LIONS SCHOOL MIRZAPUR
PRE BOARD EXAMINATION (2020-2021)

CLASS-XII TIME: 3HRS

SUBJECT-CHEMISTRY (043) MM: 70

GENERAL INSTRUCTIONS:

Read the following instructions carefully.

a) There are 33 questions in this question paper. All questions are compulsory.
b) Section A: Q.No. 1 to 16 are objective type questions. Q.No. 1 and 2 are passage based questions carrying 4 marks each while Q.No. 3 to 16 carry 1 marks each.
c) Section B: Q. No 17 to 25 are short answer questions and carry 2 marks
d) Section C: Q.No.26 to 30 are short answer questions and carry 3 marks each.
e) Section D: Q.No 31 to 33 are long answer questions carrying 5 marks each.
f) There is no overall choice. However, internal choices have been provided.
g) Use of calculators and log tables is not permitted.

SECTION-A (OBJECTIVE TYPE)

Read the passage given below and answer the following questions:

Q.1- Raoult's law is a law of thermodynamics established by French chemist Francois-Marie Raoult in 1887. He discovered that when a substance is dissolved in a solution, the vapour pressure of the solution will generally decrease. This observation depends on two variables:

a) The mole fraction of the amount of dissolved solute present and
b) The original vapour pressure (pure solvent).

On the basis of his observations, he stated a law popularized as Raoult's law. The effect of Raoult's law is that the saturated vapour pressure of a solution is going to the lower than that of the pure solvent at any particular temperature.

(a) State Raoult's law.
(b) What a solution is called that obeys Raoult's law over the entire range of concentration?
(c) Write the important characteristics of such solution.
(d) Do such solutions practically exist?

Q.2- For questions given below, two statements are given – one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the codes (A), (B), (C) and (D) as given below.

(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
(c) Assertion is correct, but reason is wrong statement.
(d) Assertion is wrong, but reason is correct statement.

Assertion(A): In coordination compounds metals show two types of linkages (valences) primary and secondary.

Reason(R): The primary valences are normally ionisable and are satisfied by negative ions.

(A)- **Assertion (A):** Mohr's salt is a double salt.

Reason(R): Mohr's salt dissociate into sample ions completely when dissolved in water.

(B)- **Assertion(A):** K_4 $[Fe(CN)_6]$ is a doubled salt

Reason (R): $[Fe(CN)_6]^{-4}$ do not dissociate into Fe^{2+} and CN^- ions.

(C)- **Assertion (A):** The species bound to the central metal atom or ion in the coordination entity in called ligand.

Reason (R): A ligand is capable of accepting electron pair (s)

Q.3- The Zero order of reaction is one whose rate is independent of:

(a) Volume of reaction vessel
(b) Concentration of reactants
(c) Temperature
(d) Pressure of light

Q.4- The rate constant of a reaction has same units as the rate of reaction. What is the order of the reaction

(a) Three
(b) Two
(c) Zero
(d) One

Q.5- Which of the following factors affect adsorption of gas on solid?

(a) Temperature
(b) Pressure of gas
(c) Nature of adsorbent
(d) All the above

Q.6- On what factor activity of catalyst depends.

(a) On the strength of chemical adsorption
(b) On the concentration of product
(c) On the concentration of reactants
(d) On the physical state of catalyst

Q.7- Phenol on treatment with dil. HNO_3 gives

(a) O-Nitrophenol
(b) P-Nitrophenol
(c) Mixture of o-and p-Nitrophenol
(d) 2,4,6-Trinitrophenol.

Q.8- Wolff Kishner reduction converts cyclobutanone to

a) Cyclobutanol
b) Cyclobutyraldehyde
c) N-Butane
d) Cyclobutane

Q.9- Hydrolysis of benzonitrile gives

a) Benzyl amine
b) Aniline
c) Benzoic acid
d) Benzene

Q.10- When acetamide is treated with Br_2 and caustic soda, the product formed is:

a) N-bromoaniline
b) Bromoacetic acid
c) Methanamine
d) Aniline

Q.11- Which proteins are generally insoluble in water?

a) Fibrous protein
b) Globular protein
c) Primary protein
d) Tertiary protein

Q.12- The helical structure or a secondary structure of proteins is stabilized by:

a) Peptide bonds
b) Dipeptide bonds
c) H-bond
d) Ether bond

Q.13-Find the strongest reducing agent.

a) NH_3
b) PH_3
c) BiH_3
d) AsH_3

Q.14- The magnetic moment of Fe^{3+} is:-

a) 5.9 BM
b) $\sqrt{5}$ BM
c) 3.0 BM
d) 3.9 BM

Q.15- Glucose is converted in - n-hexane when heated with?

a) Nitric Acid
b) Hydrogen iodide
c) Bromine water
d) Acetic an hydride

Q.16- The reaction of involving the treatment of benzene diazonium chloride with copper powder and HCL is treated as

a) Sandmeyer's reaction
b) Gattermanna's reaction
c) Ulmann's reaction
d) Kolbe's reaction

SECTION-B

The following questions, Q.No 17 -25 are short answer type and carry 2 marks each

Q.17- How will you distinguish between the following parts of terms:

I. Hexagonal close-packing and cubic close-packing?
II. Crystal lattice and unit cell?
III. Tetrahedral void and octahedral void?

Q.18- Silver crystallises In fcc lattice. If edge length of the cell is 4.07×10^{-8} cm. And density is 10.5 g cm^{-3}, calculate the atomic mass of silver.

Q.19- A sample of drinking water was found to be severely contaminated with chloroform ($CHCl_3$) supposed to be a carcinogen. The level of contamination was 15 ppm (by mass):

I. Express this in percent by mass
II. Determine the molality of chloroform in the water sample.

Q.20- Calculate the mass of a non-volatile solute (molar mass 40 g mol^{-1}) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%

Q.21- Define the conductivity and molar conductivity for the solution of an electrolyte. Discuss their variation with concentration.

Q.22- The resistance of a conductivity cell containing 0.001M KCL solution at 298 K is 1500 Ω. What is the cell constant if conductivity of 0.001 M KCL solution at 298 K is 0.146×10^{-3} S cm^{-1}.

Q.23- The decomposition of NH_3 on platinum surface is zero order reaction. What are the rates of production of N_2 and H_2 if $K = 2.5 \times 10^{-4}$ mol^{-1} L s^{-1}?

Q.24- A reaction is second order with respect to a reactant. How is rate of reaction affected if the concentration of the reactant is

I. Doubled
II. Reduced to half

Q.25- What happens when?

I. n-butyl chloride is treated with alcoholic KOH
II. bromobenzene is treated with Mg in the presence of dry ether

SECTION-C

Q.26-write the names of reagents and equations for the preparation of the following ethers by Williamson's synthesis

I. 1-Proproxypropane
II. Ethoxybenzene
III. 2-Methoxy-2-methylpropane.

Q.27- What is meant by the following terms? Give an example of the reaction in each case.

I. Cyanohydrin
II. Acetal
III. Oxime

Q.28- Define the following as related to proteins

I. Peptide linkage
II. Primary structure
III. Denaturation

Q.29- Explain what is observed

I. When a beam of light is passed through a colloidal sol.
II. An electrolyte, NaCl is added to hydrated ferric oxide sol.
III. Electric current is passed through a colloidal sol.

Q.30- A compound forms hexagonal close-packed structure. What is the total number of voids in 0.5 mol of it? How many of these are tetrahedral voids?

OR

An element with molar mass 2.7×10^{-2} kg mol^{-1} forms a cubic unit cell with edge length 405 pm. If its density is 2.7×10^{-3} kg m^{-3}, what is the nature of the cubic unit cell?

SECTION-D

Q.NO 31 TO 33 are long answer type carrying 5 marks each.

Q.31-(a) Give plausible explanation for each of the following:

I. Cyclohexanone forms cyanohydrins in good yield but 2,2,6-trimethylcyclo-hexanone does not.
II. There are two $-NH_2$ groups in semicarbazide. However, only one is involved in the formation of semicarbazones

(B) An organic compound contains 69.77% carbon, 11.63% hydrogen and rest oxygen. The molecular mass of the compound is 86. It does not reduce Tollens' reagent but forms an addition compound with sodium hydrogensulphite and give positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acid. Write the possible structure of the compound.

OR

(A) Write the short notes on the following

I. Carbylamine reaction
II. Hofmann's bromamide reaction

(b) An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound 'B' which on heating with Br_2 and KOH forms a compound 'C' of molecular formula C_6H_7N. Write the structure and IUPAC names of compounds A, B and C.

Q.32-(a) what are the azeotropes? Give an example.

(b) What is the Henrys law? Write its application.

(c) Show that half-life time is independent of concentration in first order reaction.

OR

I. What is isotonic solution?
II. What is Raoult's law for solution containing volatile liquid?
III. 100 gm of liquid 'A' (Molar mass 140g/mol) was dissolved in 1000gm of liquid B(molar mass 180g/m). The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in solution if the total vapour pressure of the solution is 475 torr

Q.33-(a) Write the balanced chemical reaction for reaction of Zn with dilute HNO_3.

(b) Draw the shape of $XeOF_4$.

(c) 'X' has a boiling point of 4.2K, lowest for any known substance. It is used as a diluents for oxygen in modern diving apparatus. Identify the gas 'X'. Which property of this gas makes it usable as diluent? Why is the boiling points of the gas 'X' so low and does not form compounds.

OR

A. Arrange the following in the increasing order of thermal stability:

   H_2o,H_2S, H_2Se, H_2Te

B. Define metal carbonyls explain bonding in metal carbonyls

C. Greenish yellow gas 'A' with pungent and suffocating odour, is a powerful bleaching agent. 'A' on treatment with dry slaked lime it gives bleaching powder. Identify 'A' and explain the reason for its bleaching action. Write the balanced chemical equation for the reaction of "A' with hot and concentrated NaOH**.**