

NAME.....ADM NO.....CLASS.....

233/2

CHEMISTRY**PAPER 2****NOV. 2017****FORM THREE****END OF YEAR EXAMINATIONS**

- Answer All the questions in the spaces provided.
- Any work done outside the provided spaces will not be marked.
- All workings must be clearly shown.
- Scientific calculators and mathematical tables may be used

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1		
2		
3		
4		
5		
TOTAL SCORE		

1. a) Study the information given below and answer the Questions that follow.

Element	Atomic radius	Ionic radius (nm)	Formula of oxide	Melting point of oxide ($^{\circ}\text{C}$)
A	0.364	0.421	A_2O	-119
D	0.830	0.711	DO_2	837
E	0.592	0.485	E_2O_3	1466
G	0.381	0.446	G_2O_5	242
J	0.762	0.676	JO	1054

i) Which elements are non-metals? Give a reason. (2mks)

Element.....

Reason.....

ii) Write the formula of the compound formed when J combines with A. (1mk)

iii) What type of bond exists in a compound formed between J and D. (1mk)

iv) Explain why the melting point of oxide of E is higher than that of the oxide of G. (2mks)

v) Give two elements that would react most vigorously with each other. Explain your answer.

Elements.....(1mk)

Explanation

vi) Which element may be suitable for making a utensil for boiling water? State two properties that make the element suitable for this use. (3mks)

Element

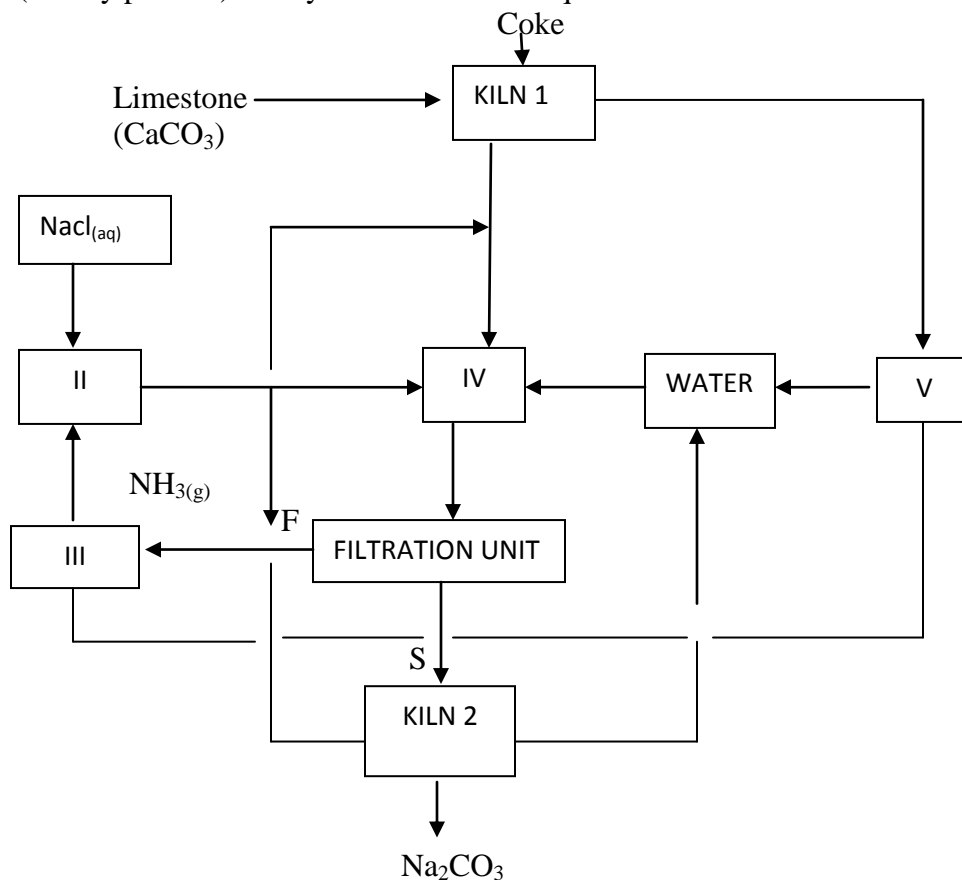
Properties

b) Write down the formula of:

i) Carbonate of E..... (1mk)

ii) Sulphate of A (1mk)

2. The diagram below represents an industrial manufacturing process for sodium carbonate (Solvay process). Study it and answer the questions that follow.



a. i) Name any two main raw materials required in the Solvay process. (2mks)

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ii) Name the process taking place in the units labeled: (3mks)

II)

IV)

V)

iii) Write the equation for the reactions taking place in: (2mks)

a) Kiln 1

b) Kiln 2

iv) Name any two substances that are recycled in the process. (2mks)

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.....

v) Name: (3mks)

a) Solid S

b) Filtrate F

c) By-product B

vi) State one use of each of the following substance in the Solvay process. (2mks)

I – Coke:

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II – Limestone

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vii) Give a reason why the Solvay process is not suitable for manufacturing Potassium Carbonate. (1mk)

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b) i) Describe giving equations the cheaper alternative of producing sodium carbonate giving the name of the starting raw materials. (2mks)

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ii) State two uses of Sodium Carbonate. (2mks)

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3. a) Write an equation to show the effect of heat on: (2mks)

i) Potassium nitrate, KNO_3

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ii) silver nitrate, $AgNO_3$

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c) Dry ammonia gas was passed over heated copper (II) Oxide in a combustion tube as shown in the diagram below.

State the observations made and represented the reaction with a chemical equation. (2mks)

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d) Calculate the percentage nitrogen content in the following ammonium salts. (2mks)

i) Ammonium sulphate $(\text{NH}_4)_2\text{SO}_4$

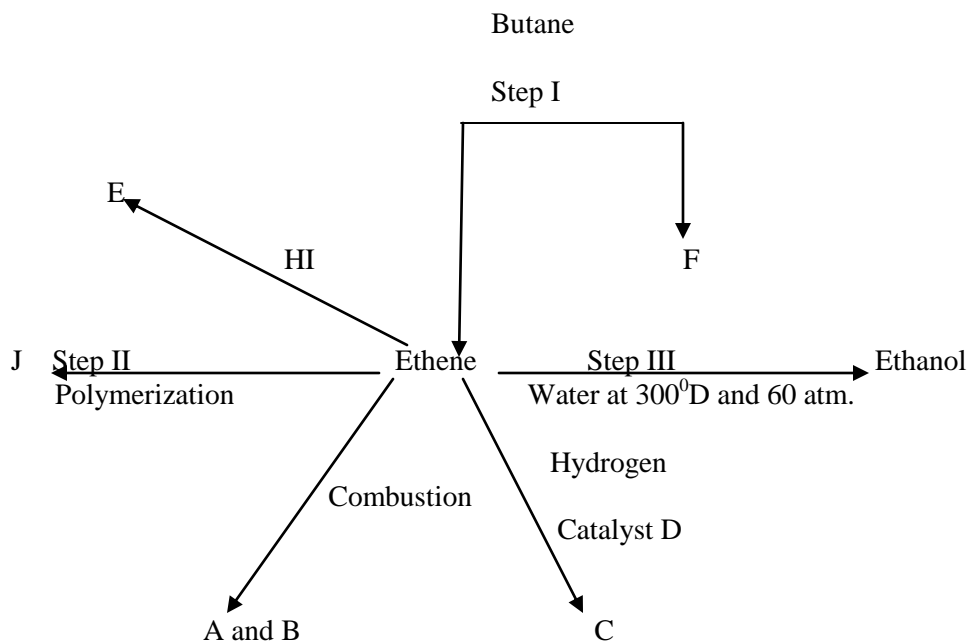
ii) Urea, $(\text{NH}_2)_2\text{CO}$ N= 14, H=1, S=32, O=16, C=12

4. a) Alkanes, alkenes and alkynes can be obtained from crude oil. Name and draw the structure of second member of the alkyne homologous series. (2mks)

Name:

Structure:

b) Study the flow-chart below and answer the questions that follow.



i) Name the process taking place in step I. (1mk)

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ii) Identify substance J. (1mk)

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iii) Give:

a) One disadvantage of continued use of substance such as J. (1mk)

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b) The name of the process that takes place in step (III). (1mk)

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iv) The relative molecular mass of J is 16,800. Calculate the number of repeating units, monomers, that make up J. (2mks)

C= 12.0; H=1.0

v) Name the substances A, B, C, D, E and F. (6mks)

A.....

B.....

C.....

D.....

E.....

F.....

5. A) The following is an outline of one method for the preparation of lead (II) sulphate from Lead oxide

Dissolve lead (II) oxide in hot dilute nitric acid and then add a light excess of a solution of sodium sulphate. Filter and wash the precipitate with distilled water and dry it in an oven.

i) Write equation for the two reactions used in the preparation. (2mks)

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ii) Name two impurities that may be removed when the precipitate of lead (II) sulphate is washed. (2mks)

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iii) Why is there very little reaction when an attempt is made to prepare lead (II) sulphate by adding lead (II) oxide to sulphuric acid? (1mk)

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iv) Name two sulphates (other than sodium sulphate) that could be prepared by adding metallic oxides to sulphuric acid. (2mks)

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b. i) Describe the preparation of pure crystals of sodium sulphate ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$) from a solution of sodium carbonate. Use equations. (3mks)

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ii) What is the relative molecular mass of sodium sulphate $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$? (Na=23, S=32, O=16, H=1.0) ()

iii) Calculate the maximum mass of crystals of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ that could be obtained from 250cm^3 of 1.0m sulphuric acid. (2mks)