ICSE Board
Class X Chemistry
Sample Paper - 6

Time: 2 hrs **Total Marks: 80**

General Instructions:

- Answers to this paper must be written on the paper provided separately.
- 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.

Section I is compulsory.
Attempt any four questions from **Section II.**
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION I (40 Marks)

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

Question 1

a. From the list given below, select words required to complete the blanks (i) to (v). Words should be used only once. Hydrogen, hydronium, hydroxide, salt, water

A solution X turns blue litmus red, so it must contain (i)_____ ions. Another solution Y turns red litmus blue, so it must contain (ii)_____ ions. When solutions X and Y are mixed, the product will be (iii)_____ and (iv)_____. Also, if a piece of magnesium is put into X, (v)_____ gas will be released. [5]

b. Give the structural formula of the following: [5]

i. Butane
ii. Ethyne
iii. Ethanol
iv. Ethanoic acid
v. Propanol

c. Name the colour of the precipitate when sodium hydroxide solution is added to each of the following aqueous solutions: [5]

i. Iron (III) chloride
ii. Calcium chloride
iii. Aluminium chloride
iv. Copper (II) sulphate
v. Iron (II) sulphate

d. Name the following: [5]

i. A polar covalent compound formed between hydrogen and halogen in Period 2 of the periodic table.
ii. A metallic chloride soluble in hot water but not in cold water.
iii. The most metallic element in Period 3.
iv. A coinage metal with brown colour.
v. The alkali formed due to the hydrolysis of washing soda.

e. Choose letters A, B, C and D to match the description: [5]

A = NH_3, B = HCl, C = H_2S, D = SO_2

i. This gas can be oxidised to sulphur.
ii. When this gas is bubbled through $CuSO_4$ solution, a deep blue solution is obtained.
iii. This gas can be obtained by the reaction of Cu with conc. H_2SO_4.
iv. This gas gives a white precipitate with $AgNO_3$ solution.
v. This gas burns in oxygen with a yellowish green flame.

f. Classify the following as strong electrolyte or non-electrolyte: [5]

i. Aqueous sodium chloride
ii. Benzene
iii. Vinegar
iv. Distilled water
v. Molten lead bromide

State how the presence of molecules or ions in each differs to give rise to electrical conductivity.

g. Write a fully balanced equation for each of the following cases: [5]

i. Red lead is warmed with concentrated hydrochloric acid.
ii. Magnesium metal is treated with dilute hydrochloric acid.
iii. Lead nitrate is heated in a dry test tube.
iv. Magnesium nitride is treated with warm water.
v. Acetic acid is warmed with ethanol in the presence of concentrated sulphuric acid.

h. Molten lead bromide is used for electrolysis. [5]

i. Name the ions present in the electrolyte.
ii. Name the anode used.
iii. Write the reaction
(a) at the cathode (b) at the anode
iv. Is lead bromide a strong or weak electrolyte?

SECTION II (40 Marks)

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

Question 2 [5]

a.

i. What property of conc. H_2SO_4 is used in the preparation of HCl or HNO_3?
ii. Which property of HCl is exhibited in the fountain experiment?
iii. Why is hydrogen chloride collected by downward displacement?
iv. Which property of conc. H_2SO_4 turns sugar black?
v. Which property of HNO_3 makes it unsuitable for the electrolysis of acidified water?

b. Write balanced equations for the following: [5]

i. Dilute nitric acid and copper
ii. Dilute sulphuric acid and barium chloride
iii. Dilute hydrochloric acid and sodium thiosulphate
iv. Dilute hydrochloric acid and lead nitrate solution
v. Dilute sulphuric acid and sulphide

Question 3

a. $KMnO_4$ dissociates as follows:

$$2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$$

(Solid)

i. Some $KMnO_4$ is heated in a test tube. After collecting 1 litre of O_2 at room temperature, it was found that there was a loss of mass of 1.32 gm. If 1 litre of H_2 under the same conditions of temperature and pressure has a mass of 0.0825 g, then calculate the relative molecular mass of O_2. [2]

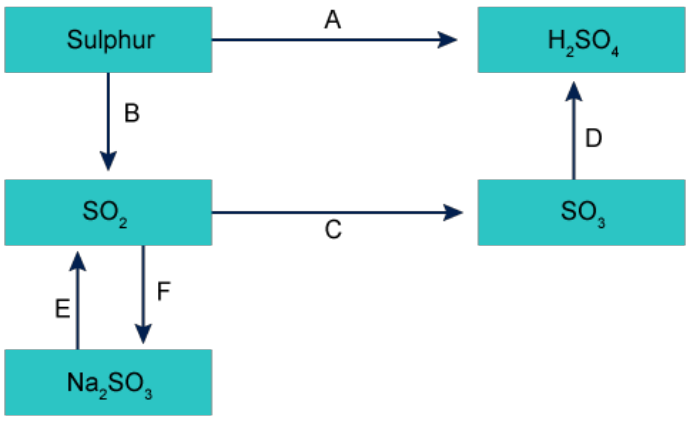
ii. Given the relative molecular mass of $KMnO_4$ is 158, what volume of O_2 (at room temperature) would be obtained by complete decomposition of 15.8 g of $KMnO_4$ (molar volume at room temperature = 24 litre)? [3]

b. The following questions refer to the extraction of aluminium: [5]

i. Name the process by which aluminium is extracted.
ii. Name the ore of aluminium used.
iii. What is the function of cryolite in the electrolyte?
iv. Why is it necessary to replace the anode after some time?
v. Write the reaction taking place at the cathode.

Question 4

a. Study the scheme below: [5]



i. Name the catalyst used in Step C.
ii. In the contact process, SO_3 is not directly dissolved in water to get H_2SO_4, instead two steps are followed. Write the chemical reactions for the two steps.
iii. What type of substance liberates SO_2 from Na_2SO_3 as in E?
iv. Write the equation for Step F.

b. [5]

i. Write the equation for the preparation of ethylene from ethanol.
ii. Write the general formula of a saturated hydrocarbon with an example with its structural formula.
iii. Name a compound which will produce acetylene gas when warmed with water.
iv. What property of rusted iron makes it unsuitable for construction work?

Question 5

a. Correct the statements as shown in the example given below: [5]

Statement: Chlorine is a bleaching agent.
Correction: Moist chlorine is a bleaching agent.

i. Lead bromide conducts electricity.
ii. Haematite is the chief ore of aluminium.
iii. Equal masses of all gases under identical conditions contain the same number of molecules.
iv. Hydrochloric acid is prepared in the laboratory by passing hydrogen chloride directly through water.

b. Consider the section of the periodic table given below: [5]

Group numbers	IA	IIA	IIIA	IVA	VA	VIA	VIIA	O
	1	2	13	14	15	16	17	18
	Li		**D**			O	**J**	Ne
	A	Mg	**E**	Si		**H**	**K**	
	B	**C**		**F**	**G**	**I**		**L**

Note: In this table,
B does not represent Boron
C does not represent Carbon
F does not represent Fluorine
H does not represent Hydrogen
K does not represent Potassium

You must see the position of the element in the periodic table. Some elements are given in their own symbol and position in the periodic table, while others are shown with a letter. With reference to the table,

i. Which is the most electronegative?
ii. How many valency electrons are present in G?
iii. Write the formula of the compound between B and H.
iv. In the compound between F and J, what type of bond will be formed?
v. Draw the electron dot structure for the compound formed between C and K.

Question 6

a. Ammonium dichromate $(NH_4)_2Cr_2O_7$ (Mol. wt. = 252) decomposes as follows:

$$(NH_4)_2Cr_2O_7 \rightarrow Cr_2O_3 + 4H_2O + N_2$$

i. What volume of nitrogen at STP will be formed when 63 gm of ammonium dichromate decomposes fully? [2]
ii. If 63 gm of ammonium dichromate is heated above 100°C, then what will be the loss of mass? (H = 1, N = 14, O = 16, Cr = 52) [3]

b. A compound X has the following percentage composition by mass. [5]
Carbon = 26.7%, Oxygen = 71.1%, Hydrogen = 2.2%
Calculate the empirical and molecular formula of X if the relative molecular mass of the compound is 90.04 grams.

Question 7

a. The following questions refer to the periodic table: [5]

i. Name the first and last element of Period 2.
ii. What happens to the atomic size going from top to bottom in a group?
iii. Which among the halogens has the highest electron affinity?
iv. How does ionisation energy vary in a period?
v. What is common in the electronic configuration of Group 7 elements?

b. Identify the following: [2]

i. An acidic gas A gives dense white fumes with ammonia.
ii. A dilute acid B does not give H_2 with metals but gives a gas with copper.

c. [3]

i. Mention one reason for the use of aluminium in thermite welding.
ii. Name a non-metal which has a metallic lustre and sublimes on heating.
iii. Predict the group of an element X if its atomic number is 16.