ICSE Chemistry: Model paper 5

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) **Answer the following**: [5]

1. Electrons are getting added to an element X,
   i) Is it getting oxidized or reduced?
   ii) What changes will X have after the addition of electrons?
   iii) Which electrode will X migrate to during the process of electrolysis?
2. Element X is a metal with a valence 2, and element Y is a non-metal with a valence 3. If Y is a diatomic gas, write the equation for the direct combination of X and Y to form a compound.

b) **Choose the correct answers from:** [5]

Parts (i) to (v) refer to changes in the properties of elements on moving left to right across a period of the Periodic Table. For each property, choose the letter corresponding to the correct answer from the choices A, B, C and D.

(i) The non-metallic Character of the elements:
(x) Decreases (y) increases
(z) Remains the same (w) depends on the period.

(ii) The electro-negativity:
(x) Depends on the number of valence electrons (y) Increases
(z) Remains the same (w) decrease.

(iii) The ionization potential:
(x) Goes up and down (y) decreases
(z) Increases (w) remains the same.

(iv) The atomic size:
(x) Decreases (y) increases
(z) Remains the same (w) sometimes increases or decreases.

(v) The electron affinity of the elements in groups 1 to 7:
(x) Goes up and then down (y) decreases and then increases
(z) Increases (w) decreases.

(*c*) **Select the correct word/words from the brackets to make the sentences correct:** [5]

(i) When sodium chloride is formed, the sodium atom loses an electron its valence shell and hence is _____ [oxidized/reduced].

(ii) When magnesium oxide is formed, the magnesium atom loses two electrons from its valence shell and hence is a _____ [reducing agent/oxidizing agent].

(iii) When sodium sulphide is formed, the Sulphur atom gains two electrons in its valence shell and hence is a _____ [reducing agent/oxidizing agent].

(iv) Covalent bond is formed when the participating atoms are two _____ [metals/non-metals] in a chemical reaction.

(v) When the participating atoms in a chemical reaction are metal and a non-metal the compound so formed has _____ [higher/lower] boiling point.

(*d*) **From the list of substances, choose the pair required to prepare**: [5]

From the substances: Copper, Lead, Sodium, Zinc, Copper oxide, Lead carbonate, Iron, Sodium nitrate solution, Lead nitrate solution, Iron[III] carbonate, Iron [III] hydroxide, Sodium hydroxide solution, Copper carbonate, Sodium carbonate solution, dilute hydrochloric acid, dilute nitric acid, dilute sulphuric acid, Hydrogen chloride, Chlorine.

1. Copper sulphate,
2. Sodium sulphate,
3. Lead sulphate,
4. Sodium chloride,
5. Lead chloride,

(*e*) **State the colour of precipitate formed when sodium hydroxide solution is added in small quantity to the following salt solution**: [5]

1. Iron [II] sulphate,
2. Copper [II] sulphate,
3. Zinc sulphate,
4. Iron [III] chloride,
5. Lead nitrate,

(f) **The following salt solutions are provided**: [5]

A: Copper nitrate	B: Iron [II] sulphate	C: Iron [III] chloride
D: Lead nitrate	E: Magnesium sulphate	F: Zinc chloride

1. Which two solutions will give a white precipitate when treated with dilute hydrochloric acid followed by barium chloride solution? [i.e. white precipitate insoluble in dilute hydrochloric acid]
2. Which two solutions will give a white precipitate when treated with dilute HNO_3 & $AgNO_3$ solution?
3. Which solution will give a white precipitate when either dilute HCl or dilute H_2SO_4 is added to it.
4. Which solution becomes a deep/inky blue colour when excess of ammonium hydroxide is added to it.
5. Which solution gives a white precipitate with excess ammonium hydroxide solution?

(g) **From the given compound/gas, select the correct one that matches the description given below:** [5]

Ammonia, chlorine, hydrogen chloride, Sulphur dioxide, hydrogen sulphide, copper oxide, copper sulphate, lead bromide, ammonium sulphate, lead carbonate, copper nitrate, ferrous sulphate.

1. A compound which on heating with sodium hydroxide produces a gas which forms dense white fumes with hydrogen chloride.
2. Although this compound is not a metal hydroxide, its aqueous solution is alkaline in nature.
3. When this gas bubbled through copper sulphate solution, a deep blue coloured solution is formed.
4. This gas is passed over heated CuO to reduce it.

Conc. sulphuric acid is not used for the drying of this gas

(*h*) **Choosing only words from the following list write down the appropriate word to fill in the blanks below**: [5]

Anion, anode, cathode, cations, electrode, electrolyte, nickel, voltmeter, oxidized, reduced, higher, lower, ions, molecules, will, will not

To electroplate an article with nickel requires an [i] _____ which must be a solution containing [ii] _____ ions. The article to be plated is placed at the [iii] _____ of the cell in which the plating is carried out. The [iv] _____ of the cell is made from pure nickel. The ions that are attracted to the negative electrode and discharged are called [v] _____. Pure water consists almost entirely of [vi] _____. We can expect that pure water [vii] _____ normally conduct electricity. With platinum electrodes hydrogen is liberated at the [viii] _____ and oxygen at the [ix] _____ . As we descend the electrochemical series containing cations, the tendency of the cations to get [x] _____ at the cathode increases.

SECTION – II (40 Marks)

Answer ANY FOUR questions

Question 2

With reference to the first three periods of the modern periodic table, answer the following questions:

(i) Write the formula of the sulphate of the element with atomic number 13.

(ii) What type of bonding will be present in the oxide of the element with atomic number 1?

(iii) Which feature of the atomic structure accounts for the similarities in the chemical properties of the elements in group 7A of the periodic table.

(iv) Name the element that has the highest Ionisation potential.

(v) How many electrons are present in the valence shell of the element with the atomic number 18.

(vi) What is the electronic configuration of the element in the third period that gains one electron to change into an anion?
(vii) What is the name given to the energy released when an atom in its isolated gaseous state accepts an electron to form an anion?

Question 3

(a) Why the atomic size of an element decreases in a period as we move from left to right?
(b) Explain why the elements placed in the same group of the periodic table have the same chemical properties?
(c) Predict the group of an element X if its atomic number is 16.

Question 4.

(a) Why do covalent compounds not conduct electricity and ionic compound in the solid state do the same thing?
(b) Why do ionic compounds have high melting points and boiling points while covalent compound have low melting points and boiling points?
(c) Why are covalent compound generally liquids or gases? State two differences between ionic compound and covalent compound.

Question 5.

(a) Define the following terms: (i) Acid (ii) p^H scale (iii) Neutralization.
(b) What is the purpose of the p^H scale? State the p^H of pure water.
(c) Differentiate between the chemical nature of an aqueous solution of HCl and an aqueous solution of ammonia.
(d) Acids dissolve in water to produce positively charged ions. Draw the structure of these ions.

Question 6.

a) Which reagent can be used to distinguish a solution containing a lead salt from a solution containing a zinc salt?
b) Name a metal which is present in the group 3 of the periodic table and which can evolve hydrogen gas when treated with sodium hydroxide solution.
c) What kind of particles will be found in a liquid compound that is a non-electrolyte?
d) Name a solid that undergoes electrolysis when molten.
e) Explain why solid chloride does not allow electricity to pass through.

Question 7.

(a) If fused metallic chloride is electrolyzed, at which electrode would the metal be obtained?
(b) What should be the physical state of lead bromide if it is to conduct electricity?
(c) What particles are present in pure lead bromide?
(d) Write the equation for the reactions that take place at the electrodes during the electrolysis of lead bromide.