ST. FRANCIS GIRLS' HIGH SCHOOL (MANG'U)

CHEMISTRY TOPICAL EXAMINATION

FORM 4 TERM ONE 2016

80 marks

2hours

Topics evaluated

- **Organic chemistry**
- **Sulphur and its compounds**
- **Chlorine and its compounds**
- **Nitrogen and its compounds**

1. Write the observation made when sulphur (iv) oxide is bubbled in each of the following solutions.

solutions	observations
(i) $Fe_2(SO_4)_3$ (aq)	
(ii) $Ba(NO_3)_2$ (aq)	
(iii) $KMnO_4$ (aq)	
(iv) $K_2Cr_2O_7$ (aq)	
(v) HNO_3 (l)	

(5marks)

i. Write ionic equation to explain the observation in (ii) (1mark)

ii. Write an equation to explain the observation in (v) above. (1mark)

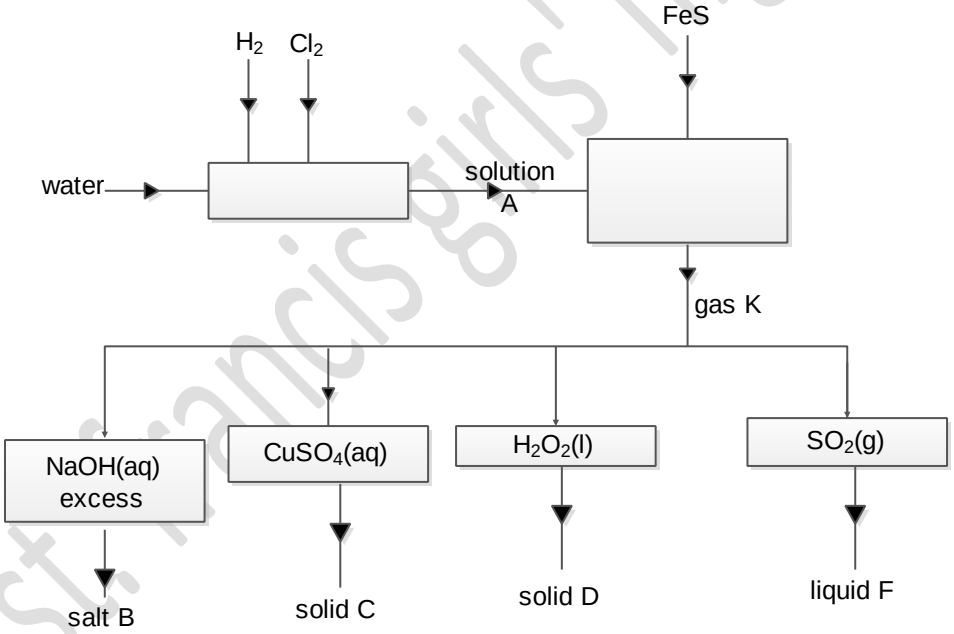
iii. Write the new cations and anions found in mixture of test (ii) and (iii) after bubbling sulphur (iv) oxide.

iv. Test (ii) ..... (1mark)

Test (iii) ..... (1mark)

i. Describe one chemical test that can be used to distinguish sodium sulphite and sodium sulphate . (3marks)

2. Read the flow chart below and answer the questions that follow.



i. Name the following substances: (6marks)

Solution A .....

Salt B .....

Solid C .....

Solid D .....

Liquid F .....

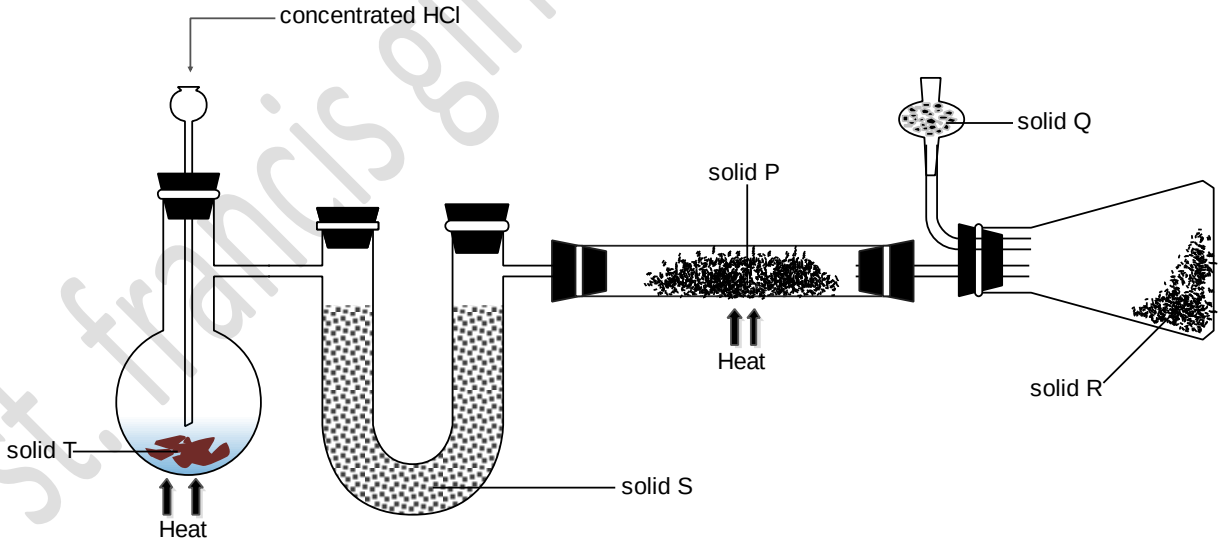
Gas K .....

ii. Write an ionic equation for the formation of; (1mark)
Solid C

iii. Write equations for the formation of: (2marks)
Solid D

Liquid F

3. The set-up below was used to prepare dry chlorine and dry aluminum chloride study it and answer the questions that follow.



i. Name solids P, S and R (3marks)

ii. Name any two substances that can be used as solid T. (2marks)

iii. State two purposes of solid Q in the set-up. (2marks)

iv. State one physical property of solid R in relation to its position in the apparatus. (1mark)

v. Write two equations for reactions that take place at solid P. (2marks)

vi. State one use of chlorine. (1mark)

4. State the observations made when concentrated sulphuric (vi) acid is added to each of the following substances.
   i. Anhydrous copper (ii) sulphate. (1mark)

   ii. Copper metal (1mark)

   iii. Sodium chloride (1mark)

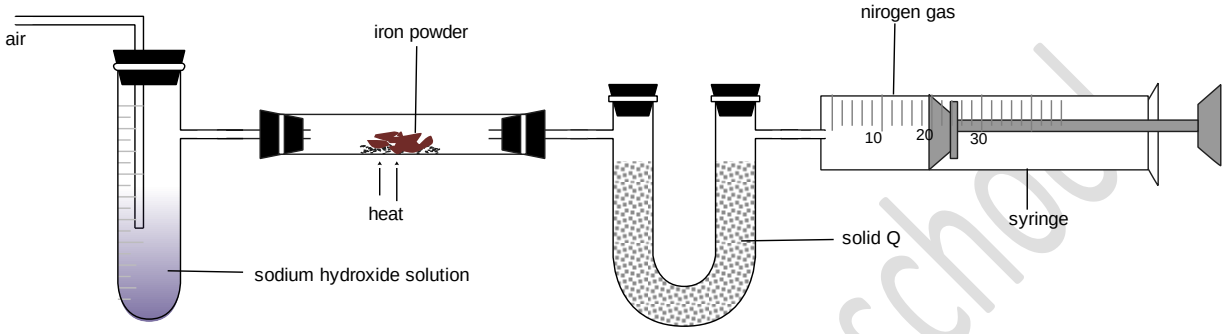
1. What is the oxidation number / oxidation state of ;
   i. Sulphur in Na_2SO_3? (1marks)

   ii. Sulphur in $ZnSO_4$? (1marks)

   iii. Nitrogen in HNO_2? (1 marks)

   iv. Nitrogen in HNO_3? (1 marks)

5. The diagram below represents a set-up used to obtain nitrogen from air. Study it and answer the questions that follow:-



A

i. What is the purpose of sodium hydroxide (1mark)

ii. Name solid Q (1mark)

iii. Write equations for the reactions which took place in tube A and combustion tube. (2 marks)

iv. Give the name of **one** impurity in the nitrogen gas obtained in the experiment. (1mark)

v. Give one use of nitrogen gas. (1mark)

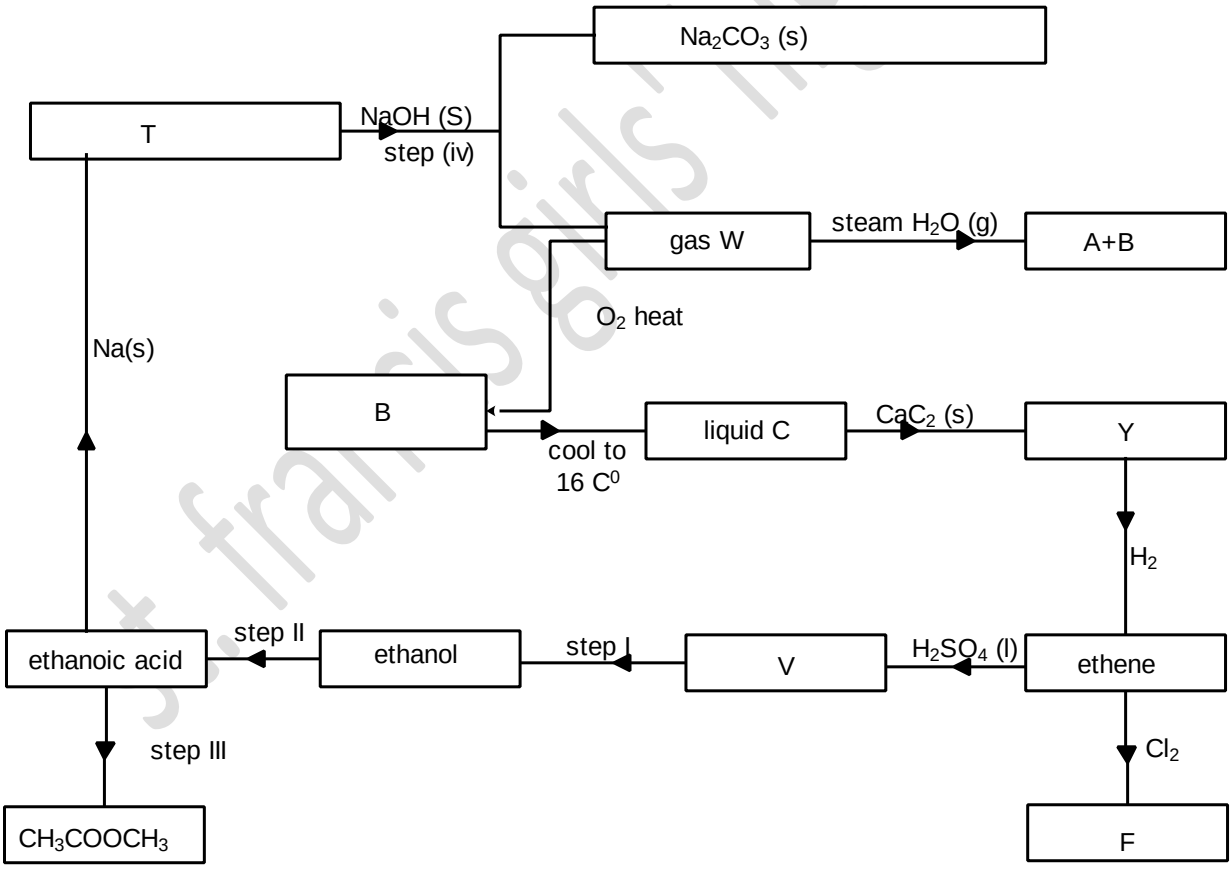
6. (i) What is the observation made when nitrogen (iv) oxide is bubbled in sodium hydroxide

solution in which phenolphthalein indicator has been added? (1mark)

(ii) Write an equation for the reaction that takes place. (1mark)

(ii) Describe one chemical test that can be used to distinguish nitrogen (i) oxide and nitrogen (ii) oxide (2marks)

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



(a) Name the substances

T.....1mk

W.....1mk

A and B.....1mk

C.....1mk

D.....1mk

Y.....1mk

V.....1mk

F.....1mk

(b). Write the equation for reaction in step (iv). (1mk)

(c)i) Name the reagents used in step (iii) (1mk)

(ii) Name two conditions necessary for the reaction in step iii to take place. (1mk)

(d) Name the reagents used in:
i) Step II (1mk)

ii) Step 1 (1mk)

(e) Write the equation between gas W and steam H_2O (1mk)

(f) Write the equation for the reaction between liquid C and calcium carbide. (1mk)

8. The table below shows some tests and observations made on compound M.

TEST	OBSERVATIONS
i. M is heated strongly	Black residue Colourless droplets Chocking smell
ii. Sodium hydroxide solution is added to solution of **M**	Blue precipitates
iii. Barium nitrate solution is added	White precipitates
iv. Solid **M** is added in dilute hydrochloric acid	No effervescence

a) Explain the observations in test **I** (3marks)

b) Name the precipitates formed in test ii and iii (2marks)

c) Write the chemical formula of M. (1mark)

9. A student was given compound **A** in order to identify it. She performed some tests and recorded the observations as shown below:

Tests	Observations
i) Aqueous sodium hydroxide was put to a solution of K	- White precipitate - It dissolved in excess NaOH
ii) Aqueous ammonia was put to a solution of K	- White precipitate - Insoluble in excess $NH_{3(aq)}$
iii) Aqueous sodium sulphate was added to a solution of K	- white precipitate
iv) K was heated strongly	- brown fumes

i) Identify the cation and anion in **A**

Cations ..... (1mk)

Anions ..... (1 Mk)

ii) Name compound **A** (1 Mk)

iii) Write ionic equations to explain observations in test; (2marks)

I .....

II .....

iv) Write an equation for the reaction in test (iv) (1mark)

10. The following tests were carried out on three separate portions of a colourless solution N.

Test	Observations
Addition of dilute hydrochloric acid to the first portion of N	No white precipitate formed
Addition of aqueous sodium carbonate to 2nd portion of N	A white precipitate was formed
Addition of aqueous ammonia to the 3rd portion of N	A white precipitate formed dissolves in excess ammonia solution

a) From the information in test (I), name a cation which is not present in solution N. (2mk)

b) Identify a cation which is likely to present in solution N. (1mk)

c) Write an ionic equation for the reaction which takes place in test (II). (1mk)