

# 10th Class 2020

Chemistry

Group-I

Paper-II

Time: 1.45 Hours

(Subjective Type)

Marks: 48

(Part-I)

2. Write short answers to any FIVE (5) questions: (10)

(i) Write down two characteristics of reverse reaction.

Ans

The two characteristics of reverse reaction are:

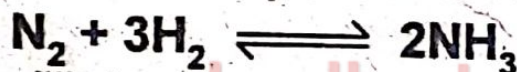
1. It is a reaction in which products react to produce reactants.
2. It takes place from right to left.

(ii) Define equilibrium constant.

Ans

Equilibrium constant is a ratio of the product of concentration of products raised to the power of coefficient to the product of concentration of reactants raised to the power of coefficient as expressed in the balanced chemical equation.

(iii) Calculate units for equilibrium constant for given reaction:



Ans

The equilibrium constant expression for this reaction is:

$$K_c = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3}$$

$$[\text{NH}_3] = \text{mol dm}^{-3}$$

$$[\text{N}_2] = \text{mol dm}^{-3}$$

$$[\text{H}_2] = \text{mol dm}^{-3}$$

$$K_c = \frac{[\text{mol dm}^{-3}]^2}{[\text{mol dm}^{-3}][\text{mol dm}^{-3}]^3}$$

$$K_c = \frac{[\text{mol}^2 \text{ dm}^{-6}]}{[\text{mol dm}^{-3}][\text{mol}^3 \text{ dm}^{-9}]}$$

$$K_c = \frac{[\text{mol}^2 \text{ dm}^{-6}]}{[\text{mol}^4 \text{ dm}^{-12}]}$$

$$K_c = [\text{mol}^2 \text{ dm}^{-6}] [\text{mol}^{-4} \text{ dm}^{12}]$$

$$K_c = \text{mol}^{2-4} \text{ dm}^{-6+12}$$

$$K_c = \text{mol}^{-2} \text{ dm}^6$$



(iv) **What do you mean by extent of a reaction?**

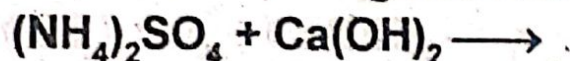
**Ans** Numerical value of the equilibrium constant predicts the extent of a reaction. It indicates to which extent reactants are converted to products. In fact, it measures how far a reaction proceeds before establishing equilibrium state.

(v) **Write two limitations of Arrhenius concept.**

**Ans** Two limitations of Arrhenius concept are:

1. This concept is applicable only in aqueous medium and does not explain nature of acids and bases in non-aqueous medium.
2. According to this concept, acids and bases are only those compounds which contain hydrogen ( $H^+$ ) and hydroxyl ( $OH^-$ ) ions, respectively. It can't explain the nature of compounds like  $CO_2$ ,  $NH_3$ , etc. which are acid and base, respectively.

(vi) **Complete and balance given reaction:**



**Ans**  $(NH_4)_2SO_4 + Ca(OH)_2 \longrightarrow CaSO_4 + 2NH_3 \uparrow + 2H_2O$

(vii) **Write two uses of pH.**

**Ans** Following are the two uses of pH:

1. It is used to determine acidic or basic nature of a solution.
2. It is used to produce medicines, culture at a microbiological particular concentration of  $H^+$  ion.

(viii) **Define double salt with an example.**

**Ans** Double salt are formed by two normal salts when they are crystallized from a mixture of equimolar saturated solutions.

Example: Ferric alum  $K_2SO_4 \cdot Fe(SO_4)_3 \cdot 24H_2O$

3. **Write short answers to any FIVE (5) questions: (10)**

(i) **Write down the name of different types of coal.**

**Ans** Following are the name of different types of coal:

1. Peat
2. Lignite
3. Bituminous
4. Anthracite

(ii) **Define alkyl radicals. How they formed?**

**Ans** Alkyl radicals are derivatives of alkanes. They are formed by the removal of one of the hydrogen atom of an alkane and are represented by a letter 'R'. Their general formula is  $C_n H_{2n+1}$ .

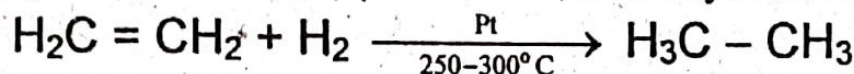


(iii) What is the importance of natural gas?

**Ans** Natural gas is so important that it is used as fuel in homes as well as in industries. It is used as fuel in automobiles as compressed natural gas (CNG). Natural gas is also used to make carbon black and fertilizer.

(iv) Describe hydrogenation of alkenes.

**Ans** Hydrogenation means the addition of hydrogen to an unsaturated hydrocarbon in the presence of a catalyst like Ni, Pt, etc.

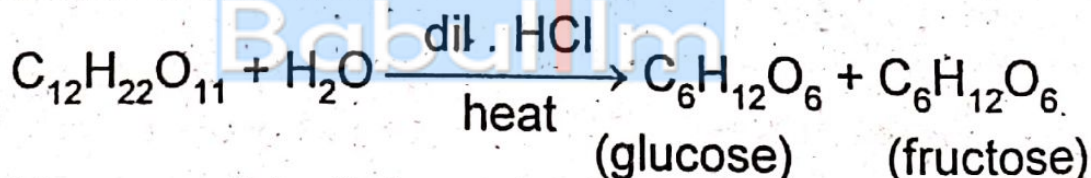


(v) Why alkenes are reactive?

**Ans** Alkenes are reactive compounds because the electrons of the double bond are easily available for reaction. These compounds have the tendency to react readily by adding other atoms, to become more saturated compounds. As a result, the double bond is converted into a single bond that is more stable.

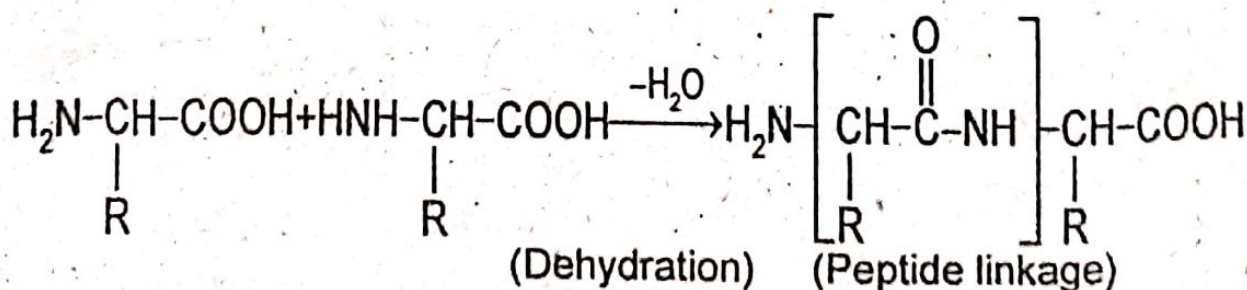
(vi) Describe hydrolysis of sucrose.

**Ans** On hydrolysis, sucrose produces one unit of glucose and one unit of fructose.



(vii) How peptide linkage is formed between amino acid of protein?

**Ans**



(viii) How margarine is produced?

**Ans** Margarine is produced by adding hydrogen to vegetable oil at  $200^\circ\text{C}$  in the presence of catalyst. Greater the amount of hydrogen added, the more solid margarine becomes.



4. Write short answers to any FIVE (5) questions: (10)

(i) Write two effects of  $\text{SO}_2$ .

**Ans** The two effects of  $\text{SO}_2$  are:

1. It forms sulphuric acid which damages buildings and vegetations.
2.  $\text{SO}_2$  causes suffocation, irritation and reverse respiratory problems to asthmatic people.

(ii) Give two effects of acid rain.

**Ans** Two effects of acid rain are:

- (i) Acid rain on soil and rocks leaches heavy metals (Al, Hg, Pb, Cr, etc.) with it and discharges these metals into rivers and lakes. This water is used by human beings for drinking purpose. These metals accumulate in human body to a toxic level. On the other hand, aquatic life present in lakes also suffers because of high concentration of these metals. Especially high concentration of aluminium ions clogs the fish gills. It causes suffocation and ultimately death of fish.
- (ii) Acid rain attacks the calcium carbonate present in the marble and limestone of buildings and monuments. Thus, these buildings are getting dull and eroded day by day.

(iii) What are secondary pollutants? Give an example.

**Ans** Secondary pollutants are produced by various reactions of primary pollutants e.g., sulphuric acid, nitric acid, etc.

(iv) Differentiate between soft and hard water.

**Ans** Soft water:

Soft water is that which produces good lather with soap.

Hard water:

Hard water is that which does not produce lather with soap.



(v) Write two disadvantages of detergents.

**Ans** Two disadvantages of detergents are:

1. Some of the detergents are non-biodegradable. When household water containing these detergents is discharged in streams, ponds, lakes and rivers, it causes water pollution.
2. The detergent remains in the water for a long time and makes the water unfit for aquatic life.

(vi) What is roasting?

**Ans** It is a process of heating the concentrated ore to a high temperature in excess of air.

(vii) Write the formulae of:

(a) Copper pyrite      (b) Matte

**Ans** (a) Copper pyrite  $\rightarrow \text{CuFeS}_2$

(b) Copper matte  $\rightarrow \text{Cu}_2\text{S} + \text{FeS}$

(viii) What is the principle of fractional distillation?

**Ans** The crude oil is refined in the refineries. Refining process is the separation of crude oil mixture into various useful products (fractions). It is carried out by a process called fractional distillation.

(Part-II)

**NOTE:** Attempt any TWO (2) questions.

**Q.5.(a)** Define and explain law of mass action by an example  $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ . (5)

**Ans** For Answer see Paper 2017 (Group-I), Q.5.(a).

**(b)** Write any four characteristics of salts. (4)

**Ans** Following are the four characteristics of salts:

- (i) Salts are ionic compounds found in crystalline form.
- (ii) They have high melting and boiling points.



(iii) Most of the salts contain water of crystallization which is responsible for the shape of the crystals. Number of molecules of water are specific for each salt and they are written with the chemical formula of a salt. For example,

Copper sulphate  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ; Calcium sulphate  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

(iv) Salts are neutral compounds. Although, they do not compose of equal number of positive and negative ions, but have equal number of positive and negative charges.

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**Q.6.(a) Write five physical properties of alkanes. (5)**

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**Ans** For Answer see Paper 2017 (Group-I), Q.6.(a).

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**(b) Write types and importance of vitamins. (4)**

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**Ans** Vitamins are divided into two types:

**(i) Fat Soluble Vitamins:**

The vitamins which dissolve in fats are called fat soluble vitamins. These are vitamin A, D, E and K. If these vitamins are taken in large quantity, they accumulate in the body and cause diseases. For example, accumulation of vitamin D in the body causes bone-pain and bone-like deposits in the kidney. However, their deficiency also causes diseases.

**(ii) Water Soluble Vitamins:**

The vitamins that dissolve in water are called water soluble vitamins. These vitamins are B complex (this include 10 vitamins) and vitamin C (ascorbic acid). Water soluble vitamins are rapidly excreted from the body. Hence, these vitamins are not toxic even if taken in large quantity. However, their deficiency causes disease.



## **Importance of Vitamins:**

- (i) Each vitamin plays an important role in the healthy development of our body.
- (ii) Natural vitamins are organic food substances found only in plants and animals. Our body is unable to synthesize vitamins. Because of this, they must be supplied either directly in the diet or by way of dietary supplements. They are absolutely necessary for our normal growth.
- (iii) Vitamins cannot be assimilated without ingesting food. This is why, it is suggested that vitamins must be taken with meal. They help to regulate our body's metabolism.

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**Q.7.(a) Explain the process of smelting with reference to copper. (5)**

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**Ans** For Answer see Paper 2019 (Group-II), Q.7.(a).

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**(b) Write two methods for removal of temporary hardness of water in detail. (4)**

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**Ans** For Answer see Paper 2018 (Group-II), Q.7.(b).

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