

ICSE Chemistry Model Paper-9

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) Write balanced equations for the following reactions. [5]

- Ammonia and excess chlorine. \longrightarrow
- Hydrogen sulphide and conc. H_2SO_4 \longrightarrow
- Sodium sulphite and dil. HCl \longrightarrow
- Lead (iv)oxide and hot conc. HCl \longrightarrow
- Sulphur dioxide and moist chlorine \longrightarrow

b) Answer the following:

- State Avogadro's [1]
- Calculate the mass of 3×10^{25} molecules of carbon dioxide at S.T.P ($\text{C} = 12$; $\text{O} = 16$) [1]
- The combustion of acetylene in the presence of air is as follows.
 $[\text{C}_2\text{H}_2 + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}]$ Calculate the volume of air required for complete combustion of 100 cm^3 acetylene [3]

c) The questions A to E refer to the following salts listed (i) to (v) [5]

- Ferrous sulphate
 - Ferric chloride
 - Ammonium nitrate
 - Ammonium nitrite
 - Lead nitrate
- A. Name the compound that produces dinitrogen oxide on heating.
B. Name the compound that produces nitrogen gas by decomposition on warming
C. Name the salt solution that produces a dirty green precipitate with sodium hydroxide
D. Name the salt solution that produces reddish brown precipitate with ammonium hydroxide.
E. Name the salt that produces nitrogen dioxide on heating.

d) Fill in the blanks (do not copy the sentence) [5]

Covalent compounds are generally soluble in _____ solvent. (Polar, non polar)
For the formation of an ionic bond between a metal and a non-metal, the metal should have _____ (high, low) ionisation energy and the non-metal should have _____ electron affinity (high, low). The ferrous ion _____ an electron to form the ferric ion. (loses, gains) The bond between two elements in the right side of the periodic table is likely to be _____ (ionic, covalent). The most electronegative element is _____ (chlorine, fluorine).

e) Match the description (i) to (v) below with the appropriate term given in the list

(sulphur dioxide, chlorine, hydrogen sulphide, nitrogen, ammonia, nitrogen dioxide)

- i) The gas, that turns lead acetate paper silvery black
- ii) The gas that turns acidified potassium dichromate solution green
- iii) The gas that bleaches silk without damaging it
- iv) The gas that reduces hot copper oxide to copper
- v) The oxidation of ammonia produces this gas

f) State the followings:

- i) The colour of the residue obtained when the following carbonates are heated and cooled. [3]
 - a. Zinc carbonate
 - b. Lead carbonate
 - c. Copper carbonate
- ii) State how you will prove chemically that [2]
 - a. Carbon is a non-metal
 - b. Calcium is a metal

g) Give reasons for the following**[5]**

- a. Electrolysis of molten lead bromide is considered as a redox reaction.
- b. The blue colour of aqueous copper sulphate does not change when it is electrolysed using copper electrodes.
- c. Dry hydrogen chloride does not turn blue litmus red.
- d. Complete the following equations
 - a. $\text{NH}_3 + \text{O}_2$ (at 800° with platinum catalyst) \longrightarrow \rightleftharpoons
 - b. $\text{HCl} + \text{Na}_2\text{SO}_3 \longrightarrow$ \rightleftharpoons

h) A solution has pH value of 7. Explain how you would**[5]**

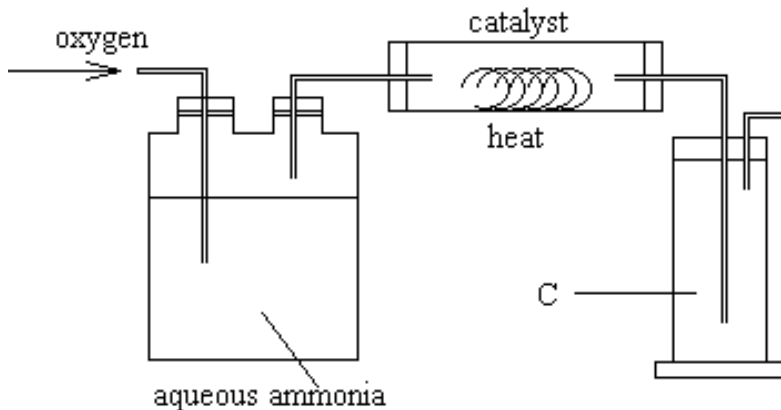
- a) increase the pH of the solution.
- b) decrease the pH of the solution.
- c) Another solution liberates ammonia gas from ammonium chloride on warming. What can you say about its pH?
- d) Using an element like sulphur how will you prepare a solution containing an acid.

Section II

Answer any *FOUR* questions from this section

Question 2.

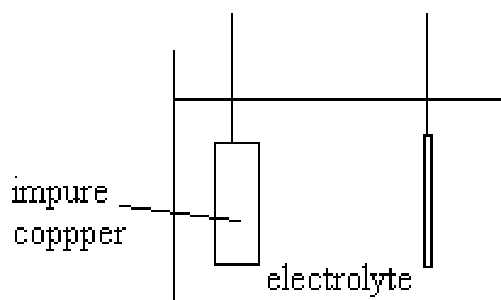
The following diagram represents the catalytic oxidation of ammonia in the laboratory.



- a) Answer the following questions regarding the above reactions [6]
- Write a balanced equation for the oxidation of ammonia in the presence of a catalyst.
 - Name a suitable catalyst.
 - What is the desired temperature for the reaction to occur?
 - Once the reaction starts, the catalyst glows brightly- give a reason for this.
 - What do you observe in flask C?
 - Write an equation for the formation of nitric acid using the product formed in C.
- b) How do you prepare [4]
- Nitric acid in the laboratory from a nitrate
 - Give any two oxidizing properties of nitric acid.
 - Give one test for a nitrate.

Question 3.

The diagram below shows the apparatus used to purify impure copper by electrolysis.



- a) Answer the following questions regarding electrolysis [8]
- What is electrolysis?
 - Name a suitable electrolyte for the above process.
 - Write the symbol for all the ions present in the electrolyte.
 - Name the anode.
 - Name the cathode.
 - Write equations to show the changes occurring at the electrodes.
- b) Give any two applications of electrolysis. [2]

Question 4.

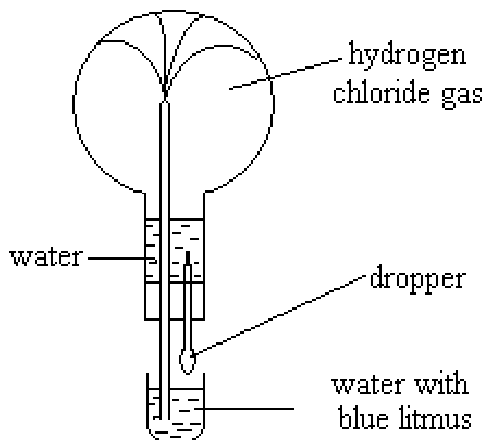
- a) Define Ionisation potential. [1]
 b) State how it varies across the period and down the group of a periodic table. [1]
 c) Give two reasons for the variation of Ionisation potential along the period and down the group of the periodic table. [2]
 d) The atoms A and B have electronic configurations (2, 8, 3) and (2, 8, 7) respectively. State
 i) To which periods and groups A and B belong. [2]
 ii) The valencies of A and B. [2]
 iii) The nature of the compound formed between A and B. Write its formula. [2]

Question 5:

- a) A hydrocarbon X contains 82.8% carbon by mass. [5]
 i) Determine the empirical formula of X.
 ii) If vapour density of X is 29, find its molecular formula.
 b) Answer the following about ammonia: [3]
 i) Name the type of bonds present in the ammonium ion that is not there in ammonia.
 ii) Which feature of ammonia molecule leads to the formation of ammonium ion when ammonia dissolves in water?
 iii) Name the other ion formed when ammonia dissolves in water.
 c) Distinguish between aqueous solutions of lead (II) salts and zinc salts using aqueous sodium hydroxide and aqueous sulphuric acid

Question 6:

- a) What is observed when:
 i) Ammonia gas is allowed to react with hydrogen chloride gas?
 ii) Neutral litmus solution is added to sodium hydrogen carbonate solution?
 iii) A small piece of iron is placed in copper sulphate solution. [3]
 b) Fill in the blanks with suitable words [4]
 An acid is a compound which when dissolved in water forms hydronium ions as the only
 1) _____ ions. A base is a compound which if soluble in water contains
 2) _____ ions. A base reacts with an acid to form a 3) _____ and water only. This
 type of reaction is known as 4) _____.



- c)
 i) Name the experiment illustrated above.
 ii) Which property of hydrogen chloride is demonstrated by the experiment?
 iii) State the colour of the water that has entered the round-bottom flask.

Question 7:

- a) Magnesium and Radium (Ra) belong to the same group in the periodic table. If Magnesium oxide has the formula MgO , what would be the formula of radium oxide, radium hydroxide and radium sulphate? [3]
- b) An element has four valence electrons in its atom, whereas the element B has one valence electron in its atom. The compound formed by A and B does not conduct electricity. [3]
- What is the nature of the chemical bond in the compound formed?
 - Draw its electron dot structure.
 - Does the compound formed between A and B contain ions or molecules?
- c) How many grams of carbon and oxygen are present in 2.5 moles of carbon dioxide? [2]
- d) Name the following: [2]
- A base that is not an alkali
 - A salt soluble in hot water but insoluble in cold water.