PAWAR PUBLIC SCHOOL, BHANDUP

Class	Subject	Exam	Marks	Date	Duration	No. of printed sides
X	Chemistry	II Prelim	80	14. 1 .19	2 hrs.	6

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 allotted for writing the answers.
This Question Paper consists of 3 sheets printed on 6 sides

PAWAR PUBLIC SCHOOL ★ BHANDUP ★

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

Section I (40 marks)

Attempt all questions from this Section

Question 1

(a) For parts a (i) to a (v), select the answer from the choices A,B,C ,D which are given. Write only the alphabet corresponding to the answer. [5]

(i) Which of the following elements has the highest value of electron affinity in 2nd Period of the Periodic Table?

A) Sodium B) Chlorine
C) Fluorine D) Potassium

(ii) Which of the following organic compounds has a carbon – carbon triple bond?

A) C_5H_{10} B) C_5H_8
C) C_5H_{12} D) C_5H_6

(iii) The following reaction occurs at an electrode during electrolysis:

$M^{n+} + ne^- \rightarrow M$

This reaction occurs at the _____ electrode where _____ takes place.

A) negative, reduction B) positive, oxidation
C) negative, , oxidation D) positive, reduction

(iv) Which of the following compounds has the least percentage of carbon by mass?

A) Ethyne B) Ethene
C) Ethane D) Data is insufficient
[H=1, C=12]

(v) Which of the following gives a greenish yellow gas on heating with conc. HCl?

A) Manganese (II) oxide B) Lead (II) oxide
C) Copper (II) oxide D) Manganese (IV) oxide

(b) **Write balanced chemical equations for the following chemical reactions:** [5]

(i) the hydrolysis of magnesium nitride

(ii) the conversion of lead carbonate to lead sulphate (2 steps)

(iii) the reaction of ethyl bromide with an alcoholic solution of caustic potash

(iv) the reaction of copper (II) oxide and ammonia

(c) **Name / State the following:** [5]

(i) the yellow, oily liquid formed when ammonia reacts with excess chlorine

(ii) the method used for the enrichment of sulphide ores

(iii) the metals comprising the alloy used in electrical soldering

(iv) the process of crushing big lumps of ores into smaller particles

(v) the metalloid placed in group 3rd Period and Group 14 of the Periodic Table

(d) **Give relevant observation(s) for each of the following chemical reactions according to the instructions given in the brackets:** [5]

(i) Copper nitrate crystals are heated (2 observations)

(ii) Calcium carbide is hydrolysed with cold water and the gaseous product formed is passed through bromine water.

(iii) Impure copper is refined electrolytically (observation at anode)

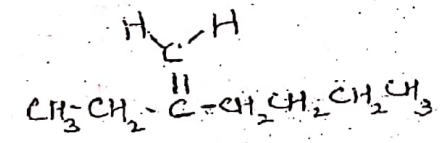
(iv) Dil hydrochloric acid is added to lead nitrate solution and the solution is heated (stepwise observation)

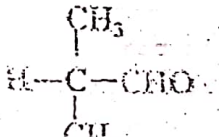
(e) **Answer the following questions:**

i) **Write the structural formula of the following functional groups:** [2]

(1) Alkyne (2) Alcohol

(ii) **Write the IUPAC names of the following organic compounds given below:** [3]

(i) 

(2) 

(3) formic acid

(f) **Give reason/s for the following:** [5]

(i) The wooden shelves on which concentrated sulphuric acid bottles are kept, are stained black.

(ii) Zinc oxide can be reduced to zinc using coke while magnesium oxide cannot be reduced using coke.

(iii) Quick lime is used to dry ammonia gas.

(iv) Chlorine has a higher Ionisation Potential than sulphur .

(v) Sulphur trioxide is not directly absorbed in water in Contact process.

(g) (i) **Give a chemical test to distinguish between the following pairs of chemical compounds:** [3]

1. Hydrogen sulphide and Sulphur dioxide
2. Sodium chloride and Sodium sulphate
3. Iron (II) sulphate and Iron (III) sulphate

(ii) Draw the electron dot structure of a covalent molecule of a gaseous element with a triple bond. [1]

(iii) Give the common name of the sulphide ore of zinc. [1]

(b) **Answer the following questions:**

(i) If 6.0 grams of element 'X' contains 9×10^{22} atoms and 1 mole of the compound X_3Y_2 weighs 148 grams, determine the relative atomic mass of element 'Y'. (Avogadro number = 6×10^{23}) [3]

(ii) Name the element with the highest value of electronegativity in the Periodic Table. [1]

(iii) Name the type of chemical bond common to water, ammonia and hydrogen chloride molecules. [1]

SECTION II (40 Marks)

Attempt any four questions from this Section

Question 2

(a) The following is an extract from 'Metals in the Service of Man, Alexander and Street/ Pelican 1976':

'Alumina has a very high melting point of over 2000°C, so it cannot readily be liquefied. However, conversion of alumina to aluminium and oxygen, by electrolysis, can occur when it is dissolved in some other substance'.

Answer the following questions with regards to the extraction of aluminium from bauxite:

(i) Write the electrode reactions involved in the Hall Herroult process of electrolytic extraction of aluminium. [2]

(ii) Why is it preferable to use a number of graphite anodes rather than a single anode when fused alumina is electrolyzed? [1]

(iii) Write the chemical formulae of the two compounds added to the fused alumina in the electrolytic reduction of alumina. Write one major reason for the addition of each of these compounds. [3]

(b) **Element X is a metal with valency 2. Element Y is a non-metal with valency 3. Answer the following questions with regards to the elements X and Y:**

(i) Write equations to show how X and Y form ions. [2]

(ii) If Y is a diatomic gas, write the equation for the direct combination of X and Y to form a compound. [1]

(iii) If the compound formed between X and Y is melted and an electric current passed through the molten compound, the element Y will be obtained at the..... and X at the ..... of the electrolytic cell. (Provide the missing words) [1]

Question 3

(a) **Some properties of sulphuric acid are listed below. Choose the property A, B, C or D which is responsible for the reactions (i) to (iv) :** [4]

A : acid B: non-volatile acid C: dehydrating agent D: oxidising agent

(Write only the relevant alphabet for each equation)

(i) $C_{12}H_{22}O_{11} + n\ H_2SO_4 \rightarrow 2C + 11H_2O + n\ H_2SO_4$

(ii) $S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$

(iii) $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl\uparrow$

(iv) $MgO + H_2SO_4 \rightarrow MgSO_4 + H_2O$

(b) (i) Explain why the oxidising strength of elements increases from left to right across a period. [1]

(ii) Name the reagent added to react with bauxite as a first step in obtaining pure alumina. Explain the principle involved in the addition of this reagent. [2]

(iii) Pure alumina for the electrolytic extraction of aluminium is obtained by heating Aluminium hydroxide. Write the balanced chemical reaction for this conversion [1]

(c) Prove that the volume occupied by 4.4 grams of carbon dioxide gas is equal to the volume occupied by 2.8 grams of carbon monoxide, both volumes being measured at S.T.P. The Gram Molecular Masses of carbon dioxide and carbon monoxide are 44 g and 28 g respectively. [2]

Question 4

(a) A hydrocarbon contains 82.66 % C and 17.34 % H by mass. What is its empirical formula? If the RMM of the hydrocarbon is 58, determine its molecular formula. [C=12, H=1] [4]

(b) Write the structural formulae of the two isomeric compounds represented by the above molecular formula. [2]

(c) The Fountain experiment is performed for the gases Ammonia and Hydrogen chloride: [2]

(i) Which common property of these two gases is demonstrated by this experiment?

(ii) Is there any difference in the nature of the gases which is demonstrated? If so, mention the same.

(d) **Identify the following salts 'X' and 'Y' using the hints given below and write their chemical formulae:** [2]

(i) Compound 'X' when heated with copper turnings and conc sulphuric acid gives a reddish brown gas. It also gives a lilac coloured flame when the flame test was performed.

(ii) Compound 'Y' gives a brisk effervescence of a colourless, odourless gas which turns lime water milky. Its aqueous solution gives a clear solution with ammonium hydroxide.

Question 5

(a) **Answer the following questions with regards to the electroplating of nickel on an iron nail:**

(i) What is the objective of electroplating the nail with nickel? [1]

(ii) Name the electrolyte used? [1]

(iii) Write the electrode reactions for the above process. [2]

(b) Distinguish between calcination and roasting. [1]

(c) State Gay Lussac's Law of combining volumes of gases. [1]

(46)

(d) Give the balanced chemical equations for the following chemical reactions with the necessary conditions: [4]

(i) zinc is reacted with sodium hydroxide solution

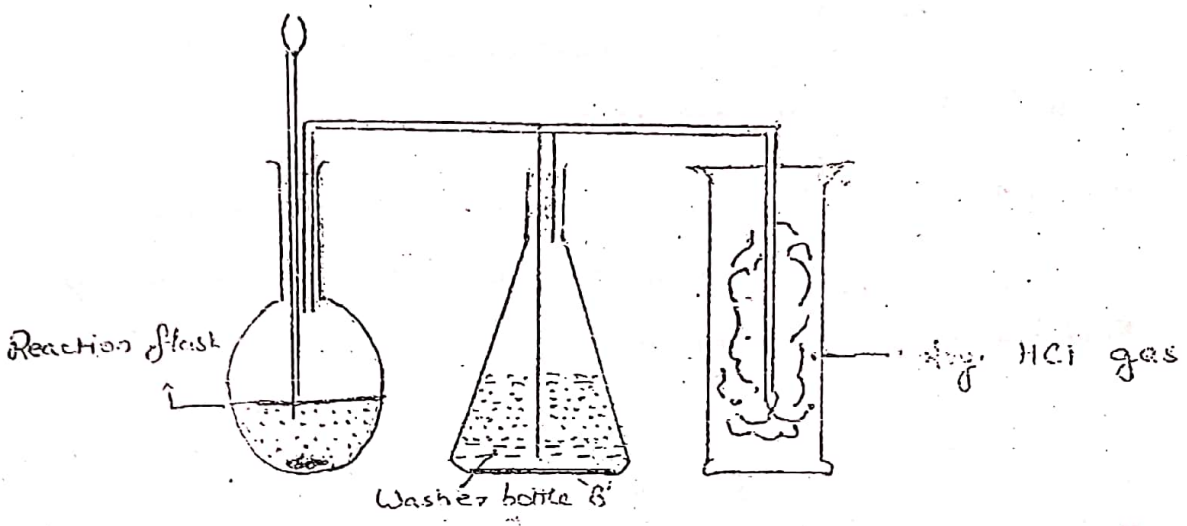
(ii) ethanol is reacted with conc. sulphuric acid

(iii) ethanol and ethanoic acid are reacted together

(iv) ethane is completely burnt in an atmosphere of excess oxygen

Question 6

(a) The diagram given below represents the preparation of hydrogen chloride gas in the laboratory from rock salt. Observe the diagram carefully and answer the questions that follow:



(i) Write the balanced chemical equation for the above preparation. [1]

(ii) Write any one precaution adopted, with respect to the apparatus, during this preparation. [1]

(iii) What are the roles of concentrated sulphuric acid in the reaction flask and in the washer bottle 'B'? [1]

(iv) How can it be ascertained that the gas jar is full of hydrogen chloride gas? [1]

(b) What is observed when ammonium hydroxide solution is added to copper sulphate solution : [4]

(i) dropwise (ii) in excess

Write balanced chemical equations for both the reactions.

(c) Name the following: [2]

(i) an oxide of nitrogen which gives an acidic solution when dissolved in water

(ii) an oxide of nitrogen which is obtained when copper is reacted with cold, dilute nitric acid

Question 7

(a) Following is a list of substances available in the laboratory: [4]

Dilute sulphuric acid	Zinc	Sodium carbonate
Dilute nitric acid	Sodium	Sodium sulphite

Using the above substances, write balanced chemical equations for the preparation of the following substances: (the same equation may be repeated if required)

(i) Hydrogen (ii) Sulphur dioxide (iii) Carbon dioxide (iv) Sodium sulphate

(b) Give reasons for the following: [2]

(i) Sodium chloride is non-volatile while carbon tetrachloride is volatile.

(ii) A solution of vinegar conducts a small amount of electric current.

(c) Give a colour test to identify each of the following gases: [2]

(i) Oxygen (ii) Ammonia

(d) Distinguish between lead carbonate and copper carbonate based on the action of heat. [1]

(e) What is the pH of pure, distilled water? [1]

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