ICSE Board
Class X Chemistry
Board Paper – 2011

Time: 1½ hrs **Total Marks: 80**

General Instructions:

1. Answers to this paper must be written on the paper provided separately.
2. You will NOT be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.
   The time given at the head of this paper is the time allowed for writing the answers.
   This question paper is divided into two sections.
3. **Section I** contains one question with parts (a) to (h); all the eight parts are to be answered.
4. **Section II** contains six questions numbered 2 to 7. You are to answer any four of these questions.
   The intended marks of questions or for parts of questions are given in brackets **[ ]**.

SECTION I (40 Marks)

*Attempt **all** questions from this section.*

Question 1

(a) Choose from the following list of substances as to what matches the description from (i) to (v) given below: [5]

[Acetylene gas, aqua fortis, coke, brass, barium chloride, bronze, platinum].

i. An aqueous salt solution used for testing sulphate radical.
ii. A catalyst used in the manufacture of nitric acid by Ostwald's process.
iii. A black powdery substance used for the reduction of zinc oxide during its extraction.
iv. A gaseous hydrocarbon commonly used for welding purposes.
v. The substance is an alloy of zinc, copper and tin.

(b) What would you observe in each of the following cases? [5]

i. Ammonium hydroxide is first added in a small quantity and then in excess to a solution of copper sulphate.
ii. Sugar crystals are added to a hard glass test tube containing concentrated sulphuric acid.
iii. Copper is heated with concentrated nitric acid in a hard glass test tube.
iv. Water is added to the product formed when aluminium is burnt in a jar of nitrogen gas.
v. When carbon monoxide is passed over heated copper oxide.

(c) Give reason as to why: [5]

i. The electrolysis of acidulated water is considered an example of catalysis.
ii. Almost 90% of all known compounds are organic in nature.
iii. It is dangerous to burn methane in an insufficient supply of air.
iv. Hydrogen chloride can be termed a polar covalent compound.
v. The oxidising power of elements increases on moving from left to right along a period in the periodic table.

(d) Fill in the blanks from the choices given below: [5]

i. In covalent compounds, the bond is formed due to the_____ (sharing/transfer) of electrons.
ii. Electrovalent compounds have _____ (low/high) boiling point.
iii. A molecule of _____ contains a triple bond (hydrogen, ammonia, nitrogen).
iv. Across a period, the ionisation potential _____ (increases, decreases, remains the same).
v. Down the group, the electron affinity _____ (increases, decreases, remains the same).

(e) [5]

i. Calculate the volume of 320 g of SO_2 at STP (Atomic mass: S = 32 and O = 16).
ii. State Gay-Lussac's Law of combining volumes.
iii. Calculate the volume of oxygen required for the complete combustion of 8.8 of propane (C_3H_8) (Atomic mass: C = 14, O = 16, H = 1, Molar volume = 22.4 dm^3 at STP).

(f) Choose the correct answer from the options given below: [5]

i. This metal is a liquid at room temperature.
   (A) Potassium
   (B) Zinc
   (C) Gold
   (D) Mercury
ii. Hydroxide of this metal is soluble in sodium hydroxide solution.
   (A) Magnesium
   (B) Lead
   (C) Silver
   (D) Copper
iii. In the periodic table, alkali metals are placed in the group_____.
   (A) 1
   (B) 11
   (C) 17
   (D) 18

iv. Hydrogen chloride gas being highly soluble in water is dried by
(A) Anhydrous calcium chloride
(B) Phosphorus pentoxide
(C) Quick lime
(D) Concentrated sulphuric acid

v. The brown ring test is used for the detection of
(A) CO_3^{2-}
(B) NO_3^-
(C) SO_3^{2-}
(D) Cl^-

vi. When dilute sulphuric acid reacts with iron sulphide, the gas evolved is _____.
(A) Hydrogen sulphide
(B) Sulphur dioxide
(C) Sulphur trioxide
(D) Vapour of sulphuric acid

vii. The functional group present in acetic acid is
(A) Ketonic $\rangle C = O$
(B) Hydroxyl -OH
(C) Aldehydic -CHO
(D) Carboxylic -COOH

viii. The unsaturated hydrocarbons undergo
(A) a substitution reaction
(B) an oxidation reaction
(C) an addition reaction
(D) none of the above

ix. The number of C–H bonds in ethane molecule are
(A) Four
(B) Six
(C) Eight
(D) Ten

x. Which of the following properties do not match with elements of the halogen family?
(A) They have seven electrons in their valence shell.
(B) They are highly reactive chemically.
(C) They are metallic in nature.
(D) They are diatomic in their molecular form.

(g) Write the balanced chemical equation for each of the following reactions: [5]

i. Sodium thiosulphate is reacted with dilute hydrochloride acid.
ii. Calcium bicarbonate reacts with dilute hydrochloric acid.
iii. Dilute sulphuric acid is poured over sodium sulphite.
iv. Lead nitrate solution is added to sodium chloride solution.
v. Zinc is heated with sodium hydroxide solution.

SECTION II (40 Marks)

*Attempt **any four** questions from this section.*

Question 2 [10]

(a) Differentiate between electrical conductivity of copper sulphate solution and copper metal.

(b) Sodium hydroxide solution is added to the solutions containing the ions mentioned in List X. List Y gives the details of the precipitate. Match the ions with their coloured precipitates.

List X		List Y	
(i)	Pb^{2+}	A.	Reddish brown
(ii)	Fe^{2+}	B.	White insoluble in excess
(iii)	Zn^{2+}	C.	Dirty green
(vi)	Fe^{3+}	D.	White soluble in excess
(v)	Cu^{2+}	E.	White soluble in excess
(vi)	Ca^{2+}	F.	Blue

(c) During the electrolysis of copper (II) sulphate solution using platinum as cathode and carbon as anode:

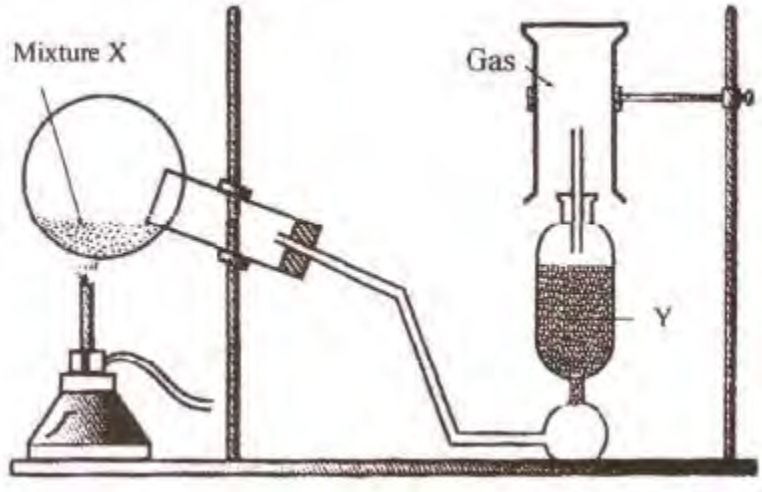
i. What do you observe at the cathode and at the anode?
ii. What change is noticed in the electrolyte?
iii. Write the reactions at the cathode and at the anode.

Question 3 [10]

(a) Answer the following questions:

i. Name a metal which is found abundantly in the Earth's crust.
ii. What is the difference between calcination and roasting?
iii. Name the process used for the enrichment of sulphide ore.
iv. Write the chemical formulae of one main ore of iron and aluminium.
v. Write the constituents of electrolyte for the extraction of aluminium.

(b) The diagram shows an experimental setup for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature.



i. Name the gas collected in the jar.
ii. Write the balanced equation for the above preparation.
iii. How is the gas being collected?
iv. Name the drying agent used.
v. How will you find that the jar is full of gas?

Question 4 [10]

(a) An organic compound with vapour density = 94 contains
C = 12.67%, H = 2.13% and Br = 85.11%. Find the molecular formula.
[Atomic mass: C = 12, H = 1, Br = 80]

(b) Calculate the mass of
i. 10^{22} atoms of sulphur
ii. 0.1 mole of carbon dioxide
[Atomic mass: S = 32, C = 12 and O = 16 and Avogadro's number = 6×10^{23}]

(c) In the laboratory preparation of hydrochloric acid, HCl gas is dissolved in water.
i. Draw a diagram to show the arrangement used for the absorption of HCl in water.
ii. Why is such an arrangement necessary? Give two reasons.
iii. Write the chemical equations for the laboratory preparation of HCl gas when the reactants are
(A) below 200°C
(B) above 200°C

Question 5 [10]

(a) Choose the correct word/phrase from within the brackets to complete the following sentences:
i. The catalyst used for conversion of ethene to ethane is commonly ____ (nickel/iron/cobalt).
ii. When acetaldehyde is oxidised with acidified potassium dichromate, it forms_____(ester/ethanol/acetic acid).
iii. Ethanoic acid reacts with ethanol in the presence of concentrated H_2SO_4, so as to form a compound and water. The chemical reaction which takes place is called____ (dehydration/hydrogenation/esterification).
iv. Write the equation for the reaction taking place between 1, 2-dibromoethane and alcoholic potassium hydroxide.
v. The product formed when ethene gas reacts with water in the presence of sulphuric acid is_____(ethanol/ethanal/ethanoic acid).

(b) Write balanced chemical equations for the following:
i. Monochloroethane is hydrolysed with aqueous KOH.
ii. A mixture of soda lime and sodium acetate is heated.
iii. Ethanol under high pressure and low temperature is treated with acidified potassium dichromate.
iv. Water is added to calcium carbide.
v. Ethanol reacts with sodium at room temperature.

Question 6 [10]

(a)

i. With the help of equations, give an outline for the manufacture of sulphuric acid by the contact process.

ii. What property of sulphuric acid is shown by the reaction of concentrated sulphuric acid when heated with
(A) Potassium nitrate
(B) Carbon

(b)

i. What is the special feature of the apparatus which is used in the laboratory preparation of nitric acid?

ii. Why should the temperature of the reaction mixture of nitric acid not be allowed to rise above 200°C?

(c) Write the balanced chemical equations for the following:

i. Chlorine reacts with excess of ammonia.

ii. Ferric hydroxide reacts with nitric acid.

iii. Zinc oxide dissolves in sodium hydroxide.

Question 7 [10]

(a)

i. Give the number of the group and period of the element having three shells with three electrons in the valence shell.

ii. By drawing an electron dot diagram, show the lone pair effect leading to the formation of ammonium ion from ammonia gas and hydrogen ion.

iii. What happens to the crystals of washing soda when exposed to air?
Name the phenomenon exhibited.

(b) Name the method used for the preparation of the following salts from the list given below:

i. Sodium nitrate

ii. Iron (III) chloride

iii. Lead chloride

iv. Zinc sulphate

v. Sodium hydrogen sulphate

List:

(A) Simple displacement

(B) Neutralisation

(C) Decomposition by acid

(D) Double decomposition

(E) Direct synthesis