# PRELIM 1 2020 – 21

**Std: X** **Marks: 80**

**Date: 24/02/21** **Subject: CHEMISTRY** **Dur. : 2 Hours**

## SECTION - A (Attempt all questions from this section)

**Q1.**

**(a) Name the following:** **10**

(i) The largest element in period 3.
(ii) A covalent molecule with 1 lone pair of electrons.
(iii) The basicity of formic acid.
(iv) A cation whose precipitate is soluble in excess of NaOH but insoluble in excess of $NH_4OH$.
(v) The product formed at anode during electrolysis of nickel sulphate using active electrodes.
(vi) Chemical formula of the substances which are added in electrolytic mixture of alumina to enhance the conductivity of the mixture.
(vii) The gas evolved when copper reacts with dil. $HNO_3$.
(viii) Cation which burns with golden yellow flame.
(ix) The second member of homologous series of aldehyde.
(x) An acid which when exposed to atmosphere becomes dilute.

**(b) Choose the correct answer:** **5**

(i) The number of C - H bonds present in Ethane are:

(a) 4 (b) 7

(c) 6 (d) 5

(ii) The acid which contains 4 hydrogen atoms in it.

(a) Formic acid (b) Sulphuric acid

(c) Nitric acid (d) Acetic acid

(iii) During the electrolysis of molten lead bromide, which of the following takes Place?

(a) Bromine is released at the cathode.
(b) Lead is deposited at the anode.
(c) Bromine ions gain electrons.
(d) Lead is deposited at the cathode.

(iv) ) If an element belongs to period 3 and group 2 then it will have:

(a) 3 shells and 2 valence electron (b) 2 shells and 3 valence electron

(c) 3 shells and 3 valence electron (d) 2 shells and 2 valence electron

(v) Which of the following is a common characteristic of a covalent compound ?

(a) High melting point

(b) Consists of molecules

(c) Always soluble in water.

(d) Conducts electricity when it is in the molten state.

**(c) Write down the branched structural formula of the following:** **4**

(i) 2- Methyl, butanaldehyde.

(ii) 2,2- dibromo, 3,3-dichloro, pentane.

(iii) Propanoic acid.

(iv) 4- Methyl, pentan-2-ol.

**(d) Write down the IUPAC names of the following:** **3**

(i) $CH_3 - CH = CH_2$

Cl

I

(ii) $CH_2 = CH - C - CH_3$

I

Br

(iii) $CH_3 - C = CH - CH - CH_3$

I I

$CH_3$ $CH_3$

**(e) Differentiate between the following by a chemical test:** **3**

(i) $H_2S$ and $NO_2$

(ii) $Na_2CO_3$ and $Na_2S$

(iii) Calcium nitrate and Zinc nitrate.

**(f) Write down the observation of the following:** **5**

(i) Observation at cathode during electrolysis of aqueous $CuSO_4$ solution using active electrode.

(ii) A basic gas when reacts with lead oxide.

(iii) When sulphur reacts with conc. $H_2SO_4$.

(iv) Catalytic hydrogenation of ethene.

(v) Thermal decomposition of $CuCO_3$.

**(g) Write down the balanced chemical equations of the following:** **5**

(i) Reaction at cathode during electroplating of nickel using active electrodes.

(ii) A silver salt when reacts with dil. HCl gives curdy white precipitate.

(iii) An acidic gas in excess when reacts with a basic gas giving a yellow explosive liquid.

(iv) An active metal reacts with conc.$HNO_3$ gives blue solution.

(v) A trivalent metallic salt when reacts with ammonium hydroxide gives reddish brown precipitate.

**(h) Give reason:** **5**

(i) The ionization potential decreases down the group in periodic table.

(ii) The electrolysis of acidulated water is considered to be an example of catalysis.

(iii) A layer of powdered coke is sprinkled over the electrolytic mixture.

(iv) The platinum continues to glow even after the heating is discontinued during catalytic oxidation of ammonia.

(v) Nitric acid appears yellow when it is left standing in a glass bottle.

**SECTION – B (Attempt any 4 questions from this section.)**

**Q2.**

**(a)** **5**

| **Group number** | **IA 1** | **IIA 2** | **IIIA 13** | **IVA 14** | **VA 15** | **VIA 16** | **VIIA 17** | **0 18** |
|---|---|---|---|---|---|---|---|---|
| **Period 2** | **Li** | | **D** | | | **O** | **J** | **Ne** |
| | **A** | **Mg** | **E** | **Si** | | **H** | **M** | |
| | **R** | **T** | **I** | | **Q** | **U** | | **y** |

In this table H does not represent hydrogen. Some elements are given in their own symbol and position in the periodic table while others are shown with a letter.

With reference to the table answer the following questions:

(i) Identify the most electronegative element.

(ii) Identify the most reactive element of group 1.

(iii) Identify the element from period 3 with least atomic size.

(iv) How many valence electrons are present in Q?

(v) Which element from group 2 would have the least ionization energy?

**(b)** Write balanced chemical equations for the following conversions: **3**

(i) NaCl $\rightarrow$ HCl

(ii) HCl $\rightarrow Cl_2$

(iii) HCl $\rightarrow NH_4Cl$

**(c)** Conc. nitric acid is not used in the laboratory preparation of HCl. Give reason. **1**

**(d)** Identify the gas when potassium sulphite is treated with dilute HCl. **1**

**Q3.**

**(a)** Draw electron dot structure of formation of ammonium ion and Methane.

[ N = 7, H = 1, C = 12] **4**

**(b)** Write down the balanced chemical reactions involved in Baeyer's process. **3**

**(c)** Write the balanced chemical equations involved for the conversion of alumina into pure aluminium. **3**

**Q4.**

**(a)** A solution has pH = 7 . **3**

(i) How would you decrease the pH value of the above solution?

(ii) If a solution changes colour of litmus from red to blue, what can you say about its pH?

(iii) What can you say about pH of the solution, which liberates $CO_2$ from calcium carbonate.

**(b)** Identify the substances on the basis of the description given below: **2**

(i) A substance A contains only ions in its aqueous state.

(ii) A substance B contains ions and molecules in its aqueous state.

**(c)** The action of heat on the blue crystalline solid L gives a reddish brown gas M, a gas which relits a glowing splinter and leaves a black residue. When gas N, which has a rotten egg smell , is passed through a solution of L a black precipitate is formed.

(i) Identify L, M and N. **3**

(ii) Write the equation for the reaction between the solution of L and the gas N. **1**

(iii) Write the formula of the black residue formed. **1**

**Q5.**

**(a)** A compound of C, H and O has the following percentage composition:

C = 26.6%, H = 2.2%, O = 71.25. Calculate the empirical formula of the compound. If its molecular weight is 90, find its molecular formula.

[ H = 1, C = 12, O = 16]. **4**

**(b)** Determine the percentage of oxygen in potassium chlorate.

[ K=39, Cl = 35.5, O = 16] **2**

**(c)** State the property of sulphuric acid which is used in the following reactions: **3**

(i) In the preparation of HCl.

(ii) When carbon converts into carbon dioxide.

(iii) When hydrated copper sulphate turns into anhydrous form.

**(d)** Differentiate between dil. $H_2SO_4$ and dil.$HNO_3$. **1**

**Q6.**

**(a)** Three test tubes contain ferrous sulphate solution, magnesium chloride solution and lead nitrate solution respectively. Describe: **6**

(i) Observation of each test tube when ammonium hydroxide is added first in drops and than in excess.

(ii) Write down the reactions involved in the above 3 test tubes.

**(b)** A substance A is heated with slaked lime and a gas B with a pungent smell is obtained. Name the substances A and B, and give the balanced chemical equation. **3**

**(c)** Name the gas produced when excess of ammonia reacts with chlorine. **1**

**Q7.**

**(a)** Write down the balanced chemical equation for the following: **5**

(i) Conversion of Ethyne into ethane.

(ii) When Ethene reacts with bromine.

(iii) Methane reacts with chlorine. (Till dichloromethane)

**(b)** Select the correct answer from the list given in brackets: **2**

(i) An aqueous electrolyte consisits of the ions mentioned in the list, the ion which could be discharged most readily during electrolysis. [ $Fe^{2+}$, $Cu^{2+}$, $Pb^{2+}$ , $H^+$ ]

(ii) The metallic electrode which does not take part in an electrolytic reaction.

[ Cu, Ag, Pt, Ni]

**(c)** Mr. Ramu wants to electroplate his key chain with silver to prevent rusting. for this electroplating: **3**

(i) Name the electrolyte.

(ii) Write the reaction at anode and cathode.