

Name:.....Adm No.Index no

Candidate's sign Class.....

Date:

233/2
CHEMISTRY
PAPER 2
TIME: 2 HOURS



ALLIANCE HIGH SCHOOL
TRIAL EXAMINATION
SEPTEMBER 2022

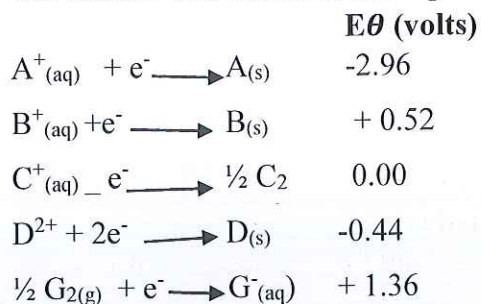
INSTRUCTIONS TO CANDIDATES:

- Write your **Name, Admission Number, index number** in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer **All** the questions in the spaces provided below each question.
- All working **MUST** be clearly shown where necessary.
- Sign and write the date of examination in the spaces provided above.
- Electronic calculators may be used
- **This paper consists of 11 printed pages.**
- **Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing**

For Examiner's Use Only

Question	Maximum score	Candidate's score
1-7	80	

1. Study the electrode potentials for the half cells below and use them to answer the questions that follow. The letters do not represent the actual elements.



- a) Identify the strongest oxidizing agent. Explain. (2 mks)

- b) Which of the two half cells would produce the highest potential difference when combined. (2 mks)

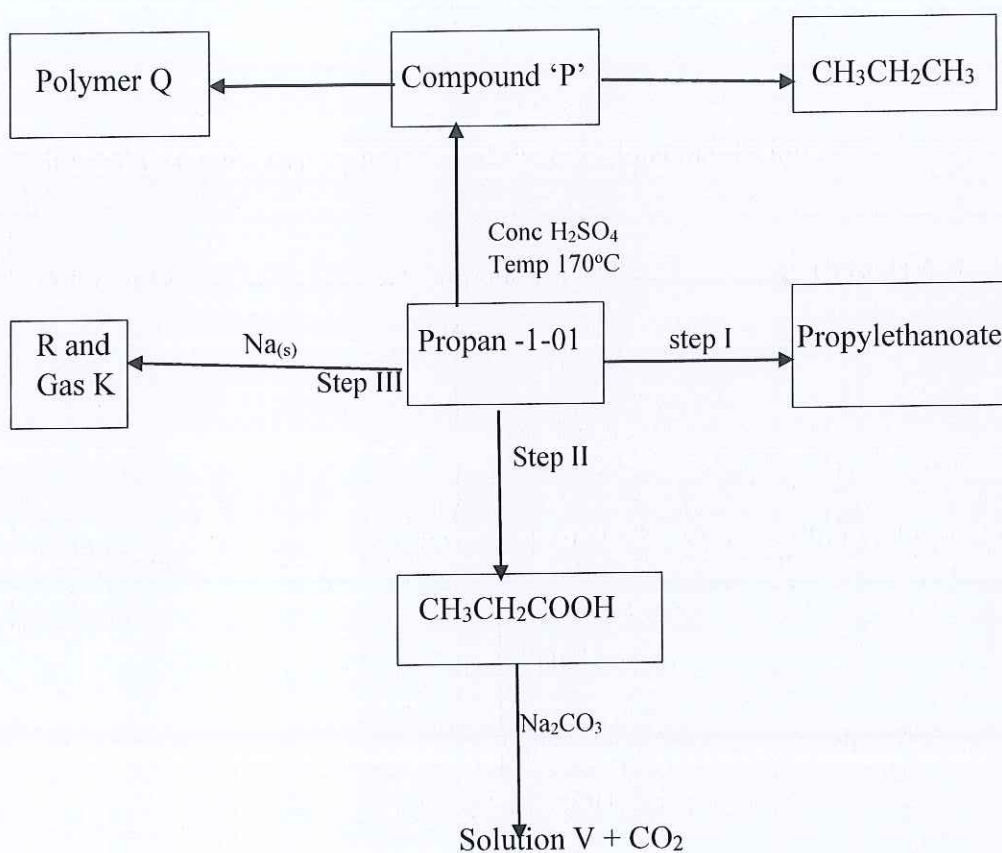
- c) Explain whether the reaction below can take place. (2 mks)



- d) Draw a well labelled diagram when combining A and B half cells. (3 mks)

- e) In an experiment to electroplate an iron watch with silver a circuit of 0.5A was passed for 48 minutes. Calculate the amount of silver deposited on the watch.
 (IF = 96,500C, Ag = 108) (3 mks)

2. Study the scheme below and answer the questions that follow.



a) Name (2 mks)

Compound 'P' _____

Solution 'V' _____

Substance 'R' _____

Gas 'K' _____

b) Write the equation for the reaction in : (3 mks)
Step I

Step II

Step III

c) Name the type of reaction in step I and step II and give the conditions. (4 mks)

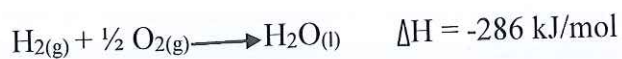
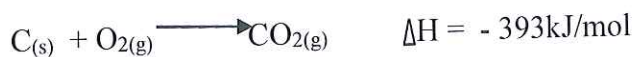
d) A sample of polymer 'Q' is found to have a molecular mass of 4200. Determine the number of monomers in the polymer (C = 12, H = 1) (2 mks)

e) Describe an experiment to distinguish propane and propyne using burning. (2 mks)

3 a) What is meant by the term enthalpy at formation.

(1 mk)

b) The enthalpies of combustion of carbon, hydrogen and ethanol are given below.



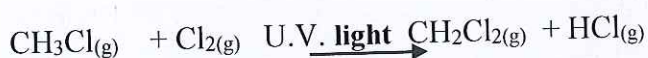
(i) If the enthalpy of combustion of ethanol is $- 1369\text{kJ/mol}$. Draw the energy cycle diagram that links the enthalpy of formation of ethanol to enthalpies of combustion of carbon and hydrogen. (3 mks)

c) Study the information in the table below and answer the questions that follow.

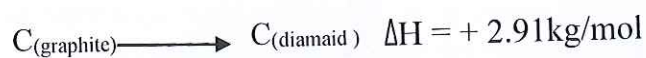
BOND	BOND ENERGY (kJ/Mol)
C - H	414
C-Cl	326
Cl-Cl	244
H-Cl	431

Calculate the enthalpy changes for the reaction below.

(3 mks)



d) At standard temperature and pressure graphite changes to diamond as shown in the equation below.



Sketch a simple energy level diagram for the above change.

(2 mks)

4. 0.12M aqueous standard nitric (v) acid was titrated against 25cm³ of aqueous sodium hydroxide solutions in a conical flask. 11.5cm³ of acid was required to react completely with alkali.

a) Name two apparatus that can be used in this experiment other than conical flask. (1 mk)

b) Calculate the concentration of sodium hydroxide used in experiment. (2 mks)

c) The table below shows the tests carried out on three portions of a compound and results obtained. Study it and answer the questions that follow.

Test	Observations
Addition of a few drops of aqueous ammonia to the first portion until excess	White precipitate soluble in excess
Addition of acidified barium nitrate to the second portion	White precipitate formed
Addition of few drops of lead (II) nitrate to the third portion	White precipitate formed

i) Identify the cation and anion present in the compound. (1 mk)

ii) Write the ionic equations in first portion and third portion. (3 mks)

iii) Define the following terms

(3 mks)

a) Solubility

b) Saturated solution

c) Fractional crystallization.

5. The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of elements.

A	F			C	D	E	M	
B			Q		G	H	J	
L								

a) Identify the most electronegative and electropositive element. Explain.

(2 mks)

b) Element Q reacted with steam at elevated temperatures to produce 150cm^3 of a gas.

Determine the mass of Q which was reacted with steam

(M.G.V = 24dm^3) (R.A.M of Q = 27)

(2 mks)

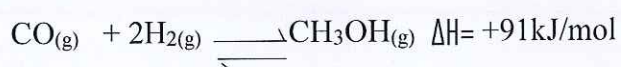
c) Explain the difference between the atomic radius of element **J** and its ionic radius (2 mks)

d) Write the formula of the most stable ion of element **G** when it ionizes. (1 mk)

e) The ionization energies for elements **A,B** and **L** are 520Kj/mol, 500kJ/mol and 420Kj/mol Values. What does the values indicate about their reactivity explain. (2 mks)

f) Draw the atomic structure of a compound formed when element **Q** reacts with oxygen.
(Atomic number of oxygen = 8) (2 mks)

6.a)The following reversible reaction represents the formation of methanol from hydrogen and carbon (II) Oxide.



What would be the effect on equilibrium and the yield of methanol/when: (4 mks)

i) Increasing pressure

ii) Decreasing temperature

iii) Using a catalyst.

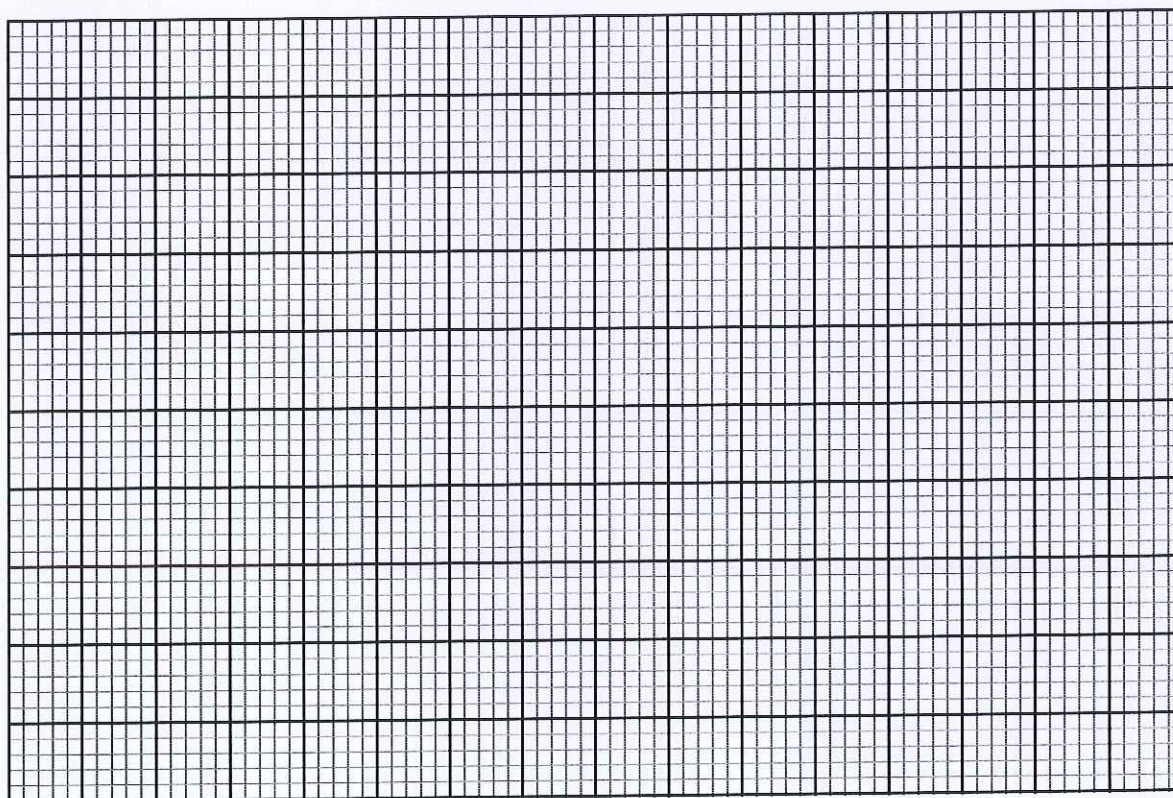
iv) Adding ethanoic acid to the equilibrium in presence of few drops of concentrated sulphuric (vi) acid and warming

b) An experiment was carried out using a given mass of magnesium ribbon and 1M HCl the results are as shown below.

Time (sec	10	20	30	40	50	60	80	100
Volume of H _{2(g)} (cm ³)	49	90	117	136	147	150	150	150

a) Plot a graph of volume of hydrogen gas produced against time.

(3 mks)



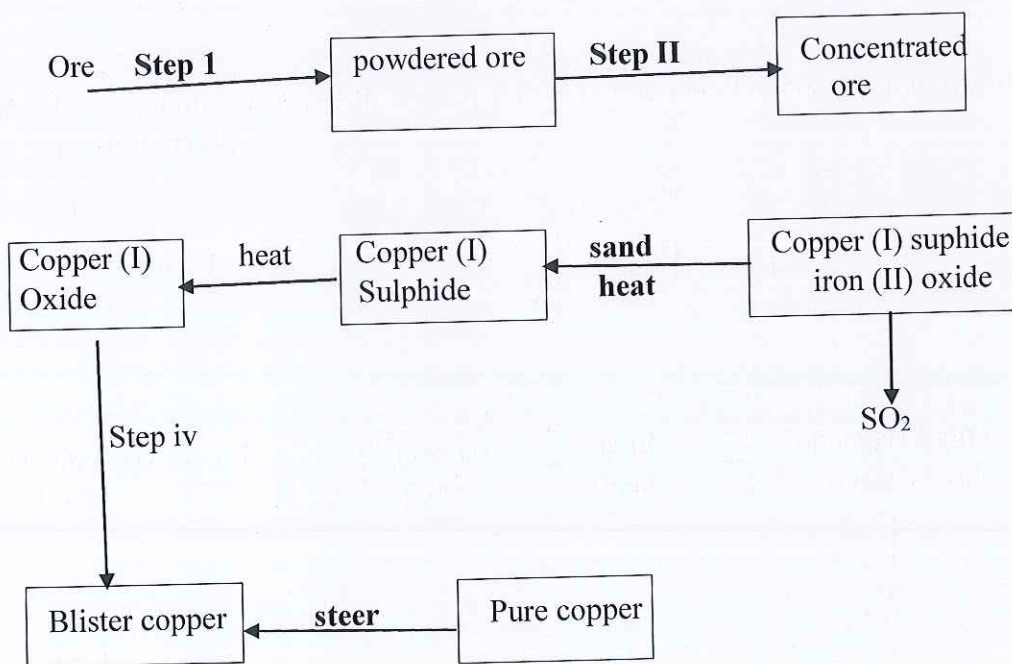
b) On the same axis sketch a graph that would be obtained if 1M CH₃COOH was used instead of 1M HCl.

(1 mk)

c) Calculate the rate of reaction of magnesium with hydrochloric acid at 50 seconds and 60 seconds. Explain. (3 mks)

d) State two factors that can affect the above rate of reaction apart from the one investigated above. (2 mks)

7. The diagram below is a flow chart for the extraction of copper. Study it and answer the question that follow.



a) Give the name and formula of the major ore from which copper is extracted. (1 mk)

b) Give the name of the process carried out in step II and III. (1 mk)

c) Write equation for the reactions taking place in step III and IV. (2 mks)

d) Iron (ii) oxide is an impurity during extraction of copper. Write the equation for the reaction to show how it is removed. (1 mk)

e) i) Draw a well labelled diagram of show blister copper is purified to form pure copper. (3 mks)

ii) Write the ionic equation for the anode and cathode reaction during purification of copper. (2 mks)

f) When copper is exposed to the atmosphere for a long period of time it forms a green coating. Name the green coating and write a balanced chemical equation for the reaction which leads to formation of green coating. (2 mks)
