Pre Board Examination - 2023-24

Class : XII

Paper : Chemistry

M.M. : 70

Time : 3 hrs.

General Instructions :

a) There are 33 questions in the question paper.

b) Section A consist of 16 Multiple Choice questions carrying 1 mark each.

c) Section B consist of 5 questions carrying 2 marks each.

d) Section C consist of 7 questions carrying 3 marks each.

e) Section D consists of 2 questions carrying 4 marks each.

f) Section E consist of 3 questions carrying 5 marks each.

g) All questions are compulsory.

h) Use of calculator is not allowed.

Section-A

1. The units of Ebullioscopic constant is

a) $KKg\ mol^{-1}$ b) $molkg^{-1}\ K^{-1}$ c) $Kg\ mol^{-1}K^{-1}$ d) $KmolKg^{-1}$

2. At a given temperature, osmotic pressure of a concentrated solution of a substance

a) is higher than that of a dilute solution

b) is lower than that a dilute solution

c) is same as that of dilute solution

d) can not be compared with of osmotic pressure of dilute solution

3. An Electrochemical cell can behave like an Electrolytic call when

a) $E_{cell} = 0$ b) $E_{cell} > E_{external}$ c) $E_{external} > E_{cell}$ d) $E_{cell} = E_{external}$

4. Using data given below find aut strongest Reducing Agent

$^{0}E_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33V$ $^{0}E_{Cl_2/Cl^-} = 1.36V$

$^{0}E_{MnO_4^-/Mn^{2+}} = 1.51V$ $^{0}E_{Cr^{3+}/Cr} = -0.74V$

a) Cl^- b) Cr c) Cr^{3+} d) Mn^{2+}

5. Which of the following statement is not correct about the order of a reaction

a) The order of a reaction can be a fractional number

b) Order of reaction is experimentally determined quantity

c) The order of a reaction is always equal to the sum of the stoichiometric coefficients of reactants in the balanced chemical equation for a relation.

d) The order of a reaction is the sum of ~~flowers~~ powers of molar concentration of reactants in the rate law expression.

6. Which of the following expressions is correct for the rate of reaction given below :

$5\,Br^-_{(aq)} + BrO^-_{3\,(aq)} + 6\,H^+_{(aq)} \rightarrow 3\,Br_{2\,(aq)} + 3H_2O_{(\ell)}$

a) $\frac{\Delta[Br]}{\Delta t} = \frac{\Delta[Br_2]}{\Delta t}$ b) $\frac{6}{5} = \frac{\Delta[H^+]}{\Delta t}$

c) $\frac{\Delta[Br^-]}{\Delta t} = \frac{5}{6}\frac{\Delta[H^+]}{\Delta t}$ d) $\frac{\Delta[Br^-]}{\Delta t} = \frac{6\Delta[H^+]}{\Delta t}$

7. $KMnO_4$ acts an oxidising agent in acidic medium The number of moles of $KMnO_4$ that will be needed to react with 1 mole of sulphide ions (S^{2-}) in acidic solution is

a) $\frac{2}{5}$ b) $\frac{3}{5}$ c) $\frac{4}{5}$ d) $\frac{1}{5}$

8. A primary alkyl halide would prefer to undergo

a) SN^1 Reaction b) SN^2 Reaction

c) α-Elimination d) Racemisation

9. Which of the following molecule is chiral.

a) 2-Bromobutane b) 1-Bromobutane c) 2-Bromopropane

d) 2-Bromopropan-2-ol

10. Monochlorination of Toluene in sunlight followed by hydrolysis with Ag.NaOH yields

a) O-cresol b) P-cresol c) 2,4 - dihydroxy toluene

d) Benzyl alcohol

11. Which of the following compounds will react with sodium hydroxide solution in water ?

a) C_6H_5OH b) $C_6H_5CH_2OH$

c) $(CH_3)C\text{-}OH$ d) C_2H_5OH

12. The correct order of increasing acidic strength is

a) Phenol < Ethanol < Chloro acetic acid < Acetic acid

b) Ethanol < Phenol < Chloroacetic acid < ~~Phenol~~ Acetic acid.

c) Ethanol < Phenol < acetic acid < Chloroacetic acid

d) Chloroacetic acid < acetic acid < Phenol < Ethanol

Q. No. 13-16

In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices.

a) Both Assertion and Reason are true and reason is the correct explanation of Assertion.

b) Both Assertion and Reason are true and reason is not the correct explanation of Assertion.

c) Assertion is true and Reason is false

d) Assertion is false and Reason is true.

13. Assertion : Hofmann's Bromamide reaction is given by primary amines.

Reason : Primary amines are more basic than secondary amines.

14. Assertion : Bond Angle is Ethers is slightly less than the tetrahedral angle

Reason : There is repulsion b/w the 2 bulky alkyl groups.

15. Assertion : Phosphorous chlorides (tri and penta) are preferred over thionyl chloride for the preparation of alkyl chlorides from alcohols.

Reason : Phosphorous chlorides give pure alkyl halides.

16. Assertion : Cu can not librate hydrogen from acids.

Reason : Because it has positive value of Electrode potential.

(Section-B)

17. Calculate the mass of urea required in making 2.5 kg of 0.25 molal aqueous solution.

18. Write reaction at anode and cathode for mercury cell. Why its voltage is almost constant during its lifetime.

19. A reaction is second order with respect to a reactant R. How is the rate of reaction affected if the concentration of reactant is (i) doubled (ii) reduce to 1/2

20. Write the preparation of potassium dichromate and also write its ionic reaction with Fe^{2+} ions in acidic medium.

21. Distinguish b/w the following

a) Acetaldehyde and Acetone

b) Phenol and Benzoic acid

(Section-C)

22. 3.9 gram of benzoic acid dissolved in 49 gram of benzene shows a depression in freezing point of 1.62 K. Calculate the Van't Hoff factor and predict the nature of solute (Associated or dissociated) $Kf = 4.9\ kKgmol^{-1}$.

23. a) What is Pseudo first order reaction Give example.

b) A first order reaction has a rate constant $4.9 \times 10^{-3}\ S^{-1}$. How long will 4g of this reactant take to reduce to 3g ? log4 = 0.6020 log 3 = 0.4771

24. Assign reason for each of the following

a) Zn has low enthalpy of Atomisation

b) Cu^{+} undergoes disproportionation in aqueous situation

c) Transition metals form large number of complex compounds.

25. a) Write the IUPAC name of $[CO(en)_2Cl_2]Cl$ and draw the structures of optical isomer with this formula of complex.

b) Why $[Ni(CN)_4]^{2-}$ is square planner and $[Ni(CO)_4]$ is tetrahedral ?

26. Give reasons :

a) n-Butyl bromide has higher boiling point than tertiary butyl bromide.

b) Racemic mixture is optically inactive.

c) The presence of nitro group at o/p positions increase the reactivity of haloarenes towards nucleophilic substitution reaction.

27. a) i) Convert phenol to anisole.

ii) Aniline to phenol

b) Write the reaction of tertiary Butyl methyl ether with HI.

28. a) Difference between nucleoside and nucleotide.

b) Name the linkage present in Carbohydrates and nucleic acid.

c) What is Denaturation of protein.

(Section-D)

29. Carbohydrates are optically active polyhydroxy aldehyde and ketones. They are also called saccharides. All those carbohydrates which reduce fehling solution and Tollen's reagent are referred to as reducing sugars. Glucose the most important source of energy for mammals, is obtained by hydrolysis of starch. Vitamins are required in the diet. Proteins are the polymers of α-amino acids and perform various function in organisms. Deficiency of vitamins leads to many diseases.

- Answer the following questions :

a) The penta acetate of glucose does not react with hydroxyl amine. What does it indicate ?

b) Why vitamin C cannot be stored in our body ?

(c) Name an optically inactive amino acid.

(d) What are anomers ? Give example.

30. The most distinctive properties of transition metal complexes is their wide range of colours. This means that, some of the visible spectrum is being removed from white light as it passes through the sample, so the light that emerges is no longer white. The colour of complex is complementary to that which is absorbed. The complementary colour is the colour generated from the wavelength left over. If green light is absorbed by the complex, it appears red. The colour in the coordination compound can be readily explained in terms of the crystal field theory.

Answer the following questions :

a) Define crystal field splitting energy.

b) What do you mean by spectrochemical series ?

c) Why low spin tetrahedral complex are not formed ?

d) How crystal field theory Explain the colour of compound.

(Section-E)

31 a) How molar conductivity of strong and weak electrolyte varies with dilution. Show graphically.

b) Write the Nernst equation and find emf of the following cell at 298K.

$Mg(s) / Mg^{2+}$ (0.001M) // Cu^{2+} (0.0001M) / Cu(s)

Given ${}^{0}E_{Mg^{2+}/Mg} = -2.37$ ${}^{0}E_{Cu^{2+}/Cu} = 0.34V$

c) What is Kohlrausch law ?

32. Write about the following :

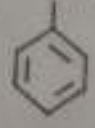
a) (i) Rosenmund reduction

(ii) Cannizaro reaction

b) Complete the following :

i) $CH_3 - \overset{O}{\overset{\|}{C}} - OH \xrightarrow[\Delta]{NH_3} A \xrightarrow[NaOH]{Br_2} B$

ii) $CH_3 - CH_2CN \xrightarrow[H_2O]{DIBAL-H} A \xrightarrow[NaOH]{dil} B$

iii)  $\xrightarrow{Zn\ dust} A \xrightarrow[Anhyd.\ AlCl_3,\ CuCl]{CO,\ HCl} B$

33. a) Why carboxylic acid is more acidic than phenol ?

b) Why pKb of Aniline is more than Ammonia ?

c) Why Aniline cannot be prepared using Gabriel pthalimide synthesis ?

d) What is diazotization ?

e) What is the final product formed when Aniline is treated with excess of CH_3I.