



SUN SHINE STUDY CIRCLE

CHEMISTRY (THEORY)

CLASS – XII

By Dr. Alok Srivastava

TIME – 3 HOURS

MAX. MARKS – 70

GENERAL INSTRUCTIONS -

1. All the questions are compulsory
2. Question number 1 to 5 is very short answer questions and carries 1 mark each.
3. Question number 6 to 10 is short answer questions and carries 2 marks each.
4. Question number 11 to 22 is also short answer questions and carries 3 marks each.
5. Question number 23 is value based & carries 4 marks.
6. Question number 24 to 26 is long answer questions and carries 5 marks each.
7. Use Log Tables, if necessary. Use of calculator is not allowed.

1. Write the formula of an oxo-anion of Manganese (Mn) in which it shows the oxidation state equal to its group number.
2. What is the role of depressant in the froth floatation process of dressing of ores?
3. Ortho nitro phenol has lower boiling point than p-nitro phenol. Why?
4. Write a structure of 1-Bromo-4-chlorobut-2-ene.
5. What are the expected products of hydrolysis of lactose?
6. The unit cell of an element of atomic mass 108 u and density 10.5g/cm^3 is a cube with edge length, 409 pm. Find the type of unit cell of the crystal.
7. Explain the following terms with suitable example.
Ferromagnetism and Ferrimagnetism.
8. Explain why aquatic species are more comfortable in cold water rather than in warm water?
9. Write the reactions taking place at cathode and anode in lead storage battery when the battery is in use. What happens on charging the battery?
10. Name the only vitamin which can be synthesized in our body. Name one disease that is caused due to the deficiency of this vitamin. State two functions of carbohydrates.
11. Explain
 - (a) Xenon does not form such fluorides as XeF_3 and XeF_5 .
 - (b) Out of noble gases only Xenon is known to form real chemical compounds.
 - (c) Chemistry of actinoids is complicated as compared to lanthanoids.
12. Haloalkanes undergo nucleophilic substitution whereas haloarenes undergo electrophilic substitution. Explain.
13. Write the dispersed phase and dispersion medium in smoke and milk colloidal system. Write one difference between homogenous catalysis & heterogenous catalysis.
14. The conductivity of 0.20M solution of KCl at 298K is 0.025S/cm . calculate its molar conductivity. Calculate the degree of dissociation of acetic acid if its molar conductivity is $39.05\text{ S cm}^2\text{ mole}^{-1}$.
Given: $\lambda^0(\text{H}^+) = 349.6\text{ S cm}^2\text{ mole}^{-1}$ and $\lambda^0(\text{CH}_3\text{COO}^-) = 40.9\text{ S cm}^2\text{ mole}^{-1}$.
15. Explain the mechanism of dehydration of ethanol in acidic medium.
16. The rate of reaction becomes four times when the temperature changes from 293K to 313K. calculate the energy of activation of the reaction assuming that it does not change with temperature. [$R = 8.314\text{J/K/Mol}$, $\log 4 = 0.6021$].
17. Differentiate between chain growth and step growth polymerization? What is the function of sulphur in the vulcanization of rubber? Write the structure of monomer used for getting Dacron & Buna-N.
18. Giving examples differentiate between calcination and roasting. What is the role of cryolite in the extraction of aluminium? Write the principle of method used for the refining of Germanium.
19. Give names of two complexes which are used in medicines. Using valence bond theory of complexes, explain the geometry and magnetic nature of $[\text{Ni}(\text{CN})_4]^{2-}$.
20. Describe the following giving the relevant chemical equation in each case –
 - (a) Carbylamines reaction,
 - (b) Hofmann bromamide degradation reaction
 - (c) Hell-Volhard Zelinsky reaction.

21. How will you bring the following conversions-
- Nitrobenzene to phenol
 - Aniline to chlorobenzene
 - Phenol to benzoquinone
22. Define the following:
- Anionic detergents
 - Broad spectrum antibiotics
 - Antiseptic
23. Mr. Rakesh a chemistry teacher observed some suspicious movements in his neighborhood people and one day he saw packets of ammonium nitrate in their hand. As a chemistry teacher he knew that ammonium nitrate is used in explosives. He immediately informed the police about this. Police immediately took the required action and caught them with 3 Kg of ammonium nitrate which they were using in explosives. Comment in brief-
- About the value/s displayed by Mr. Rakesh.
 - Name the gas evolved on heating ammonium nitrate. Write the chemical reaction.
 - Write two uses of ammonium nitrate.
24. (a) With the help of chemical equations explain the principle of contact process in brief for the manufacture of sulphuric acid.
- Account for the following -
 - Bond dissociation energy of F_2 is less than that of Cl_2 .
 - Nitric oxide becomes brown when released in air.

OR

- Account for the following -
 - Helium is used in diving apparatus.
 - Fluorine does not exhibit positive oxidation state
 - Oxygen shows catenation behavior less than sulphur.
 - Draw the structure of the following molecules
 - XeF_2
 - $H_2S_2O_8$
25. (i). Describe the preparation of potassium dichromate from chromite ore. What is the effect of change of PH on dichromate ion?
- How is the variability in oxidation states of transition elements different from that of non- transition elements. Illustrate with examples.

OR

- An element has atomic mass 93 g/mole and density 11.5 g/cm^3 . If the edge length its unit cell is 300 pm, identify the type of unit cell.
 - Account for the following:
 - Transition metal for large number of complex compounds,
 - The lowest oxide of transition metal is basic whereas the highest oxide is amphoteric or acidic.
 - E^0 value for the Mn^{3+}/Mn^{2+} couple is highly positive (+1.57V) as compare to Cr^{3+}/Cr^{2+} .
26. (i) Although phenoxide ion has more number of resonating structures than carboxylate ion, caboxylic acid is a stronger acid than phenol. Give two reasons.
- Account for the following-
 - Phosphorus shows high tendency for catenation
 - F_2 is more reactive than ClF_3 but ClF_3 is more reactive than Cl_2
 - Nitrogen is found in gaseous state whereas phosphorus is found as solid.

OR

- Two moles of organic compound A on treatment with strong base giving two compounds B and C. compound B on dehydrogenation with Cu gives A while acidification of C yields carboxylic acid D with molecular formula of CH_2O_2 . Identify the compounds A, B, C, D and write all chemical reactions involved.
- Write the chemical reaction equations for the reactions of glucose with acetic anhydride and hydroxyl amine. Also draw Fischer projections of D-glucose and L-glucose.