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PRELIMINARY EXAMINATION DECEMBER '20

CHEMISTRY

Class : 10
Marks : 80
Reading Time : 1:15 p.m. to 1:30 p.m.
Writing Time : 1:30 p.m. to 3:30 p.m.
Uploading Time: 3:30 p.m. to 4:15 p.m.
Date : 16.12.'20

- ***All the answers to be written in the JNS notebook.***
- ***On top of each page write:***
  First Line:
  First and Last Name: _____ Class and Division: _____ Roll No: _____
  Second Line:
  Subject: _____ Date: _____ Page No: _____
- ***On the first page write the Total No. of Pages used: _____***
- ***Do not copy the questions.***
- ***Take the pictures of the written pages using "Scanbot App" or "Adobe Scan App" and save as "pdf". Upload the pdf file on Edusprint.***
- ***Only when you have completed uploading the document, click the "FINISH" button.***

Attempt all the question from Section I and any four questions from the Section II
Write the correct question number and follow the instructions.
The intended marks for questions or parts of questions are given in the brackets [ ]
This paper consists of 8 printed pages.

Section I (40 marks)
All questions are compulsory.

Question 1

a) **Select the correct answer from choices a, b, c and d which are given below for the following questions:** **[5]**

1. The element with the highest electron affinity is _____.
   a. Fluorine
   b. Chlorine
   c. Bromine
   d. Iodine
2. Which of the following hydroxide is not an alkali?
   a. Ammonium hydroxide
   b. Calcium hydroxide
   c. Copper hydroxide
   d. Sodium hydroxide

3. What is the correct increasing order of the pH of the following solutions with the equal concentration?
    a. HCl< NaOH< CH_3COOH
    b. HCl< CH_3COOH< NaOH
    c. NaOH< HCl< CH_3COOH
    d. CH_3COOH < NaOH< HCl
4. The relative molecular mass of the gas is 44. Therefore, its vapour density is _____.
    a. 44
    b. 88
    c. 22
    d. 11

5. Which of the following statements is wrong about alkanes?
    a. They all are saturated hydrocarbon.
    b. They can undergo addition as well as substitution reaction.
    c. They are almost non-polar in nature.
    d. On complete combustion give out carbon dioxide and water.

b) **Name the following:** **[5]**

1. The common name of the elements of group 2
2. A bond in which the electron pair shifts towards the more electronegative atom
3. A compound which is added to lower the fusion temperature of electrolytic bath during extraction of aluminium
4. The chemical in which gold metal can dissolve
5. The gas that burns in oxygen with a green flame

c) **Select from the list given (A to E) one substance in each case which matches the description given in parts 1 to 5.** **[5]**

Note: Each substance is used only once in the answer.

A. NH_4Cl
B. NH_4NO_3
C. $NaNO_3$
D. $Ag(NO_3)_2$
E. $Ca(NO_3)_2$

1. The salt solution which does not give an insoluble precipitate on addition of ammonium hydroxide in small amount
2. The salt solution which gives a white precipitate with excess of sodium hydroxide solution
3. A metal nitrate which precipitates a chloride ion
4. A compound which does not leave any residue on heating

5. A salt when heated with an alkali produces white fumes with concentrated HCl

d) State your observation for each of the following: **[5]**

1. When ammonia is oxidized with heated copper (II) oxide
2. When zinc nitrate is heated strongly in a test tube
3. Action of dilute hydrochloric acid on iron (II) sulphide
4. When concentrated hydrochloric acid reacts with heated manganese dioxide
5. When copper metal reacts with concentrated sulphuric acid

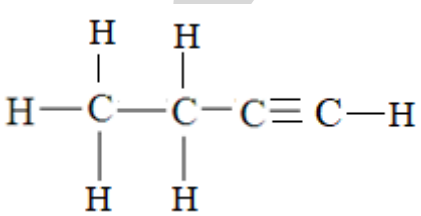
e) Give scientific reasons for the following: **[5]**

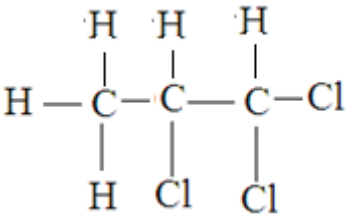
1. Silver nitrate is a good electrolyte, but it is not used for electroplating an article with silver.
2. Blue colour of solid copper sulphate disappears when concentrated sulphuric acid is added to it.
3. Reducing power of the elements decreases across the period from left to right.
4. Ethyne is more reactive than ethane.
5. Covalent compounds have lower melting point and boiling point than ionic compounds.

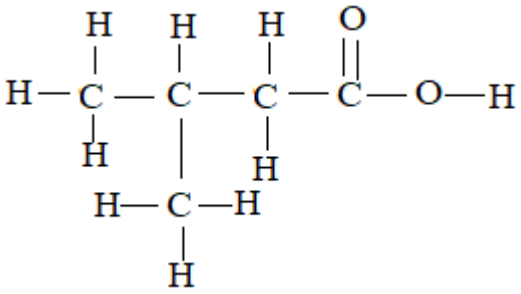
f) Solve the following: **[5]**

1. A compound X consists of 48% of carbon and 95.2 % of bromine by mass. Determine the empirical formula of this compound working correct to one decimal place.
   (Atomic weight- C= 12, Br= 80)
2. Calculate the total percentage of oxygen in Mohr's salt $(NH_4)_2SO_4.FeSO_4.6H_2O$.
   (Atomic weight- H= 1, N= 14, S= 32, O= 16, Fe= 56)

g) (i) Give the IUPAC name of the following organic compounds: **[5]**

1. 

2. 

3. 

(ii) Draw the branched structural formula of the next homologue of methanol. What is its common name?

h) **Write the balanced chemical equation for each of the following:** **[5]**

1. Action of concentrated sodium hydroxide solution on bauxite
2. Reaction of magnesium bicarbonate solution with dilute hydrochloric acid
3. Action of cold dilute nitric acid on zinc metal
4. Reaction of dilute sulphuric acid with insufficient amount of potassium hydroxide solution
5. Reaction of greenish yellow acid gas with excess of basic gas

Section II (40 marks)
Attempt <u>ANY FOUR</u> questions from this section.

Question 2

a. **In part of the periodic table given below, some elements are given in their own symbol and position while others are shown with a letter. These letters are not symbols for those elements.** **[5]**

Groups / Periods	1	2	13	14	15	16	17	18
2	Y	Be		L		A	P	Ne
3	X		Al	Si		N	Q	K
4	Z				M		R	

With reference to the above table answer the following questions

i. What is the electronic configuration of the elements in the second period which gains one electron to change into anion?

ii. Which type of bond will element A form with X?

iii. Draw an electron dot diagram to show the formation of a compound between Z and N.

iv. Identify the element of period 3 with the highest Ionisation potential.

b. Aluminium is extracted from its chief ore, Bauxite. The ore is first purified and then the metal is extracted from it by electrolytic reduction. **[5]**

i. Name the process used for the purification of bauxite.

ii. Write the equation for the action of heat on aluminium hydroxide.

iii. Graphite anodes are continuously replaced during the electrolysis. Give a reason.

iv. Write the equation for the reaction at the cathode and anode during extraction of aluminium.

Question 3

a. Draw an electron dot diagram of a positively charged ion which when combined with a chloride ion produces a compound that is sublimable in nature. State the type of bonding in the ion formed. **[3]**

b. A compound Q on reacting with bromine water gives 1,2- dichloroethane. **[2]**

i. Identify Q.

ii. Mention the type of reaction exhibited by Q with bromine water.

c. A compound is composed of 74% C, 8.7% H and 17.3% N by mass. If the molecular mass of the compound is 162, what is its molecular formula? (Atomic weight- H= 1, C= 12, N= 14) **[5]**

Question 4

a. Answer the following questions: **[2]**

i. Define electronegativity.

ii. Concentrated nitric acid turns yellowish brown in colour when it is kept in the plain glass bottle. Give a reason.

b. Write the balanced chemical equation for the following. State the property exhibited by sulphuric acid in each reaction. **[4]**

i. Action of concentrated sulphuric acid on carbon

ii. Reaction of nitre with concentrated sulphuric acid

c. Answer the following questions with respect to electrolysis of copper sulphate solution by using copper electrodes. **[4]**

i. State your observation at the electrodes. (clearly mentioning the name of the electrode)

ii. State the practical application of electrolysis of copper sulphate solution.

iii. Why the blue colour of electrolyte fades away when platinum electrodes are used during electrolysis?

Question 5

a. Arrange the elements according to the instruction given in the bracket: **[5]**

i. Na, Cs, Li, Rb, K (increasing order of atomic size)

ii. Cu, Mg, Na, Pb, K (decreasing order of reactivity of metals)

iii. Ethane, methane, ethene, ethyne (increasing order of molecular weight)

iv. S, Cl, N, O, F (increasing order of electronegativity)

v. S^{2-}, K^{+}, Cl^{-}, Ca^{2+}, (increasing order of size of ions)

b. **Give one chemical test to differentiate between each of the following pairs.** **[2]**

i. Ferrous nitrate and lead nitrate

ii. Sodium carbonate and sodium sulphite

c. **Industrially, ammonia is obtained by direct combination of nitrogen and hydrogen.** **[3]**

i. Name the process.

ii. Write the balanced chemical equation for the direct combination of nitrogen with hydrogen.

iii. State the purpose of liquefying the ammonia produced in the above process.

Question 6

a. **Fill in the blanks by using correct word/term given in the brackets and rewrite the complete sentence.** **[6]**

i. Compounds of carbon and hydrogen are called _____. (carbohydrate/ hydrocarbon)

ii. The colour of universal indicator at pH 7 is _____. (colourless/ green)

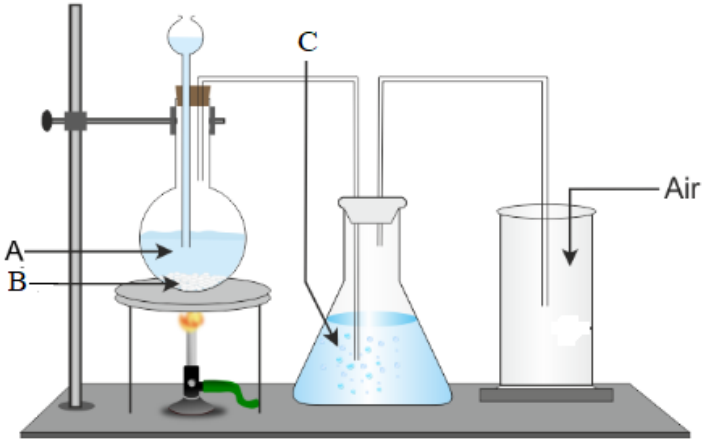
iii. A catalyst used for hydrogenation reaction is _____. (carbon tetra chloride/ nickel)

iv. In aqueous solution, ethanoic acid is ionized _____. (partially/ completely)

v. The branched isomer of butene is _____. (2-methyl butene/ 2-methyl propene)

vi. The oxidized product obtained on reaction of H_2S gas with dilute nitric acid is_____. (sulphur dioxide/ sulphur)

b. **The diagram shows an apparatus for the laboratory preparation of hydrogen chloride gas.** **[4]**



i. Write the balanced chemical equation for the reaction taking place between A and B. (Do not use the letter A and B in the equation)

ii. Identify C.

iii. Give reasons for the following:

a) Hydrogen chloride gas dissolves in toluene but this solution does not conduct electricity.

b) Hydrochloric acid is prepared by using special funnel arrangement.

Question 7

a. **Element X is a metal with a valency 2. Element Y is a non- metal with valency 3.** **[3]**

i. Write the equations to show how X and Y form ions.

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

b. **A sample of X has a cation and anion from the following list:** **[4]**

Anion- CO_3^{2-}, SO_3^{2-}, SO_4^{2-}

Cation – Ca^{2+}, Pb^{2+}, NH^{4+}, Zn^{2+}

Following tests are conducted on a small amount of sample X. State the presence or absence of ions based on the following observations made in each test.

i. When the salt X is strongly heated, it sublimes. Which cation may be present?

ii. On treating solution of X with sodium hydroxide solution

1. No precipitate is formed.
2. A pungent smelling gas is evolved which gives dense white fumes with concentrated HCl.

Which cations are absent?

iii. When dilute sulphuric acid is added to salt X and is heated, a gas is evolved which shows an effect on Acidified potassium dichromate solution. Which anion is present?

iv. The Aqueous solution of X forms a white precipitate with barium nitrate solution. The precipitate is soluble in dilute hydrochloric acid.
Which anion is present?

v. Name the salt X.

c. Following tests are performed with a colourless liquid P. **[3]**

1. When a very dilute solution of liquid P is treated with magnesium ribbon, a colourless, odourless gas is evolved which burns with a pop sound.
2. When freshly prepared acidified ferrous sulphate solution is added to P, a brown ring is formed.

Answer the following questions:

i. Name the liquid P.

ii. Write a balanced chemical equation for the reaction between P and magnesium.

iii. Write the formula of the compound which forms the brown ring.

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