

**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  $\text{NH}_4\text{OH}$ .
- (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.  $\text{HNO}_3$ .
- (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**

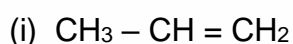
- (i) The number of C - H bonds present in Ethane are:
  - (a) 4
  - (b) 7
  - (c) 6
  - (d) 5
- (ii) The acid which contains 4 hydrogen atoms in it.
  - (a) Formic acid
  - (b) Sulphuric acid
  - (c) Nitric acid
  - (d) Acetic acid
- (iii) During the electrolysis of molten lead bromide, which of the 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**



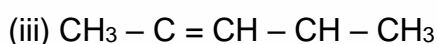
Cl

|



|

Br



|

|

$\text{CH}_3$

$\text{CH}_3$

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

- (i)  $\text{H}_2\text{S}$  and  $\text{NO}_2$   
 (ii)  $\text{Na}_2\text{CO}_3$  and  $\text{Na}_2\text{S}$   
 (iii) Calcium nitrate and Zinc nitrate.

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

- (i) Observation at cathode during electrolysis of aqueous  $\text{CuSO}_4$  solution using active electrode.  
 (ii) A basic gas when reacts with lead oxide.  
 (iii) When sulphur reacts with conc.  $\text{H}_2\text{SO}_4$ .  
 (iv) Catalytic hydrogenation of ethene.

(v) Thermal decomposition of  $\text{CuCO}_3$ .

**(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.  $\text{HNO}_3$  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)  $\text{NaCl} \rightarrow \text{HCl}$

(ii)  $\text{HCl} \rightarrow \text{Cl}_2$

(iii)  $\text{HCl} \rightarrow \text{NH}_4\text{Cl}$

(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  $\text{pH} = 7$ . 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  $\text{CO}_2$  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 relights 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. **2**  
[ K=39, Cl = 35.5, O = 16]
- (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<sub>2</sub>SO<sub>4</sub> and dil.HNO<sub>3</sub>. **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 then 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 consists of the ions mentioned in the list, the ion which could be discharged most readily during electrolysis. [ Fe<sup>2+</sup>, Cu<sup>2+</sup>, Pb<sup>2+</sup>, H<sup>+</sup> ]
- (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.