ST MARY'S SCHOOL ICSE, MAZGAON, MUMBAI - 400010

Preliminary Examination

Class : 10 | Time : 1hr. 30 min.

Date : January 17, 2008 | Marks : 80

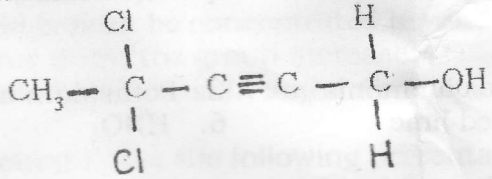
CHEMISTRY

Section -I (All the questions are compulsory.)

Q.I.a. Write the structural formula of (2)

1. dimethyl propane
2. 2-chloro 2 butene

b. Write the IUPAC name of (2)

1. Isopentane
2. 

c. Name the following and write a balanced reaction in each case. (6)

1) The gas liberated when excess of chlorine reacts with ammonia.
2) The precipitate formed when rotten egg smelling gas is bubbled in silver nitrate solution.
3) The salt obtained when plumbous oxide is treated with caustic potash solution.
4) The residue left on thermal decomposition of Chile salt petre.

d. Element X forms a trivalent cation and element P forms a divalent anion.

1) State the valence electrons in the atoms of X and P respectively. (1)
2) What kind of compound is formed by i) X and P (1)
   ii) P and element T with atomic number one. (1)

e) Given symbols of elements:- Li, Na, Fr, Rb, K, Cs

1) What is similar to all these elements? (1)
2) Which has the largest atomic size? (½)
3) Are these elements good oxidizing or reducing agents? (½)

f) Give balanced chemical reactions to convert (3)

1) ethene to ethylene dibromide
2) silver chloride to soluble complex salt
3) sulphur trioxide to pyrosulphuric acid

g. State the property of the underlined substance. (2)

1) P_2O_5 is not used to dry ammonia.
2) HNO_3 is not stored in plain glass bottles.

h. 6 l of a fluoride of phosphorus weighs 22 g at s.t.p. Find the molecular formula of the given fluoride (P = 31 F = 19) (3)

i. State the colour of:- (2)

1) The solution obtained on bubbling sulphur dioxide through ferric chloride solution.
2) The precipitate obtained when cupric chloride is treated with sodium hydroxide solution.

j. Match the process with the questions given below and write the answers only. (5)
Process: Esterification, Neutralization, Calcination, Dehydrohalogenation, Dehydration

1. To prepare ethene from ethyl chloride and sodium hydroxide
2. Reaction of carboxylic acid and an alcohol
3. Preparation of ethene from ethanol
4. Reaction of an acid and a base to give salt and water
1. Heating zinc carbonate in the absence of or in little air

k. During electro refining of impure copper
l. What are the electrodes made up of ? (2)
2. Name the electrolyte used and why is it used ? (2)

l. Name (3)
1. a nitrate which decrepitates on heating
2. a sulphate used in the glass industry
3. a reagent which gives white ppt. with dilute sulphuric acid

m. Identify if acid, base or salt. (3)
1. Sodium nitrate 2. Liquor ammonia 3. Potassium mercuric iodide
4. HCOOH 5. Slaked lime 6. HNO_3

Section – II

Attempt any four questions from Section - II

II. a Prepare the following:
X : Iron (III) chloride
Y : Sodium hydroxide solution
Z : Lead nitrate solution
i) Write the reaction as indicated. (3)
1. X using iron filings
2. Y using sodium and water
3. Z using lead carbonate and dilute nitric acid
ii) What do you observe:- (2)
1. Mixing solutions of X and Y
2. Mixing solutions of X and Z

b. Choose the correct word and write the answers only.
i) Element A has a high ionization potential and high electronegativity, element A is likely to be _____. (metal/non metal) (1)
ii) In a period element B is to the right of element C. (4)
1. The atom of element B would be _____ (larger/smaller) than element C.
2. Element B would be _____ (more /less) metallic in character than element C.
3. The element with greater electron affinity would be _____.(B/C)
4. B would have _____ (greater/lesser) ionization potential than the element C.

III. a. State the reason for using:
1. Solder in an electrical fuse. (½).
2. Zinc in copper alloys. (½)
b. Name
1. Alloy of aluminium and magnesium (½)
2. Metals added to Fe and C to make stainless steel (1)
3. A non metal beside iodine which is lustrous (½)
c. In the extraction of Aluminium :-
1. Which solution is used to purify the ore and why? (1½)
2. State the chemical composition of the electrolyte. (1½)
3. Which electrode is continuously replaced and why? (1½)
4. In which state does aluminium come out of the electrolytic bath? (½)
5. Write the electrode reactions? (2)

IV. a. Prove the following facts with the help of balanced chemical reactions. (3)
1. Concentrated sulphuric acid is a non volatile acid.
2. Hydrochloric acid contains chlorine.(not by thermal decomposition)
3. Sulphur dioxide is a reducing agent.

b. Choose the correct alternative and write the answer only. (2)

i. HCl being (1) (less volatile/ volatile) is not used to prepare nitric acid.

ii. Liquid ammonia is (2) (weak/strong / non) electrolyte as it (3) (contains/lacks) (4) (few/only / no) ions.

c. Give reasons :- (5)

1. Sulphur dioxide prepared in the laboratory is made to pass through a washer bottle containing conc. sulphuric acid.
2. During electrolysis of nickel sulphate using nickel anode, the green colour persists. (remains)
3. Nitric acid cannot be concentrated beyond 68% by just distillation.
4. Atomic size down the group increases.
5. Slaked lime is preferred in ammonia preparation.

V. a 1. A compound X has the following percentage composition: 35% N, 5% H and the rest is oxygen. If the empirical formula and molecular formula is the same, then find the molecular formula. (3)

2. Aqueous solution of X gives the brown ring test. Identify the anion and cation of X. (1)

b. Calculate the volume of air needed for complete combustion of $20cm^3$ of propane (C= 12 H = 1 and 20% of air is oxygen)
$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ (3)

c. 5 g of sodium chloride and sodium nitrate was dissolved in water. To this solution excess of lead nitrate was added and 2.78g of lead (II) chloride was precipitated. Find the percentage of sodium chloride in the original mixture. (3)

VI. a. Name the functional group in $CH_3\ CH_2\ CHO$. (1)

b. What kind of reactions will C_5H_{12} undergo? (½)

c. State the term used for organic compounds with same molecular formula but different structural formula. (½)

d. Write a balanced chemical reaction (3)

1. To prepare urotropine
2. Convert ethanol to ethanoic acid.
3. To prepare methyl acetate

e. Identify if ether, ketone, alkane, alkene, alkyne, acid. (3)

1. $C_{17}\ H_{32}$
2. $C_{15}H_{32}$
3. CH_3 -O- CH_3
4. HCOOH
5. C_3H_6
6. $CH_3\ CO\ CH_3$

f. Write the formula of the precipitate formed on bubbling acetylene in ammoniacal silver nitrate solution. (1)

g. Define hydrocarbons. (1)

VII. a. Write a balanced chemical reaction to prepare (2)

1. HCl from ammonia
2. Sulphuric acid from chlorine

b. 1. Draw a dot and cross diagram for hydronium ion. (1)

2. State the kind of bonding present in it. (1)

c. What is the difference in the passing of electricity through copper sulphate solution and copper wire? (1)

d. Using a weak alkali differentiate between zinc ions and plumbous ions. (1)

e. Pick the odd one giving reasons. (4)

1. Nitric acid, Hydrochloric acid, Hydrofluoric acid
2. Sodium potassium carbonate, Calcium oxy chloride, Calcium bi carbonate
3. Lead sulphide, Zinc sulphide, Cupric sulphide
4. Silver electrode, Platinum electrode, Graphite electrode