

The Cathedral and John Connon School.
Preliminary Examination.2007-08.
Std. X

Date:16.01.08

Subject : Chemistry
(One hour and a half)

Marks: 80

The exam papers is . com

Answer to this paper must be written on the paper provided separately.

You will not be allowed to write during the first 10 minutes.

This time is to be spent in reading the Question Paper.

The time given at the head of the paper is the time allowed for writing the answers

Section-I is compulsory . Attempt any four questions from Section-II .

The intended marks for questions or parts of questions are given in bracket [] .

Section-I (40marks)

(Attempt all questions from this section.)

Question-1.

- (a) Select from the list given below , the one substance in each case which matches the descriptions given in parts (i) to (v) . Any substance can be used only once . [5]
- A. Zinc oxide.
 - B. Zinc hydroxide.
 - C. Zinc sulphite.
 - D. Zinc sulphide.
 - E. Zinc.
- i) This substance gives colourless and odourless gas, when mixed with dilute sulphuric acid.
- ii) This substance is yellow when hot and white when cold.
- iii) This substance gives pungent smelling gas when mixed with dilute sulphuric acid.
- iv) This substance dissolves in excess of ammonium hydroxide solution.
- v) This substance gives a gas having a smell of a rotten egg, when mixed with dilute sulphuric acid.
- (b) Choose the correct answer from the choices A,B,C and D. [5]
- i) Copper on reaction with hot concentrated sulphuric acid gives:-
- A. SO₂
 - B. H₂
 - C. H₂S
 - D. SO₃

This paper consists seven printed pages.

ii) Ammonia gas when heated with copper oxide gives;-

- A. N_2O
- B. NO_2
- C. N_2
- D. O_2

iii) Manganese dioxide on heating with concentrated hydrochloric acid gives:-

- A. O_2
- B. H_2
- C. Cl_2
- D. None

iv) The main waste gas from the blast furnace is:-

- A. CO
- B. CO_2
- C. N_2
- D. H_2

v) Copper on reaction with hot concentrated nitric acid gives:-

- A. N_2O
- B. NO_2
- C. NH_3
- D. NO

c) Name a laboratory reagent added to the following substances to show the change as described below:- [5]

- i) Copper sulphate solution turns inky blue solution.
- ii) White precipitate of lead hydroxide dissolves to give colourless solution.
- iii) Sugar changes into black spongy mass.
- iv) Lead nitrate solution gives white precipitate which dissolves on heating.
- v) Silver chloride precipitate dissolves to give colorless solution

d) Match the description (i) to (v) with the appropriate term from the list:-[5]

- | | |
|----------------|-----------------|
| 1. Acidity. | 6. Flux |
| 2. Catenation. | 7. Electrolyte. |
| 3. Mineral. | 8. Conductor. |
| 4. Basicity. | 9. Ore. |
| 5. Allotropy. | 10. Slag. |

- i) Tendency of carbon atoms to form long chain.
- ii) The number of hydrogen ions produced by the dissociation of one molecule of the acid in its aqueous solution.
- iii) The compound or the combined form of metal selected for the extraction of a metal .
- iv) A compound which in the fused state or in aqueous solution , allows passage of electric current and is decomposed by it.
- v) A fusible by-product obtained during smelting of hematite ore in blast furnace .

e) Write balanced chemical equations for the following reactions:- [5]

- i) Sodium bicarbonate reacts with dilute hydrochloric acid.
- ii) Lead nitrate crystals are heated in a dry test tube.
- iii) Barium chloride solution is added to sodium sulphate solution.
- iv) Potassium nitrate reacts with hot concentrated sulphuric acid.
- v) Ferrous sulphide reacts with dilute sulphuric acid.

f) The following table represents a part of the periodic table :- [5]

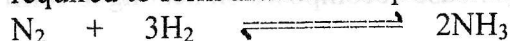
H
Li , Be , B , C , N , O , F
Na , Mg , Al , Si , P , S , Cl

- i) Select an element having the smallest size in the second period.
- ii) An element having the largest size in the third period.
- iii) What type of bonding is expected between the largest and the smallest atom you have named in (i) and (ii).?
- iv) Which two elements will combine to give a basic gas .?
- v) What type of bonding is expected in the formation of the basic gas?

g) A flask contain 2.8g of nitrogen gas. [5]

[At. Wt of N=14, Avogadro's No : 6×10^{23}] Calculate :-

- i) The number of moles of nitrogen present in the flask.
- ii) The number of molecules of nitrogen present in the flask.
- iii) The volume occupied by 2.8g of nitrogen gas at stp.
- iv) For a volume calculated in (iii) , calculate the volume of hydrogen required to form ammonia as per the equation given :



- h) Refer to the purification of bauxite ore by Bayer's process and provide the suitable word to fill the blanks :- (5)
A concentrated solution of (i)----- is added to bauxite ore. The filtrate obtained is a solution of (ii)----- which is represented by the chemical formula (iii)----- . The filtrate is treated with water acidified with dilute hydrochloric acid to precipitate (iv)----- which is converted into ----- by heating.

Section-II.

(Answer any four questions)

Question-2.

- a) Water can be decomposed into hydrogen and oxygen by electrolysis under suitable condition (5)
- State the suitable condition for the decomposition of water by electrolysis
 - Write a balanced chemical equation to show the decomposition of water into its elements.
 - What is the weight in grams of hydrogen and oxygen formed when one mole of water is electrolysed.? [Atomic weight : H=1 , O=16]
 - If 2500cm^3 of hydrogen is obtained ,calculate the volume of oxygen formed under the same conditions of temperature and pressure. .
- b) Answer the following questions:- (3)
- Which one has a higher content of carbon : pig iron or steel?
 - What is the role of coke in the extraction of iron from haemetite ore ?
 - What is the name of an alloy used in making an aircraft body ?
- c) Write a balanced chemical equation for the following reactions :- (2)
- Ammonia reacts with excess of chlorine.
 - Carbon is oxidized by concentrated sulphuric acid..

Question-3.

- a) From the list given below, select the suitable chemical(s) which are the reactants described from (i) to (v). Write a balanced chemical equation for each reaction :- List : NaOH , NH_4Cl , CaO, FeCl_3 , dilute H_2SO_4 , Na_2SO_3 , $\text{Cu}(\text{OH})_2$, $\text{Pb}(\text{OH})_2$, Mg, Cu, dilute HNO_3 (5)
- A base neutralizes an acid to give salt and water.
 - An alkali liberates ammonia when heated with a salt.
 - An alkali is used to precipitate an insoluble hydroxide.
 - A metal produces hydrogen gas on reaction with dilute acid.
 - A base decomposes on heating to form a black residue.

- b) Identify the chemical property of sulphur dioxide gas, which brings the following changes in a reaction.:- (3)
- Hydrogen sulphide changes to yellow sulphur.
 - Pale yellow ferric chloride solution turns light green solution of ferrous chloride.
 - Moist red flower becomes white.
- c) An electron is removed from an element X. (2)
- Write the ionic equation to show removal of an electron from X
 - Is X getting oxidized or reduced.?
 - Is X a metal or non-metal.?
 - Which electrode will X ion in solution, migrate to during electrolysis.

Question-4.

- a) In the laboratory preparation of nitric acid, what is the importance of the following factors :- (3)
- Concentrated sulphuric acid is used.
 - Glass apparatus is used.
 - The reaction mixture should not be heated beyond 200°C .
- b) Write balanced chemical equations for the reaction occurring in the various chambers in the manufacture of nitric acid by Ostwald's process. (3)
- c) What is the term explained in the following? (4)
- Tendency of an atom to attract pair of electrons towards itself in a chemical bond.
 - Energy required to remove an electron from the outermost shell of an atom in gaseous state.
 - Energy released when atom in its gaseous state gains an electron.
 - Electrons present in the outermost shell of an atom..

Question-5.

- a) Give reasons:- (4)
- Copper, though a good conductor of electricity is a non-electrolyte.
 - Electrolysis is an example of a redox reaction.
 - Sulphur trioxide should not be directly converted into sulphuric acid by adding water.
- b) Write the IUPAC name of the following organic compounds: (4)
- CH_3COOH .
 - HCHO .
 - $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2$.
 - CH=CH .

- c) Fill in the blanks:- (2)
- Ethene, propene and butene are -----of alkene series with successive member differing in their molecular formula by --- group.
 - Organic compounds having the same molecular formula but different structure are called -----.
 - Alkanes can be represented by a general formula -----

Question-6.

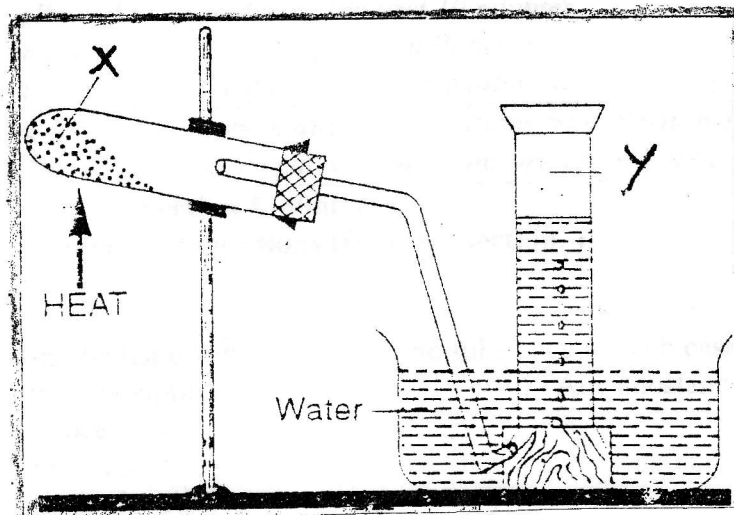
- Answer the following questions relating to salts and their preparation : (4)
 - Define salt.
 - What kind of salt is prepared by precipitation ?
 - Write a balanced chemical equation to show preparation of a salt by synthesis.
 - Which procedure would you use to prepare sodium sulphate.
- Copy and complete the following table which refers to two practical application of electrolysis. (3)

S.No	Application	Cathode	Anode	Electrolyte
i)	Silver plating of a spoon			
ii)	Purification of an impure sheet of copper			

- In the manufacture of sulphuric acid by contact process . write balanced chemical equations for the following steps ;- (3)
 - Oxidation of sulphur dioxide into sulphur trioxide.
 - Absorption of sulphur trioxide on sulphuric acid
 - Dilution of oleum .

Question-7.

- a) A hydrocarbon of vapour density 15 has 80% carbon and the rest is hydrogen.. Find the molecular formula of the hydrocarbon.
[Atomic weight :- C=12 , H=1 .] (4)
- b) Diagram given below shows the laboratory preparation of a hydrocarbon gas which is also known as marsh gas. (3)



- i) What are the reactants present in the mixture X ?
- ii) Write the IUPAC name of the gas Y produced.
- iii) Write balanced chemical equation to show the laboratory preparation of this gas Y
- c) Answer the following questions:- (3)
- i) What do you observe when silver nitrate solution is added to dilute hydrochloric acid.?
- ii) How will the action of dilute sulphuric acid on sodium carbonate and sodium sulphite enable you to distinguish between these two compounds?
- iii) Name one lead compound that can be used to oxidize concentrated hydrochloric acid into chlorine gas.
-