



**INDIAN SCHOOL SOHAR**  
**FINAL EXAM**  
**CHEMISTRY**

STD: XI

MARKS: 70

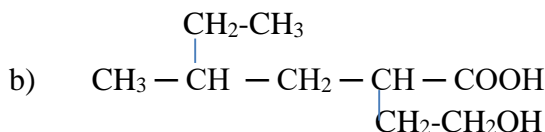
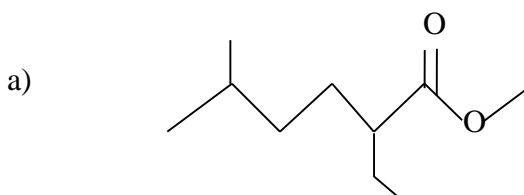
Date: 26-02-17

TIME: 3Hrs

**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 short answer question and carry 4 marks.
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. State Aufbau principle.
  2. What is meant by isoelectronic species?
  3. Write the conjugate acid and conjugate base of  $\text{HCO}_3^-$ .
  4. What is the oxidation state of potassium in  $\text{KO}_2$ ?
  5. Write the reaction when orthoboric acid is heated.
  6. Define an orbital. What does angular quantum number tell about an orbital?
  7. Write the IUPAC name of the following compounds:



8. What is Baeyer's reagent? What is it used for?
9. What do you understand by Greenhouse effect? What are the major Greenhouse gases?

OR

Explain any two processes that are generally responsible for the de oxygenation of water?

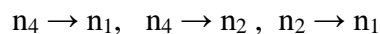
10. A substance, on analysis, gave the following percentage composition:  
Na = 43.4%, C = 11.3%, O = 45.3%. What is its molecular formula if its molar mass is 106.  
(Atomic mass of Na = 23, C = 12, O = 16 )
- 11a) If the combustion of 1 g of graphite produces 20.7 KJ of heat, what will be the molar enthalpy change? ( Atomic mass of C = 12 )
- b) The enthalpy change for the reaction:  $\text{HCN(g)} + 2\text{H}_2\text{(g)} \longrightarrow \text{CH}_3\text{NH}_2\text{(g)}$   
is -150 KJ. Calculate the bond enthalpy of  $\text{C}\equiv\text{N}$  bond given bond enthalpies of C-H, H-H, N-H and C-N bonds are 414, 435, 369 and 293  $\text{KJmol}^{-1}$  respectively.

12. Give reasons:

- i) Be has higher ionization enthalpy than B.
- ii) The size of the anion is larger than the parent atom.
- iii) Halogens act as good oxidizing agents.

13a) Why are Bohr's orbit also called stationary orbits?

b) Which of the following transition will have minimum wavelength and why?



14. An endothermic reaction,  $A(g) + 2B(g) \rightleftharpoons 2C(g)$ , is in equilibrium at a certain temperature. Can we increase the amount of C by

- i) adding catalyst
- ii) increasing pressure
- iii) increasing temperature. Justify

15a) Write the conditions of temperature and pressure when gases deviate most from the ideal behaviour.

b) How did Vander Waals modify the ideal gas equation which describes the behavior of real gases over a wide range of temperature and pressure? Explain.

16a) Define entropy.

b) Comment on the spontaneity of a reaction at constant temperature and pressure in the following cases and justify:

- i)  $\Delta H < 0$  and  $\Delta S > 0$
- ii)  $\Delta H > 0$  and  $\Delta S > 0$

17. If 0.56 g of KOH is dissolved in water to give 200 mL of solution at 298 K, calculate the concentrations of potassium, hydrogen and hydroxyl ions. What is the pH of this solution? (Atomic mass of K=39, O=16, H=1)

18a) A student constructed an electrochemical cell using two electrodes  $Al^{3+}/Al$  (1M) and  $Mg/Mg^{2+}$  (1M) and represented it as :  $Al/Al^{3+}(1M) \parallel Mg^{2+}(1M)/Mg$ .

Is he correct? Justify your answer. Given  $E^\circ_{Mg^{2+}/Mg} = -2.37 V$  ;  $E^\circ_{Al^{3+}/Al} = -1.66V$ .

b) Given the standard electrode potentials, arrange the following metals in the increasing order of their reducing power:



OR

a) Balance the following equation by ion electron method in acidic medium:



19a) How is hydrogen peroxide prepared by electrolytic method?

b) What is synthesis gas? How is it obtained from coal? What is the process called?

20a) What is meant by diagonal relationship?

b) Write two properties to show the diagonal relationship of beryllium with aluminium.

21a) Why is Lassaigne's solution boiled with conc.  $HNO_3$  before testing for halogens?

b) Distinguish between position and functional isomerism with one example each.

22a) For which kind of compounds formula mass is used instead of molecular mass and why?

b) Gastric juice contains 3 g of  $HCl$  per litre. If a person produces about 2.5 L of gastric juice, how many antacid tablets each containing 400 mg of  $Al(OH)_3$  are needed to neutralize all the  $HCl$  produced? ( Atomic mass of H=1, O=16, Al=27, Cl=35.5 )

23. Ozone is health hazard at the ground level because it plays a significant role in forming photochemical smog. However, presence of ozone layer in stratosphere shields the earth from the harmful solar radiations. The excessive use of chlorofluorocarbons in refrigerators and air

conditioners over the years has caused depletion of ozone layer considerably and this has led to ozone hole particularly over Antarctica. The ozone hole is a strong reminder that human activities can have a profound effect on environment.

On the basis of the above passage, answer the following questions:

- Explain how ozone layer depletion is caused by chlorofluorocarbons?
- Which property of CFC's is responsible for their use in refrigerators and air conditioners ?
- How do  $\text{NO}_2$  and  $\text{CH}_4$  act as natural sinks for  $\text{ClO}$  and  $\text{Cl}$  free radicals in other parts of stratosphere?
- As an individual, what measures (any two) would you take to prevent ozone layer depletion.

24a) Give reasons:

- Thallium in +1 oxidation state is more stable than in +3 oxidation state.
- $\text{AlF}_6^{3-}$  exists but  $\text{BF}_6^{3-}$  does not exist.
- Orthoboric acid acts as a Lewis acid.

b) What are silicones? How are they prepared?

OR

a) Account for the following:

- $\text{SiCl}_4$  can be hydrolysed but  $\text{CCl}_4$  cannot be hydrolysed.
- Conc.  $\text{HNO}_3$  can be stored in aluminium containers.

b) A certain salt X gives the following results:

- its aqueous solution is alkaline
- it swells up to a glassy material Y on strong heating.

Identify X and Y and write equations for the reactions. What is the application of the reaction involved in (ii)? What is this test called?

25a) What is Anti-Markovnikov rule? Explain why 1-bromopropane is the major product when propene reacts with  $\text{HBr}$  in the presence of benzoyl peroxide. Write the mechanism for it.

b) Peroxide effect is not observed when  $\text{HCl}$  or  $\text{HI}$  is added to propene . Give reasons.

OR

a) The nature of substituents attached to benzene ring is responsible for activation or deactivation of the benzene ring towards further electrophilic substitution and also for orientation of the incoming group. Explain with examples and write the mechanism also.

b) Explain giving equation what happens when

- Vapours of phenol is passed over heated zinc dust.
- 2-bromopropane is heated with alcoholic  $\text{KOH}$ .

26a) Sketch the shapes of molecular orbitals formed by the overlap of the following orbitals:

- End on overlap of 2p orbitals
- side on overlap of 2p orbitals.

b) How is valence bond theory different from Lewis concept with regard to the formation of covalent bond?

OR

a) In each of the following pairs, predict which has higher value of the property mentioned and justify it.

- $\text{HF}$ ,  $\text{HCl}$  (polar character)
- $\text{C}_2\text{H}_2$ ,  $\text{C}_2\text{H}_4$  (s-character in the hybridisation of carbon)

b) Account for the following:

- Hydrogen bonding does not exist in  $\text{HCl}$ .
- $\text{CH}_4$  is tetrahedral but not square planar.
- $\text{BCl}_3$  is planar but anhydrous  $\text{AlCl}_3$  is tetrahedral.