ATUL VIDYALAYA
FIRST PRELIMINARY EXAMINATION 2012-13
(Science Paper 2) CHEMISTRY[TYPEB]

STD: X **TIME: 1 ½ hrs**
DATE: 26-9-12 **MM:80**
SESSION: II

Answer all the questions from Section A and four questions from Section B. You will not be allowed to write during first 10 minutes. This time is to be spent in reading the question paper. All working including rough work should be done on the same sheet. The intended marks for questions or parts of questions are given in brackets.

SECTION –I
(Answer all the questions)

Question 1:

a. Name the following: **[5]**

(i) An alloy that expands on cooling.
(ii) An allotrope of carbon used as electrode.
(iii) A non-metal liquid at room temperature.
(iv) A metal obtained by electrolytic reduction of its ore.
(v) A hydrocarbon used to give very high temperature flames.

b. Give answer in one word: **[5]**

(i) Property of carbon to form long chains.
(ii) Number of atoms present in one molecule of an element.
(iii) Covering an inferior metal by a superior metal by the process of electrolysis.
(iv) Property of losing water of crystallisation to hot air.
(v) Reaction of methane with chlorine in presence of diffused sunlight.

c. Choose from the following list of substance, the one substance in each case which matches the descriptions (i) to (v) given below(write down the names exactly as they are given in list.Do not use symbols or formulae). [5]

Nickel ammonium sulphate, lead sulphate, lead chloride, water, carbon, sodium chlorate, sodium hypochlorate, magnesium nitride.

(i) Which compound reacts with water to give ammonia?
(ii) Name the electrolyte used during nickel plating.
(ii) Name the chloride which is soluble in hot water and insoluble in cold water.
(iii) Name the sulphate which is insoluble in water.
(iv) A solvent for polar molecules.

d. What would you observe when: **[5]**

(i) Burning magnesium ribbon is introduced into a jar of sulphur dioxide.
(ii) Ethene is passed through an alkaline solution of $KMnO_4$.
(iii) A piece of gold is placed in “Aqua Regia ”.
(iv) When ammonia burns in oxygen.
(v) Aqueous copper sulphate solution is electrolyzed between copper electrode .

e. Write balance equations for the following reactions: **[5]**

(i) Lead sulphate from lead nitrate solution and dilute sulphuric acid.
(ii) Copper sulphate from copper and concentrated sulphuric acid
(iii) Lead chloride from lead nitrate solution and sodium chloride solution.
(iv) Ammonium sulphate from ammonia and dilute sulphuric acid.
(v) Sodium chloride from sodium carbonate solution and dilute hydrochloric acid.

f. Select from the list given below, one substance in each case which matches the description given in parts (i) to (v) **[5]**

A. Ferrous sulphate B. Ferric chloride C. Ammonium nitrate D. Hydrogen chloride E. Sodium nitrate

(i) This compound when heated leaves no residue.
(ii) This compound when heated gives oxygen gas.

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(iii) This substance is used to test the presence of nitrate radical.
(iv) This compound forms a yellow solution in water.
(v) This is a highly polar compound.

g. Name the following: **[5]**

(i) Lightest metal in periodic table.
(ii) The element that has an anomalous position in the periodic table.
(iii) Which substance gives a reddish brown precipitate with sodium hydroxide solution?
(iv) Non-metal which exists in two crystalline form.
(v) A metal used in clinical thermometers.

h. A flask contains 4g of methane gas(C=12, H=1). Calculate: **[5]**

(i) Relative molecular mass of methane.
(ii) Vapour density of methane
(iii) Volume occupied by 4 g of methane at STP.
(iv) Number of moles of methane present in flask.
(v) Number of molecules of methane present in flask.

SECTION –II

(Answer any **four** questions)

Question 2 **[10]**

(a) Alumina (Aluminium oxide) has a very high melting point of over 2000^{o}C so that it cannot be readily liquefied. However, conversion of alumina to aluminium and oxygen, by electrolysis, can occur when it is dissolved in some other substance'.

(i) Which solution is used to react with bauxite as a first step in obtaining pure aluminium oxide?

(ii) The aluminium oxide for the electrolytic extraction of aluminium is obtained by heating aluminium hydroxide. Write the equation for this reaction.

(b)

(i) Name the element which serves both as the anode and the cathode in the extraction of aluminium.

(ii) Write the equation for the reaction that occurs at the cathode during the extraction of aluminium by electrolysis.

(iii) Give the equation for the reaction which occurs at the anode when aluminium is purified by electrolysis.

(iv)

1. Name the charged particles which attract one another to form electrovalent compounds.
2. In the formation of electrovalent compounds, electrons are transferred from one element to another. How are electrons involved in the formation of a covalent compound?
3. The electronic configuration of nitrogen is 2,5 . How many electrons in the outer shell of a nitrogen atom are not involved in the formation of a nitrogen molecule?
4. In the formation of magnesium chloride (by direct combination of magnesium and chlorine), name the substance that is oxidized and the substance that is reduced.

Question 3: **[10]**

a. Copy and complete the following table with appropriate words/formulae:

Name of homologous series	Formula of compound	Trivial name	IUPAC name
(i)----------	(iii)----------	Acetylene	(viii)----------
(ii) ----------	C_2H_5OH	(v)----------	(ix)----------
Alkanoic acid	(iv) ----------	(vi)----------	Ethanoic acid
Alkane	CH_3-$CH(CH_3)$-CH_3	(vii)----------	(x)----------

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Question 4 **[10]**

(a) Give balanced equations for the preparation of salts in lab.
(i) Zinc sulphate from Zinc.
(ii) Copper sulphate from copper carbonate.
(iii) Lead sulphate from lead chloride.
(iv) Ammoniumsulphate from ammonium carbonate.

(b) A hydrocarbon X contains 85.7% by weight of C.
(i) Determine its empirical formula(C=12, H=1)
(ii) If moleucular mass of X is 28, find its molecular formula.
(iii) Name the final product formed when X reacts with chlorine.

(c) Calculate the volume of oxygen required to burn 50 cc C_2H_6 completely:
$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$.

Question 5 **[10]**

a. Answer the following:

(i) Of the two gases, ammonia and hydrogen chloride, which is more dense? Name the method of collection of this gas.

(ii) Give one example of a reaction between the above two gases which produces a solid compound.

b. Write a balanced equation for a reaction in which ammonia is oxidized by:

(i) A metal oxide,

(ii) A gas, which is not oxygen.

c. The equation for the burning of octane is:
$2C_8H_8 + 25\ O_2 \rightarrow 16CO_2 + 18\ H_2O$

(i) How many moles of carbon dioxide are produced when one mole of octane burns?

(ii) What volume at STP is occupied by the number of moles determined n (b)(i)?

(iii) If the relative molecular mass of carbon dioxide is 44, what is the mass of carbon dioxide produced by burning two moles of octane?

(iv) What is the empirical formula of octane?

Question 6 **[10]**

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). Some properties may be repeated: Acid, Dehydrating agent, Non-volatile acid, Oxidizing agent

(i) $C_{12}H_{22}O_{11} + nH_2SO_4 \rightarrow 12C + 11\ H_2O + n\ H_2SO_4$

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

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

(iv) $Na_2CO_3 + H_2SO_4 \rightarrow Na_2SO_4 + H_2O + CO_2$

b. (i) Name the acid formed when sulphurdioxide dissolves in water.
(ii) Name the gas released when sodium carbonate is added to a solution of sulphur dioxide.
(iii) What are the two necessary conditions for the direct combination of sulphur dioxide and chlorine forming sulphuryl chloride?
(iv) State the property of sulphur dioxide which causes potassium permanganate to change its colour from purple to colourless.

Question 7: **[10]**

a.

(i) HCl, HNO_3 AND H_2SO_4 are the formulae of three compounds. Which of these compounds has the highest boiling point and which has the lowest?

(ii) Dilute hydrochloric acid and dilute sulphuric acid are both colourless solutions. How will the addition of barium chloride solution to each help to distinguish between the two?

(iii) You enter a laboratory after a class has completed the Fountain experiment. How will you be able to tell whether the gas used in the experiment was hydrogen chloride or ammonia?

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b.What change do you observe at anode when following are electrolyzed:

(i) Aqueous $CuSO_4$ using Cu electrodes.
(ii) Molten lead bromide using graphite electrodes.
(iii) Dil. H_2SO_4 using platinum electrode.
(iv) Aqueous $CuSO_4$ using platinum electrodes.
(v) Alumina dissolved in molten cryolite.

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