ICSE Chemistry: Model Paper 2

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) Select the correct alternative from the given bracket to make the statement true:

(i) A solution which on heating with $CaCO_3$, we get the CO_2 gas is _____ [conc. H_2SO_4 / dil. HCl / dil. H_2SO_4].

(ii) A solution which is used to distinguish an ammonium salt from a sodium salt is _____ [$CuCl_2$ soln / NH_4OH / dil. H_2SO_4 / $AgNO_3$ soln.]

(iii) The pH of blood is 7.4, of saliva is 6.5 and a dil. acid 4.5. A solution that is alkaline is _____ [dil. acid / saliva / blood].

(iv) Decomposition of _____ [NaCl / $NaHCO_3$ / $NaNO_3$] by dil. H_2SO_4 an unstable acid is formed.

(v) A metal which reacts with an alkali to liberate hydrogen is _____ [iron / copper / aluminium].

(b) Give balanced equations for the conversion of the following:

(i) An alkane to an alcohol (ii) An alkene to an alkane (iii) An alkyne to an alkene
(iv) An alcohol to an alkene (v) An aldehyde to an acid.

(c) Give reasons for the following:

(i) Hydrogen sulphide is used as an analytical reagent in the laboratory.

(ii) Conc. sulphuric acid is used in the laboratory preparation of iodine from hydrogen iodide.

(iii) To distinguish between dil. H_2SO_4 and dil. HNO_3, barium chloride can be used.

(iv) The gas obtained when zinc reacts with dil. H_2SO_4 or conc. H_2SO_4 are different.

(v) H_2S and SO_2 decolourises acidified $KMnO_4$ solution, even then the two gases can be distinguished with the same.

(d) Fill in the blanks from the given alternatives in the brackets:

(i) Lead nitrate is a / an _____ [acid / normal] salt of nitric acid.

(ii) When H_2S reacts with Dil. HNO_3, the oxidized product obtained is _____ [Sulphur / Sulphur dioxide / sulphuric acid]

(iii) A nitrate on heating melts and liberates only one neutral gas is _____ [lead nitrate / sodium nitrate / silver nitrate / calcium nitrate].

(iv) A mineral acid obtained from conc. nitric acid on reaction with a non-metal is _____ [carbonic acid / sulphuric acid / hydrochloric acid].

(v) The reaction of _____ [calcium oxide / calcium carbonate / calcium sulphate] with dilute nitric acid is an example of neutralization reaction.

(e) Choose the most probable substance from (A),(B),(C),(D) and (E) which need to be added to distinguish :

(i) Ammonia and Sulphur dioxide gas (ii) Ammonium sulphate and ammonium chloride (iii) liquor ammonia and liquid ammonia (iv) Copper (II) oxide and copper (II) chloride (v) Potassium sulphate and ammonium sulphate;

(A) conc. hydrochloric acid (B) Ammonia gas (C) Barium chloride (D) Phenolphthalein (E) Sodium hydroxide.

(f) Choose the compounds from (A),(B),(C),(D) and (E) to match the description (i) to (v) given below :

(A) NH_4Cl, (B) $Ag(NH_3)_2Cl$,(C) AgCl, (D) $FeCl_2$, (E) $PbCl_2$

(i) A soluble salt obtained on reaction of a metallic chloride with liquor ammonia.
(ii) A salt which is insoluble dilute nitric acid but soluble in ammonium hydroxide.
(iii) A salt obtained on reaction of an active metal with hydrogen chloride gas.
(iv) A salt obtained when a basic gas reacts with hydrogen chloride gas.
(v) A salt soluble in hot water but not in cold, obtained on heating an oxidizing agent with conc. HCl.

(g) Name a metal from the activity series which (i) forms an oxide on exposure to air, (ii) displaces hydrogen from steam, (iii) does not react with dilute HCl or H_2SO_4, (iv) forms an oxide and hydroxide soluble in water and (v) forms a nitrate which on thermal decomposition metal is left.

(h) Match the statements in (i) to (v) selecting from (A) to (J) given below:

(A) Anode, (B) Cathode, (C) Sucrose solution, (D) Cl^{-}, (E) Formic acid, (F) Ammonia, (G) Electro-metallurgy, (H) Mg^{2+}, (I) Electro-refining, (J) Sulphur dioxide:

(i) A compound that contains molecules only.
(ii) A compound that ionizes in solution but not in gaseous state.
(iii) An ion that accepts electrons from the cathode and is reduced to neutral atoms.
(iv) The electrode to which the cyanide ions of Na $[Ag(CN)_2]$ solution in water migrate during electrolysis.
(v) An application of electrolysis in which the anode does not generally diminish in its size.

SECTION II (40 Marks)

Attempt **Any Four** *questions from this Section*

Question 2:

(a) Calculate the percentage of water of crystallization in hydrated copper sulphate $[CuSO_4.5H_2O]$ [Cu = 63.5, S = 32, O = 16, H = 1] [Ans. 36.07%]

(b) Following data were obtained from a compound: C = 57.82%, O = 38.58% and rest hydrogen. Its vapour density is 83. Find its empirical and molecular formula. [C = 12, O = 16, H = 1] [Ans. $C_4H_3O_2$ and $C_8H_6O_4$]

(c) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$; $C + O_2 \xrightarrow{\Delta} CO_2$

using the above equation, calculate the amount of $KClO_3$, which on being heated decomposes to give some volume of O_2, which is the volume required for the combustion of 24 g of carbon. [K = 39, Cl = 35.5, O = 16, C = 12] [Ans. 163.33 g.]

Question 3.

(a) Explain the action of NaOH on the following with suitable chemical equations: Zn, PbO, ZnO, Al_2O_3 and $Zn(OH)_2$.

(b) Define the following with suitable example:
Water of crystallisation, Deliquescence, Efflorescence, Electrovalent and Covalent bonds.

Question 4.

(a) Write the electron dot formula of the following compounds :
Water, Ammonia, Methane, Oxygen molecule and Carbon tetrachloride.

(b) With reference to the period 3 of the periodic table – write
(i) The type of bonding in element whose electronic configuration is 2, 8, 7.
(ii) The formula of the chloride of element whose electronic configuration is 2, 8, 4.
(iii) The nature of the oxide of the alkaline earth metal in this period.
(iv) The number of electrons in the penultimate shell of the element whose valence is – 1.
(v) The electronic configuration of the element whose hydroxide is a weak base.

Question 5.

(a) From the list of substance given below choose the pair required to prepare the salts (i) to (v) in the laboratory and write down the relevant equations. The substances are: Copper, Lead, Sodium, Zinc, Potassium, Copper oxide, Lead carbonate, sodium carbonate solution, dilute hydrochloric acid, Dilute nitric acid, and dilute sulphuric acid.
(i) Zinc sulphate; (ii) Copper sulphate (iii) Sodium sulphate (iv) Lead sulphate and (v) Potassium sulphate.

(b) Name the ions formed when – HCl ; HNO_3 ; H_2SO_4 ; CH_3COOH ; NaOH ; NaCl ; Na_2CO_3 ; H_3PO_4 ; KOH and NH_4OH ionizes in aqueous solution.

Question 6.

(a) 'Iron is electroplated with silver'. (i) Define electroplating. (ii) Draw diagram for electroplating. (iii) State two reasons for electroplating. (iv) Why iron is not placed at the anode and silver at the cathode during electroplating ?

(b) Give one use with reason of aluminium in (i) metallic, (ii) powder, (iii) foil, (iv) wire and (v) alloyed form.

Question 7.

(a) Name three chemical products manufactured from nitric acid. Give two general uses of HNO_3.

(b) Starting from H2S how would you obtain Sulphur using – (i) chlorine, (ii) SO_2, (iii) conc. H_2SO_4, (iv) oxygen and (v) nitric acid.