



INDIAN SCHOOL SOHAR
FINAL EXAM 2015-2016
CHEMISTRY

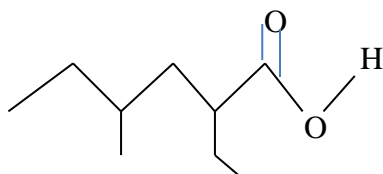
STD: XI
Date: 23 February, 2016

MARKS : 70
TIME : 3 Hrs

Instructions:

1. All questions are compulsory.
2. Question nos. 1-5 are very short answer questions and carry 1 mark each.
3. Question nos. 6-10 are short answer questions and carry 2 marks each.
4. Question nos. 11-22 are short answer questions and carry 3 marks each.
5. Question no. 23 is value based question and carry 4marks.
6. Question nos. 24-26 are long answer questions and carry 5 marks each.
7. Write serial no. of the question before attempting it.
8. Use log tables for calculations.

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1. Write the atomic number of the element present in the third period and seventeenth group of the periodic table.
 2. Write chemical reactions to show amphoteric nature of water.
 3. Write the IUPAC name of the given compound:



4. Give a chemical test to distinguish between pent-1-yne and pent-2-yne.
5. What is Baeyer's reagent.
6. Explain the formation of C_2H_2 based on hybridization.
- 7.a) 0.5 mole each of H_2S and SO_2 mixed together in a reaction flask react according to the equation:
 $2H_2S + SO_2 \longrightarrow 2H_2O + 3S$
Calculate the number of moles of sulphur formed.
- b) If 6.023×10^{23} molecules of N_2 react completely with H_2 according to the equation:
 $N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$
then calculate the number of molecules of NH_3 formed.
8. How will you detect the presence of sulphur in organic compounds? Explain giving equations.
9. What do you understand by electron deficient and electron precise compounds of hydrogen? Provide justification with suitable examples.

OR

How is H_2O_2 prepared by electrolytic method? How is it concentrated?

10. Predict the feasibility of a reaction when
- both ΔH and ΔS increase
 - both ΔH and ΔS decrease
 - ΔH decreases but ΔS increases
 - ΔH increases but ΔS decreases.
11. a) How many unpaired electrons are present in N ($Z=7$)? State the principle which explains the presence of these unpaired electrons.
- What is meant by quantisation of energy?
 - An element has electronic configuration $[\text{Ar}]3d^4$ in its +3 oxidation state. What will be the electronic configuration of its atom?
- OR
- How does change in velocity of a moving particle alter the wavelength of the particle?
 - Why did Heisenberg replace the concept of definite orbits by the concept of probability?
 - Give the values of n and l for $2s$ orbital.
12. An organic compound containing carbon, hydrogen and oxygen gave the following percentage composition: C=40.68%, H=5.08% and O=54.22%. Find the molecular formula of the compound if its molecular mass is 118. (Atomic mass of H=1, C=12, O=16)
13. Explain briefly what do you understand by black body radiation and photoelectric effect? How did it lead to the concept of particle nature of electromagnetic waves?
14. Define ionization enthalpy and explain the effect of any two factors on ionization enthalpy.
15. a) Explain why N_2 has greater bond dissociation enthalpy than N_2^+ whereas O_2^+ has greater bond dissociation enthalpy than O_2 .
- Write two conditions which must be satisfied for hydrogen bonding to take place in a molecule.
16. a) State Dalton's law of partial pressure.
- What will be the pressure of the gaseous mixture when 0.5L of H_2 at 0.8 bar and 2 L of O_2 at 0.7 bar are introduced into a 1 L vessel at 27°C ?
17. Find out whether it is possible to reduce MgO using carbon at 298K according to the following equation. If not, at what temperature it becomes spontaneous?
- $$\text{MgO(s)} + \text{C(s)} \longrightarrow \text{Mg(s)} + \text{CO(g)}; \Delta H = 91.2\text{KJ mol}^{-1}, \Delta S = 197.6\text{JK}^{-1}\text{mol}^{-1}.$$
18. a) Predict whether SO_3^{2-} is a Bronsted base or acid and justify your answer.
- The equilibrium constants for the reactions
 - $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$ and
 - $2\text{NO} + \text{O}_2 \rightleftharpoons 2\text{NO}_2$ are K_1 and K_2 respectively. What will be the equilibrium constant for the reaction $\text{N}_2 + 2\text{O}_2 \rightleftharpoons 2\text{NO}_2$?
19. A cell is constructed using Al^{3+}/Al and Mg^{2+}/Mg electrodes. Write the half cell reactions, overall reaction and calculate the emf of the cell given
- $$E^\circ_{\text{Mg}^{2+}/\text{Mg}} = -2.36\text{V}; \quad E^\circ_{\text{Al}^{3+}/\text{Al}} = -1.66\text{V}.$$
20. a) Explain the following giving an example for each:
- Resonance
 - Electromeric effect
- Explain tautomerism with an example.
21. a) What are the conditions for an organic compound to be aromatic? Give an example.
- Addition of HBr to propene gives 2-bromopropane while in the presence of benzoyl peroxide, the same reaction gives 1-bromopropane. Explain

- 22.a) Illustrate the following with an example:
 i) Wurtz reaction ii) Kolbe's electrolytic method.
 b) What effect does branching of an alkane chain has on its boiling point?
23. Shruti attended a seminar on environmental pollution in which people were asked to minimize the use of aerosols, fertilizers and highly branched detergents.
 a) How are the above mentioned substances responsible for pollution?
 b) Define Biochemical oxygen demand.
 c) As an individual, what steps would you take to minimize pollution. (Any two)

24.a) Give reasons:

- i) Superoxides are formed by heavier elements of the group.
- ii) Cesium can be used in photoelectric cell while lithium cannot be used.
- iii) Be and Mg do not impart flame colouration.
- iv) BeSO_4 is soluble in water but BaSO_4 is insoluble in water.
- v) Gypsum is added in the final stages of preparation of cement.

OR

- a) How is BeCl_2 prepared? Give its structure in i) solid state ii) vapour phase
- b) What is meant by anomalous behavior? What is it due to? Write three properties of Be to show its anomalous behavior.

25.a) Define buffer. Derive Henderson-Hasselbalch equation for acidic buffer.

- b) At a certain temperature and under a pressure of 4 atm, PCl_5 is 20% dissociated. Calculate the pressure at which PCl_5 will be 40% dissociated, temperature remaining same.

OR

- a) What is meant by common ion effect? Explain with an example.
- b) How many grams of NaOH must be dissolved in 1 L of the solution to give it a pH of 12.
- c) A sample of PCl_5 was introduced into an evacuated vessel at 473K. After equilibrium was attained, concentration of PCl_5 was found to be 0.05 mol L^{-1} . If value of K_c is 8.3×10^{-3} , what are the concentrations of PCl_3 and Cl_2 at equilibrium?

26.a) Account for the following:

- i) SiCl_4 undergoes hydrolysis but CCl_4 does not undergo hydrolysis.
- ii) Carbon monoxide is poisonous.
- iii) Ionisation enthalpy of lead is more than tin in group 14 of the periodic table.

- b) What are silicones? How are they prepared?

OR

a) A certain salt 'X' gives the following results:

- i) Its aqueous solution is alkaline in nature.
- ii) It swells up to a glassy material 'Y' on strong heating.
- iii) When conc. H_2SO_4 is added to a hot solution of 'X', white crystals of an acid 'Z' separates out.

Identify compounds X, Y and Z and write equations for all the above reactions.

- b) Give the reaction of diborane with the following:

- i) H_2O ii) NH_3

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