Name: ……. Adm Number: ……Class: ……

Index number……

233/2

CHEMISTRY

PAPER 2

TIME – 2HRS

SUKELLEMO PRE MOCK JOINT EXAMS

Pre Mock Examination

JUNE 2022

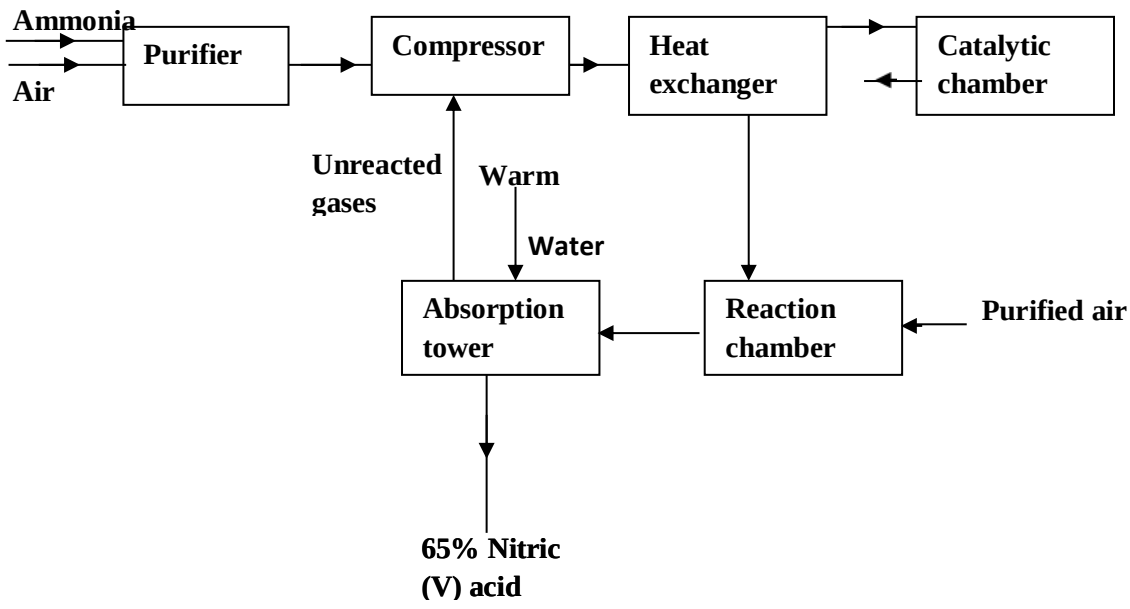
INSTRUCTIONS TO THE CANDIDATES:-

- Write your **Name, Index and admission number** in the spaces provided.
- Answer ***all*** the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

For Examiners Use Only

Question	Maximum score	Candidate's score
1	12	
2	12	
3	10	
4	14	
5	12	
6	12	
7	08	
Total	**80**	

1. (a)The diagram below shows part of the processes in the manufacture of Nitric (V) acid



(i) Explain the role of the purifier (1mk)

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(ii) State the pressure used in the compressor (1mk)

……

(iii) State **two** functions of the heat exchanger (1mk)

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……

……

(iv) Name the catalyst used in the catalytic chamber (1mk)

……

(v) Write equation of the reaction that takes place in:

(I) Catalytic chamber (1mk)

……

(II) Reaction chamber (1mk)

……

(III) Absorption tower (1mk)

……

(b) (i) Calculate the volume of Oxygen that would be obtained from the decomposition of 21.25g of Sodium Nitrate at s.t.p *(1 mole of a gas occupies 22.4dm3 at stp, N=14, Na=23,O=10)* (3mks)

(c) Name **two** commercial uses of Nitric (V) acid (2mks)

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……

……

2. In an experiment to investigate the solubility of solid Y and Z, the following results were obtained.

Temperature ^{o}C	0	10	20	30	40	50
Solubility of solid Y (g/100g of water)	8	13	24	38	61	98
Solubility of solid Z (g/100g of water)	28	32	35	38	42	46

a) What do you understand by the term solubility? (1mk)

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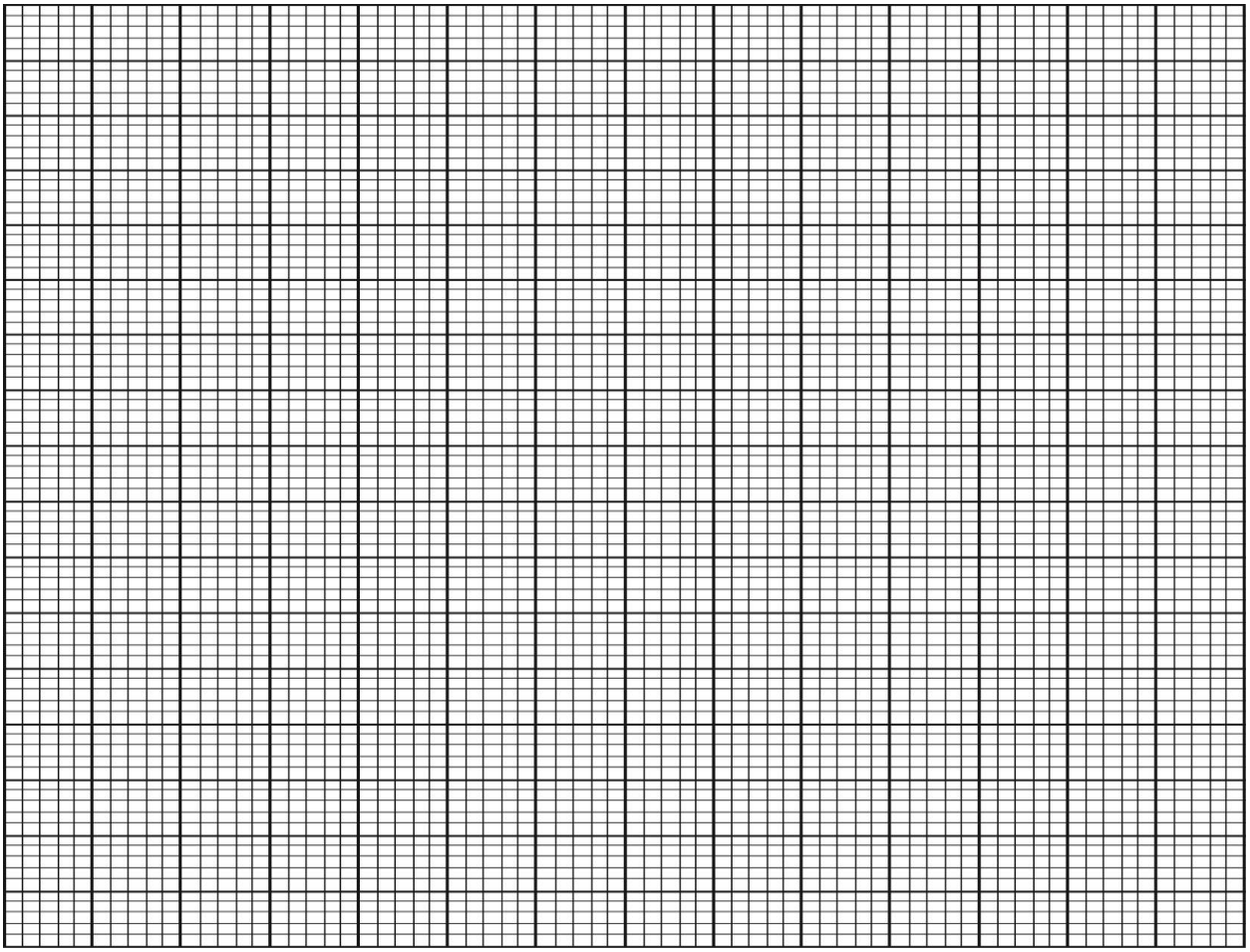
b) On the grid provided, plot a graph of solubility of Y and Z against temperature (on the x-axis). (4mks)



c) From your graph determine

(i) The solubility of Y at room temperature (25^{o}C) (1mk)

……

(ii) The temperature at which solubility of Y is 45g/100g of water. (1mk)

……

……

d) If a solution of Y contains 35g of solid in 100g of water is cooled from 40°c, Determine

(i) The temperature at which the crystals will first form (1mk)

……

……

(ii) The mass of crystals deposited if the solution is cooled to 5°c (1mk)

……

……

e) Compare the solubilities of Y and Z in water. (2mks)

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……

……

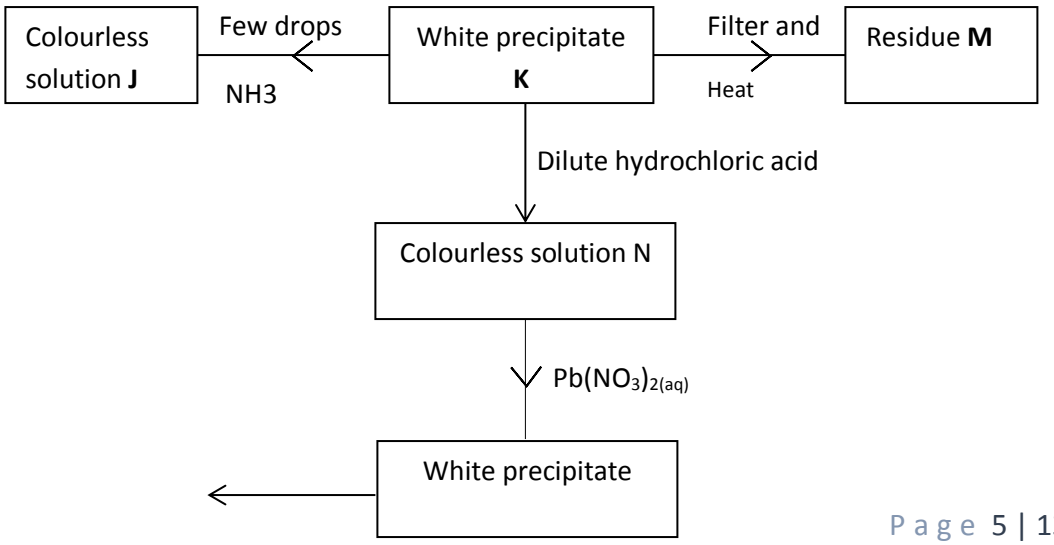
……

f) Give one application of solubilities. (1mk)

……

……

3. Study the flow chart below and answer the questions that follow.



Residue **M** was yellow when hot and white when cold.

(a) (i) Identify.

I White precipitate **K** _____ (1 mark)

II Solution **N** _____ (1 mark)

III Residue **M** _____ (1 mark)

(ii) Write an ionic equation for the reaction of solution N with $Pb(NO_3)_{2(aq)}$. (1 mark)

……

……

(iii) Write observations that would be made when ammonia solution is added dropwise till in excess to the colourless solution **N**. (1 mark)

……

……

(b) Ammonia gas bubbled into water forms a solution which conducts electricity whereas the solution formed when it is bubbled through methylbenzene does not. Explain. (2 marks)

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(c) Boilers used for boiling hard water are normally covered with boilers scale after sometime.

(i) What is the chemical name for boilers scales? (1 mark)

……

(ii) How is the boiler scale removed? (1 mark)

……

……

(d) Write the formula of the anion in solution **J**. (1 mark)

……

4. (a) Name each of the processes described below which takes place when salts are exposed to air for sometime.

(i) Anhydrous copper (II) sulphate becomes wet. (1 Mark)

……

(ii) Common table salt forms an aqueous solution (1 Mark)

……

(iii) Fresh crystals of sodium carbonate $Na_2CO_3.10H_20$ becomes covered with white powder of formula $Na_2CO_3.H_2O$ (2 Marks)

……

……

(b) Write the formula of the complex ion formed in each of the reactions described below.

(i) Zinc metal dissolves in hot alkaline solution (1Mark)

……

……

(ii) Copper hydroxide dissolves in excess ammonia solution (1Mark)

……

……

(c) A hydrated salt has the following composition by mass. Iron 20.2%, Oxygen 23%, Sulphur 11.5% and water 45.3%. Its relative formula mass is 278

(i) Determine the formula of the hydrated salt. (3Marks)

(Fe = 56, S = 32, O = 16, H = 1)

(ii) 6.9g of the hydrated salt was dissolved in distilled water and the total volume made to 250cm^3 of solution. Calculate the concentration of the salt solution in moles per litre. (2Marks)

(d) Describe how a solid sample of lead (II) chloride can be prepared using the following reagents:- dilute nitric acid, dilute hydrochloric acid and lead carbonate. (3 Marks)

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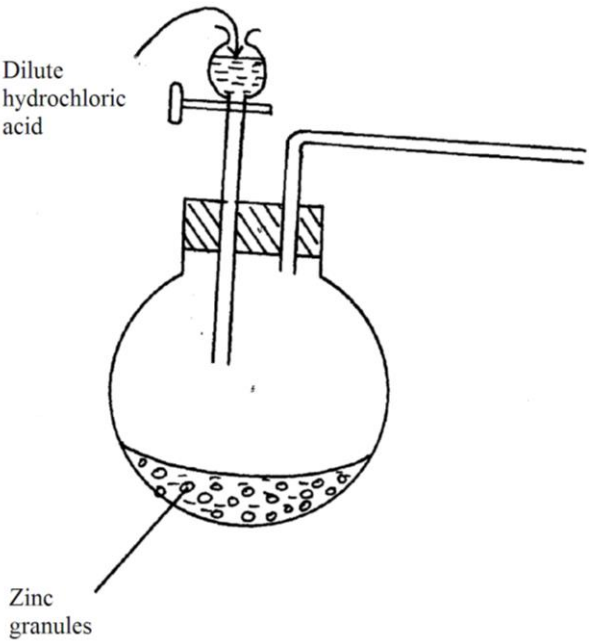
5. a) The set up below was used to prepare dry hydrogen gas.



i) Complete the diagram to show how dry sample of hydrogen gas can be collected. (3mks)

ii) Hydrogen gas is used in hardening of oils into fats during the manufacture of margarine. Give two conditions necessary for the process to occur. (2mks)

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……

……

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iii) Give a reason why the following are not used in preparation of hydrogen gas in the lab(2mks)

a) Magnesium metal

……

……

b) Iron

……

……

iv) Write the formula of the substance added in preparation of hydrogen to make the reaction proceed faster (1mk)

……

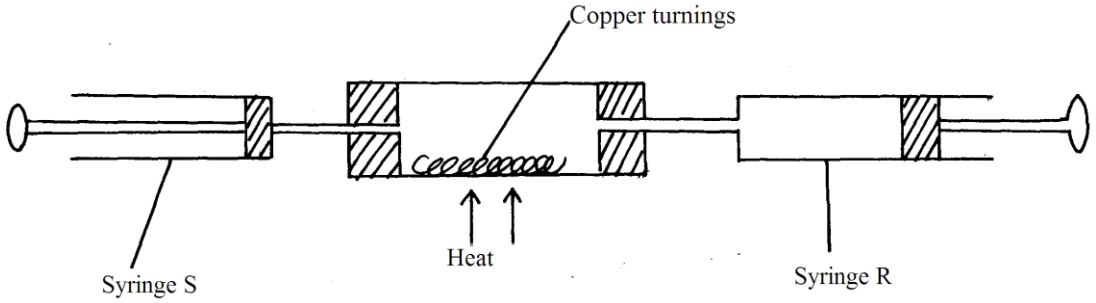
……

v) Other than hardening of oils, state two other uses of hydrogen. (1mk)

……

……

b) In an experiment to determine the proportion of oxygen in air, copper turnings were packed in excess along a combustion tube connected to two syringes of 120cm^3 each in volume. Syringe R contained 120cm^3 of air while syringe S was empty as shown.



Air was passed over the heated turnings slowly and repeatedly until there was no further change in volume. 95.5cm^3 of air remained in syringe R.

i) Why was air passed over heated copper slowly and repeatedly. (1mk)

……

ii) State one observation made in the combustion tube during the experiment. (1mk)

……

iii) Determine the percentage of oxygen used during the experiment. (1mk)

6. Use the table below to answer the questions that follow.

(The letters are not the actual symbols of the elements)

Element	Atomic number	Melting point (^{0}C)
A	11	97.8
B	13	660
C	14	1410
D	17	-101
E	19	63.7

(a) Write the electronic arrangement for the ions formed by the elements B and D

B _____ (½ mark)

D _____ (½ mark)

(b) Select an element which is

(i) a poor conductor of electricity _____(½ mark)

(ii) most reactive metal _____ (½ mark)

(c) Explain briefly how the atomic radii of element B and C compare. (2 marks)

……

……

(d) Use dots (•) and crosses (x) to represent outermost electrons and show the bonding in the compound formed between C and D. (2 marks)

(e) Explain why the melting point of element B is higher than that of element A. (2 marks)

……

……

(f) Write an equation for the reaction that takes place between element A and water. (1 mark)

……

……

(g) Describe how a solid mixture of the sulphate of element E and lead (II) sulphate can be separated into solid samples. (3 marks)

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……

7. (a) Give the systematic names for following compounds;

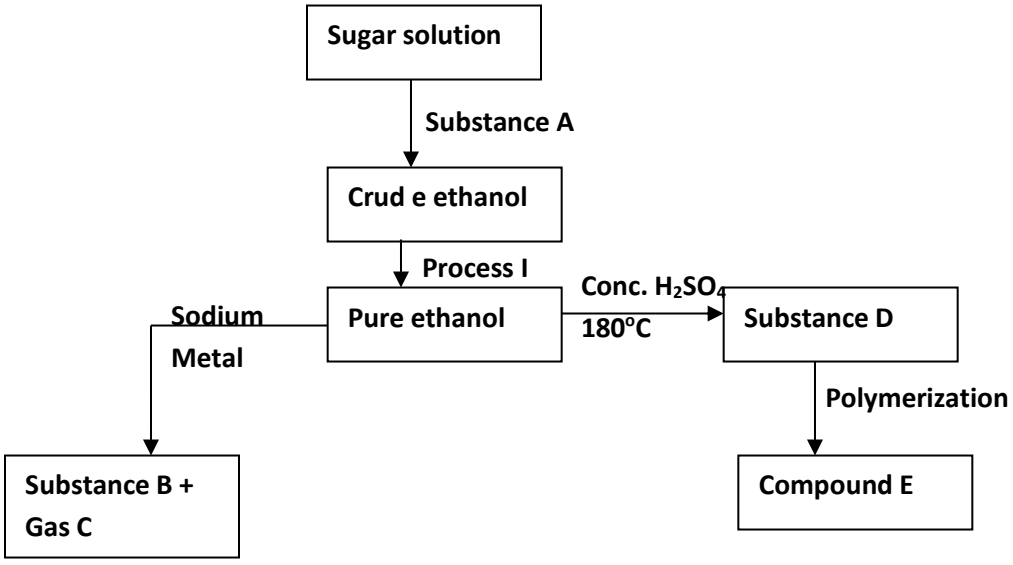
(i) $CH_3CH_2\overset{\overset{O}{\|}}{C} - O - CH_2CH_3$ (1mk)

……

(ii) $CH_2CHCHCH_2$ (1mk)

……

(b) Study the flow chart below and use it to answer the question that follow



(i) Name:

Substance **A** (½mk)

……

Process **I** (½mk)

……

Substance **B** (½mk)

……

Gas **C** (½mk)

……

Substance **D** (½mk)

……

Compound **E** (½mk)

……

II. If 144kg of sugar ($C_6H_{12}O_6$) was used to produce ethanol in this process, calculate the mass in kg of ethanol produced *(C=12,H=1, O=16)* (3 marks)

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