II PUC PREPARATORY EXAMINATION, JANUARY- 2024

SUBJECT : CHEMISTRY (34)

Time : 3 Hrs. 15 Mins. **Max Marks : 70**

Instructions :

1) **The question paper has FIVE parts. All parts are compulsory.**
2) **a) Part-A carries 20 marks. Each question carries 1 mark.**
   b) Part-B carries 06 marks. Each question carries 2 marks.
   c) Part-C carries 15 marks, Each question carries 3 marks.
   d) Part-D carries 20 marks. Each question carries 5 marks.
   e) Part-E carries 09 marks. Each question carries 3 marks.
3) **In Part-A questions, first attempted answer will be considered for awarding marks.**
4) **Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.**
5) **Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.**
6) **Use log tables and simple calculators if necessary. (Use of Scientific Calculator is not allowed)**

PART - A

I Select the correct option from the given choices. **1x15=15**

1) Soda-water is an example for
   a) Binary Solution b) Quaternary solution c) Tertiary solution d) Not a solution
2) Red-blood cells shrinks, when it is placed in a
   a) Hypotonic solution b) Hypertonic solution c) Isotonic solution d) Saturated solution
3) The value of energy of activation for a radioactive decay is
   a) High b) Low c) almost zero d) moderate
4) Which of the following is also known as 'Trial and error' method ?
   a) integrated method b) isolation method c) initial rate method d) Half-life method
5) Which among is not used in the most common fuel cells ?
   a) Hydrogen gas b) Methane c) Methanol d) Acetone
6) The amount of charge used to convert one mole of Al^{3+} to Al.
   a) 2,89,461 coloumbs b) 19,2974 C c) 96,500 C d) 48,2435 C
7) Brass is an Alloy of
   a) Cu + Zn b) Cu + Sn c) Cu + Mg d) Cu + Al
8) Actinoids belongs to _____ in the modern periodic table
   a) 7^{th} period, III B group b) 7^{th} period, III A group
   c) 6^{th} period, III B group d) 6^{th} period, III A group
9) The co-ordination compound is used in the treatment of cancer tumours
   a) Cis-platin b) trans-platin c) EDTA d) Diethyl glyoximate
10) The molecular formula of Freon-12 is
   a) CF_4 b) CF_3Cl c) CF_2Cl_2 d) $CFCl_3$
11) Lucas reagent is a mixture of
   a) Antrydrous $ZnCl_2$ + Con HCl b) Aqueous $ZnCl_2$ + Con HCl
   c) Anhydrous $ZnCl_2$ + Dil HCl d) Dilute $ZnCl_2$ + Con HCl
12) The role of Conc H_2SO_4 in esterification reaction is
   a) As a catalyst b) as a Dedydratising agent
   c) Both as a catalyst and dehydrating agent d) None of the above
13) The Benzene Diazonium Chloride (BDC) reacts with Aniline in acidic medium at 273 – 278 K to form coupling compound known as
   a) p-amino azobenzene b) O-amino azobenzene
   c) m-amino azobenene d) All the above
14) The Hybridisation of Nitrogen atom in Tertiary amine is
   a) sp^2 b) sp^3 c) sp d) sp^3d
15) The Amino-acid containing sulphur is
   a) Glycine b) Lysine c) Cysteine d) Tyrosine

(P.T.O.)

KABIR PUBLICATIONS SAVADATTI YouTube Channel : Contact 9738237960

II Fill in the blanks by choosing the appropriate word from those given in the brackets: **5x1=5**

(paraldehyde, Darzen's process, Chirality, Achirality, Phenol, Testosterone)

16) The preparation of alkyl chloride from alcohol and thionyl chloride is known as _____.
17) The condition for optical activity is _____.
18) _____ is used in Medicine as a hypnotic.
19) Benzene diazonium chloride solution hydrolysed at a temperature of 283 K to _____.
20) _____ Harmone is reason for the development of secondary sex characters in Males.

PART-B

III Answer any THREE of the following. Each question carries two marks. **3x2=6**

21) Give reasons
a) Soda water and soft drinks are sealed under high pressure. **(1M)**
b) the i-value for aqueous KCl is more than ethanol in Benzene. **(1M)**
22) What is pseudo-first order reaction ? Give one example.
23) Draw the geometrical isomers of $\left[Fe(NH_3)_2(CN)_4\right]^-$.
24) "Haloalkanes react with KCN to form alkyl cyanides as main product, while AgCN forms isocyanide as the Chief product". Give reason.
25) Explain the following reaction $A + B \xrightarrow[373\text{-}673\,K]{ZnO\text{-}Cr_2O_3,\ 200\text{-}300\ atm} CH_3OH$
26) Write the 'Haworth's structure for Sucrose [cane sugar]

PART-C

IV Answer any THREE of the following. Each question carries three marks. **3x3=9**

27) Calculate the spin only magnetic moment of $M^{3+}_{(aq)}$ ion (Z = 24).
28) Write the equations for the preparation of potassium permanganate from MnO_2.
29) Give any three General Characteristics of Actinoids.
30) a) What is denticity ? Give one example. **(2M)**
b) Write the IUPAC name of $K_2[Zn(OH)_4]$ **(1M)**
31) Using valence bond theory (VBT), explain Geometry, hybridisation and magnetic properties of $[CoF_6]^{3-}$ ion. [Atomic no. of cobalt is 27]
32) What are Metal carbonyls ? Explain Synergic pairing effect in Metal Carbonyl.

V Answer any TWO of the following. Each question carries three marks. **2x3=6**

33) Write any three differences between positive and negative deviations of Non-ideal solutions.
34) What is Molar Conductivity ? Explain the variation of specific conductance (K) and molar conductivity (λ_m) with dilution.
35) Explain the working function of Lead-Storage battery.
36) Derive integrated rate equation for first order reaction.

PART-D

VI Answer any FOUR of the following. Each question carries Five marks. **4x5=20**

37) a) State "Saytzeff's rule (Zaitsev) with an example.
b) 'Aryl halides are less reactive towards nucleophilic substitution reaction."
c) What are enantiomers ? **(2+2+1)**
38) a) Explain the Mechanism of hydration of alkenes to alcohols.
b) How do you prepare picric acid from phenols ? **(3+2)**

KARBUR PUBLICATIONS, SIVALAYI YouTube Channel : Contact 9738237966

39) a) Give name of the reagents to bring about following transformations.
i) Hexan-1-ol to Hexanal
ii) Cyclohexanol to cyclohexanone
iii) But-2-ene to ethanal.
b) Explain the effect of substituents on the acidity of carboxylic acids. **(3+2)**

40) a) What is decarboxylation ? Give one example.
b) Explain the reaction of Ketone with 2, 4 - DNPH with an example.
c) What is Formalin ? **(2+2+1)**

41) a) What happens when vapours of 1°, 2° and 3° alcohols are passed over heated copper at 573 K ?
b) An organic compound 'A' refluxed with alkaline $KMnO_4$ followed by Acid hydrolysis gives benzoic acid. Write chemical equation and name the compound "A". **(3+2)**

42) a) An organic 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 names of the compound 'A', 'B' and 'C'.
b) Give reason
a) Aliphatic amines of lower molecular mass soluble in water.
b) Dimethylamine is more basic than methyl amine. **(3+1+1)**

43) a) Write the reaction to show that carbonyl group in Glucose is an aldehydic group.
b) What is 'Zwitter ion' of amino acid ? Give it's general structure.
c) How many hydrogen bonds are present in Guanine and Cytosine. **(2+2+1)**

PART-E (Problems)

VII Answer any THREE of the following. Each question carries three marks. 3x3=9

44) Calculate the osmotic pressure of 5% $\left(\frac{M}{V}\right)$ solution of urea at 300K.

[Molar mass of urea is 60g/mol]

45) 18gm of Glucose ($C_6H_{12}O_6$) is dissolved in 1 Kg of water in a saucepan. At what temperature will water boil at 1.013 bar ? [K_b for water is 0.52 K Kg mol^{-1}, Molecular mass of Glucose is 180 g/mol. B.P of water is 100°C].

46) The resistance of a 1 M salt solution occupying a volume between two platinum electrodes 1.8 cm apart and 5.4 cm^2 in area was found be 32 Ω. Calculate the conductivity of a solution.

47) In the button cells, widely used in watches and other devices in the following reaction takes place

$$Zn_{(s)} + Ag_2O_{(s)} + H_2O_{(l)} \longrightarrow Zn^{2+}_{(aq)} + 2Ag_{(s)} + 2OH^{\ominus}_{(aq)}$$

Determine ΔG° for the reaction.

$\left[E^0_{Zn} = -0.76V \text{ and } E^0_{Ag} = +0.34V\right]$

48) The rate of a particular reaction doubles when temperature changes from 27°C to 37°C. Calculate the energy of activation.

49) The decomposition of N_2O_5 in CCl_4 at 318 K has been studied by monitoring the concentration of N_2O_5 in the solution. Initially, the concentration of N_2O_5 is 2.33 mol L^{-1} and after 184 minute it is reduced to 2.08 mol L^{-1} the reaction takes place according to the equation.

$$2N_2O_{5(g)} \longrightarrow 4NO_{2(g)} + O_{2(g)}$$

Calculate the average rate of reaction interms of minutes and the rate of production of NO_2 during this period.

****

KARBUR PUBLICATIONS SAVADATTI YouTube Channel : Contact 9738282060