)} = 0.001247$ ✓
$\frac{\text{mass of } Ba^{2+}}{\text{mass of Barium salt}} \times 100\% = \frac{0.001247(137.3)}{0.308} \times 100\% = 56.13\%$ ✓ 1 1 1
在此書寫。

Sample: low performance

(iii) the compound is in solid. X

The compound is not complex. X

structure of the

End

Chemistry Practice Papers

Students' Performance in Paper 1
Section B Part II

Q.9(b)

Many students gave answers based on structure rather than on bonding of the oxides. They got 0 marks.

- e.g. Ionic crystals is basic,
  simple molecular structure is acidic.
  /Metal oxide is basic,
  non-metal oxide is acidic.

Q.9(c)

- In general, students used 2 approaches to answer this part
- (i) dissolve the oxide in water and test the pH

  Since some of the oxides are insoluble, full mark would not be awarded.
- (ii) add the acidic oxides to alkali, basic oxides to acid etc. and state the expected observation.
- Some students just used equations to answer the question so they could not get marks for communication.

Q.10

- (a) Some students wrote “observe the colour” instead of “colorimetry”.
- (b)(i) The question asked for evidence from the graph, but some students ignored this.

(ii) Although the question is simple, the performance of students was unsatisfactory.

Many students did not mention, “add $Mn^{2+}(aq)$ to the reaction mixture at the beginning of the repeated experiment”

Q.11

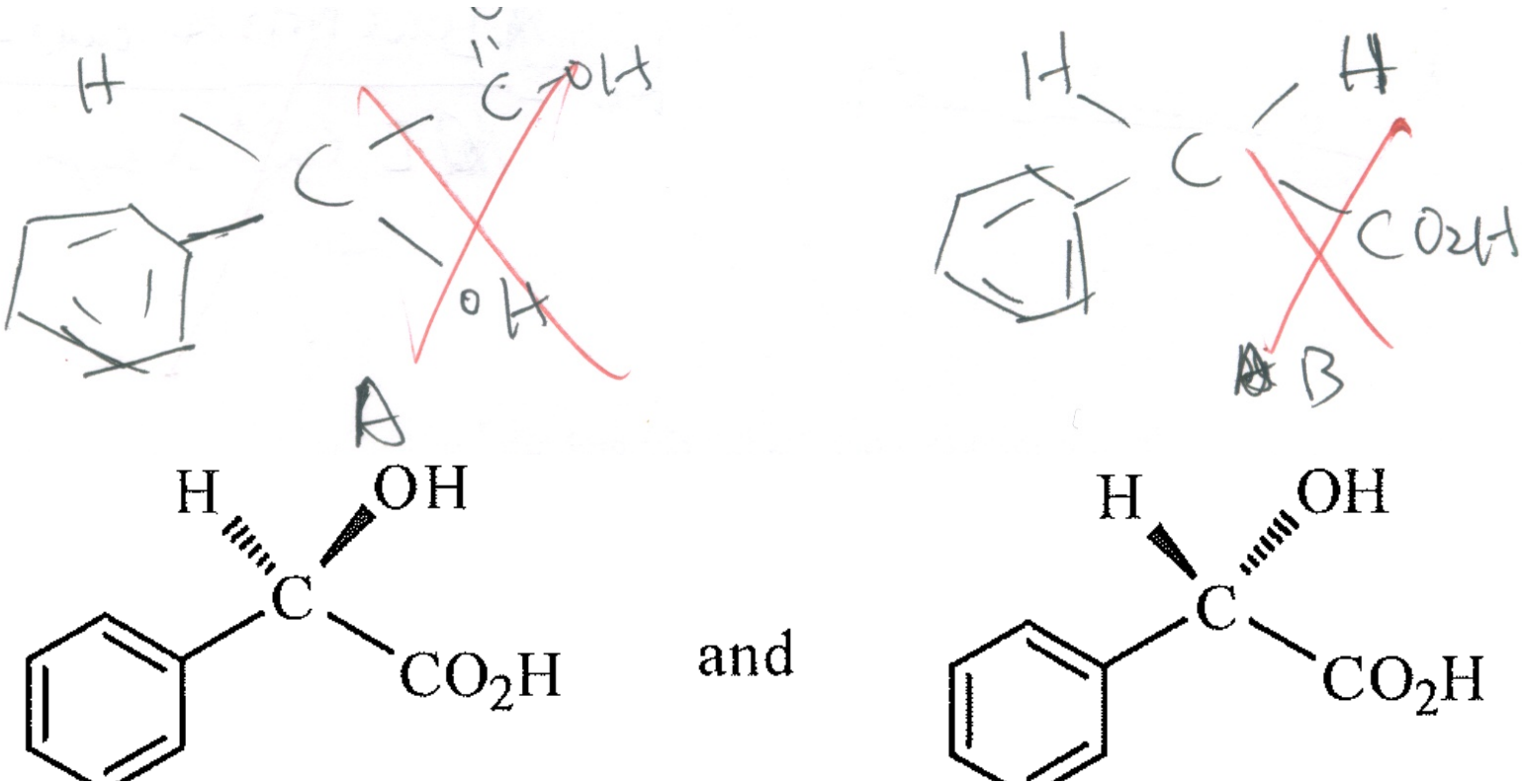
- Sometime students gave incorrect reagents or reaction conditions for the conversions,

  e.g. $LiAlH_4$, reflux/

  $LiAlH_4$ in water/ $H_2SO_4(aq)$

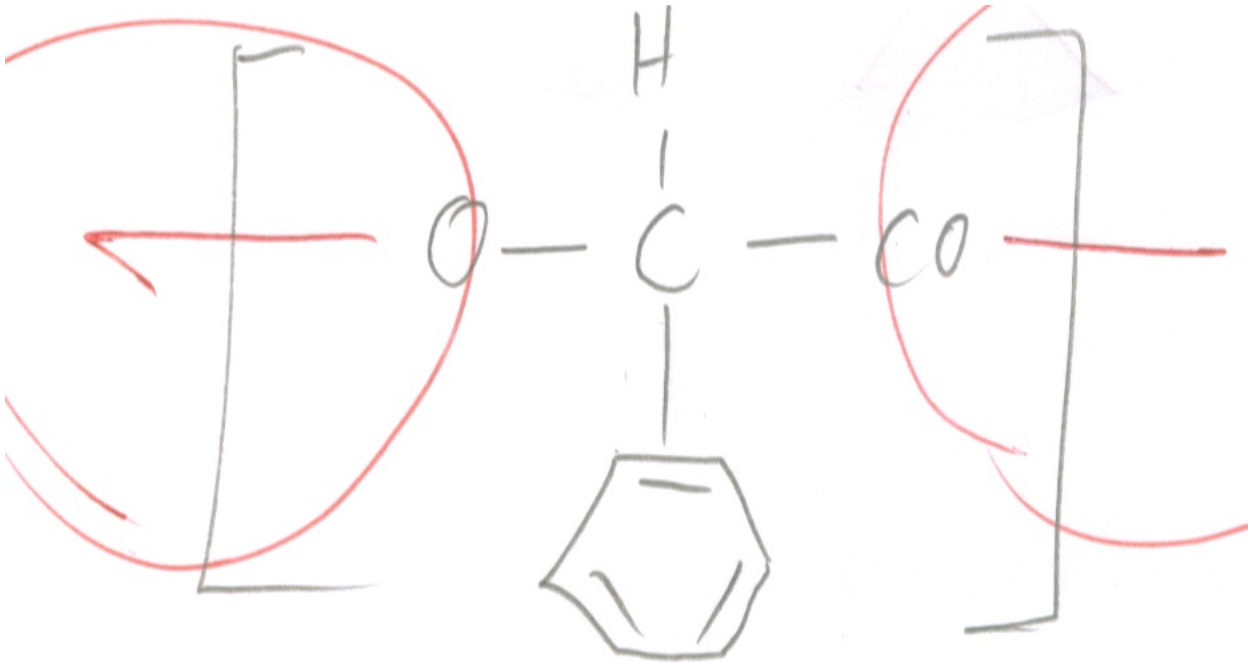
Q.12

- (a)(i) Students were weak in drawing 3-D structures



Q.12(b)

- Students made careless mistakes in drawing the repeating unit, e.g.



Q.13

- (b) Students were weak in using calculators. Many correctly substituted the given data into the equilibrium expression but were unable to arrive at the correct answer. Some had difficulty in giving the correct units to the final answer.
- (c) This is a difficult part and students' performance was poor.

END