Board of Secondary Education Rajasthan, Ajmer

Practice Question Paper Sr. Secondary Examination-2022

SUBJECT: CHEMISTRY
CLASS-XII

Time: 2 Hours 45 Minutes **Marks: 56**

(SECTION-A)

Multiple Choice Questions

Q.1. In the following questions select the correct answer and write it into the answer sheet:-

(i) Which of the following is a non-crystalline solid? **[1]**

(a) CsCl (b) NaCl (c) CaF_2 (d) Glass

(ii) For which of the following ore, froth floatation method is used ? **[1]**

(a) $CaCO_3$ (b) $Al_2O_3.2H_2O$ (c) PbS (d) Fe_2O_3

(iii) The oxidation state of metal in Iron in $[Fe(CN)_6]^{3-}$ is **[1]**

(a) –6 (b) +3 (c) – 3 (d) + 6

(iv) Which of the following halide is 2^o **[1]**

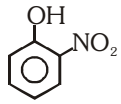
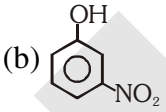
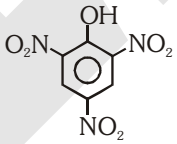
(a) Isopropyl chloride (b) Isobutyl chloride

(c) *n*-propyl chloride (d) *n*-butyl chloride

(v) In the Sandmeyer's reaction, —NN—X group of diazonium salt is replaced by :- **[1]**

(a) Halide group (b) Nitro group (c) —OH group (d) —$NHNH_2$ group

(vi) Nitration of phenol with conc. nitric acid gives :- **[1]**

(a)  (b)  (c)  (d) 

(vii) Glucose on oxidation with nitric acid as well as gluconic acid both gives – **[1]**

(a) Saccharic acid (b) n-Hexane (c) Fructose (d) Glucosazone

(viii) Vitamin C is called : **[1]**

(a) Antisterility (b) Antiscurvy (c) both of these (d) None of these

(ix) Zwitter ion is – **[1]**

(a) neutral ion (b) positive charge ion (c) negative ion (d) None of these

Q.2. Fill in the blanks -

(i) The importance of lime stone in the extraction of Iron from Hemetite ore is_____. **[1]**

(ii) Malachite is _____ ore. **[1]**

(iii) Due to lanthanide contraction the size of element _____. **[1]**

(iv) $K_4[Fe(CN)_6]$ is a/an_____. **[1]**

Q.3. Very Short answer type question:–

(i) Write the value of packing efficiency in body – centred cubic structure. **[1]**

(ii) Write Raoult's Law. **[1]**

(iii) What will be the value of Van't Hoff factor for ethanoic acid in benzene? **[1]**

(iv) What is the role of graphite rod in the electrometallurgy of aluminium ? **[1]**

(v) Explain the reason for Lanthanoid contraction. **[1]**

(vi) Write the IUPAC name of diethylether. **[1]**

(vii) Write chemical equation of carbylamine reaction. **[1]**

(viii) Draw the resonating structures of Aniline. **[1]**

(SECTION-B)

Short Answer type question:–

4. Atoms of element B from hcp lattice and those of the element A occupy $1/3^{rd}$ of tetrahedral voids. What is the formula of the compound formed by the element A and B ? **[1½]**

5. Give any one difference between anisotropy and isotropy nature of solid. **[1½]**

6. Draw a diagrammatic representation of the process of Reverse Osmosis. **[1½]**

7. **(i)** Generally solubility of gases in liquids is decreases as increasing temperature. Give reason.
(ii) How many gram of NaCl is required to make 200 mL aqueous solution of 5% (w/v) NaCl.
[3/4 + 3/4 = 1½]

8. The decomposition of NH_3 on plantinum surface is zero order reaction. What are the rates of production of N_2 and H_2 if value of rate constant is 1.5×10^{-4} mol L^{-1} S^{-1}. **[1½]**

9. Show that in a first order reaction, time required for completion of 75 % is twice of half life of the reaction. (log 2 = 0.3010) **[1½]**

10. Explain giving reasons : **[3/4 + 3/4 = 1½]**
(i) Transition metals and many of their compounds show paramagnetic behaviour.
(ii) The enthalpies of atomisation of the transition metals are high.

11. Calculate the 'spin only' magnetic moment of $M^{2+}_{(aq)}$ ion (Z = 27). **[1½]**

12. Aldehydes are more reactive than ketons towards nucleophillic addition reaction. Explain. **[1½]**

13. $CH_3OH \xrightarrow{[A]} [A] \xrightarrow{CH_3MgI} [B] \xrightarrow{H_2O} [C]$ **[1½]**
Write the chemical formula [A], [B] and [C] in above reaction sequence.

14. Arrange the following carboxylic acid in ascending order of their acidity. **[1½]**
Benzoic acid, 4–methoxybenzoic acid, 4–nitrobenzoic acid.

15. Why phenol are more acidic than alcohol? Explain. **[1½]**

(SECTION-C)

Long Answer type question:–

16. Define order of reaction. Derive integrated rate equation for zero order reaction. **[1 + 2 = 3]**

OR

Define rate of reaction. Explain temperature dependence of rate of reaction on the basis of activation energy (Ea). **[1 + 2 = 3]**

17. **(i)** Write hybridized state of carbon bonded to halogen atom in benzyl chloride. **[1 + 2 = 3]**

(ii) Explain the mechanism of bimolecular nucleophillic substitution reaction.

OR

(i) Write the chemical equation of Wurtz-Fittig reaction. **[1 + 2 = 3]**

(ii) The reactions of alkyl chloride with aqueous KOH leads to the formation of alcohols but in presence of alcoholic KOH, alkenes are major products. Explain.

18. **(i)** Write chemical formula of ethyl isothiocyanate. **[1 + 1 + 1 = 3]**

(ii) Arrange $CH_3–CH_2–NH_2$, $CH_3–\underset{\displaystyle NH_2}{\underset{|}{CH}}–CH_3$ and $CH_3–\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}–NH_2$ in ascending order of their basis strengths.

(iii) Write the reason for solubility of Butan-1-Ol in water is more as compare to Butan-1-Amine.

OR

(i) Write the structural formula and chemical name of Hinesberg's reagent.

(ii) Write the balanced chemical equation of carbyl amine reaction exhibiting by ethanamine.

(iii) Write the reason for basic strength of CH_3NH_2 is more as compare to $C_6H_5NH_2$.

(SECTION-D)

Essayistic question:–

19. **(i)** Define Homoleptic and Hetroleptic complexes. **[1 + 1 + 1 + 1 = 4]**

(ii) Solution of $[Ti(H_2O)_6]^{3+}$ is coloured. Give reasons.

(iii) Draw the crystal field splitting of degenerate d-orbitals of free metal ion in octahedral crystal field.

OR

(i) Write the type of isomerism exhibited by $[Co(NH_3)_5(SO_4)]Br$ and $[Co(NH_3)_5Br]SO_4$ and also define it. **[1 + 1 + 1 + 1 = 4]**

(ii) $[Co(NH_3)_6]^{3+}$ is diamagnetic while $[CoF_6]^{3-}$ is paramagnetic. Give reasons.

(iii) Draw the crystal field splitting of degenerate d-orbitals of free metal ion in tetrahedral crystal field.

20. **(i)**Write structural formula of oxalic acid. **[1 + 2 + 1 = 4]**

(ii) Explain mechanism of Aldol condensation.

(iii) Arrange the following haloacids in increasing order of their acidity.

FCH_2COOH, $ClCH_2COOH$, $BrCH_2COOH$

OR

(i) Write structural formula of Diethyl ketone. **[1 + 2 + 1 = 4]**

(ii) Explain mechanism of Kolbe electrolysis.

(iii) Arrange the following haloacids in increasing order of their acidity.

Cl_3CCOOH, $Cl_2CHCOOH$, $ClCH_2COOH$