INDIAN SCHOOL SOHAR
FIRST TERM EXAM 2015-2016
CHEMISTRY

STD: XII   MARKS: 70
Date:10-09-2015   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. 6-10are short answer questions and carry 2 marks each.
4. Question nos11-22 are short answer questions and carry 3 marks each.
5. Question no. 23 is short answer questions 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.

---

1. Arrange the following in the increasing order of boiling point:

   CH_3OCH_3, C_2H_5OH, CH_3COOH, CH_3CHO

2. Write the IUPAC name of the given compound: $CH_3-CH-CH=CH-COOH$ (with OH on the CH_3-CH carbon)

3. Why are aquatic species more comfortable in cold water in comparison to warm water?

4. What is the quantity of electricity in coulombs required to reduce 1 mol of $Cr_2O_7^{2-}$?

5. Aniline cannot be prepared by Gabriel Phthalimide synthesis method. Why?

6. For the reaction $2A + B \rightarrow C + D$, the following kinetic data were obtained in three separate experiments at 298K.

S.No.	Initial conc.[A] (mol L^{-1})	Initial conc. [B] (mol L^{-1})	Initial rate of reaction (mol L^{-1} s^{-1})
1.	0.1	0.1	1.2 x 10^{-3}
2.	0.1	0.2	1.2 x 10^{-3}
3.	0.2	0.1	2.4 x 10^{-3}

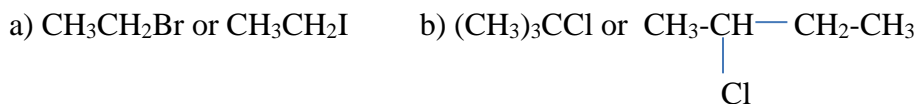   a) Calculate order with respect to A and B   b) What is the value of rate constant 'k'?

7. An organic compound 'A' having molecular formula C_3H_8O on treatment with Cu at 573 K gives 'B' which does not reduce Tollen's reagent but gives yellow precipitate with I_2 and NaOH. Identify 'A' and 'B' and write chemical equations for the reactions.

8. a) What is the product obtained when aniline reacts with bromine water?
   b) Why is acetylation carried out before bromination of aniline? Write the reaction.

9. Which compound in each of the following pair will react faster in S_N2 reaction with $-OH^-$?
   Justify your answer.

   a) CH_3CH_2Br or CH_3CH_2I b) $(CH_3)_3CCl$ or $CH_3-CH-CH_2-CH_3$
                                                              |
                                                              Cl

10. Alcohols can act both as an electrophile and as a nucleophile. Justify.

                                        OR

    Illustrate the following with an example:
    a) Kolbe Schmidt reaction   b) Reimer Tiemann reaction

11. Phenol associates in benzene to a certain extent to form dimer. A solution containing
    2×10^{-2} Kg of phenol in 1Kg of benzene has depression in freezing point of 0.69K.Calculate
    the degree of association of phenol. k_f for benzene = 5.12 K Kg mol^{-1}, Mol wt of phenol=94

                                        OR

    Calculate the freezing point of a solution containing 0.1g of $K_3[Fe(CN)_6]$ (molwt 329) in
    100g of water if it is 50% ionized. k_f for water = 1.86 K Kg mol^{-1}

12. Complete the following reactions:

                    Br_2/KOH CHCl$_3$ + KOH   Sn / HCl
    a) $C_6H_5CONH_2$ ─────────────→ A ─────────────→ B ─────────────→ C

                    Na /C$_2$H$_5$OH   HNO$_2$ KMnO$_4$
    b) CH_3CH_2CN ─────────────→ A ─────────────→ B ─────────────→ C

13.a) Why is single O-O bond weaker than single S-S bond?
   b) $SbCl_5$ is more covalent than $SbCl_3$. Why?
   c) Why is BiH_3 strongest reducing agent in group 15?

14. How will you bring about the following conversions:
    a) Benzene to p-nitrobenzaldehyde
    b) Benzaldehyde to phenyl acetic acid
    c) Acetaldehyde to butan-2-ol

15.a) Write the mechanism for the reaction : $CH_3CH_2OH + HCl \longrightarrow CH_3CH_2Cl + H_2O$
   b) Why is allyl chloride more reactive than vinyl chloride towards nucleophilic substitution
      reactions?
   c) What products are obtained when anisole reacts with HI?

16.a) How will you test the presence of SO_2?
   b) Why is H_3PO_2 a better reducing agent than H_3PO_3.
   c) Can PCl_5 act as both oxidizing and reducing agent? Why?

17. Collision theory of chemical reactions provide a greater insight into the energetic and
    mechanistic aspects of reactions. Explain.

18.a) Explain why the molecular mass of NaCl determined with the help of colligative property is half of its actual molecular mass while that of acetic acid is double its molecular mass.
   b) What is the value of Van't Hoff factor 'i' for K_2SO_4 if it is 50% ionized?

19. Account for the following:
   a) There are two $-NH_2$ groups in semicarbazide but only one is involved in the formation of semicarbazone.
   b) Chloroacetic acid is more acidic than acetic acid.
   c) Benzaldehyde does not undergo Aldol condensation.

20. What happens when
   a) Two moles of chlorobenzene react with sodium metal in presence of ether as a solvent?
   b) Chlorobenzene reacts with Conc. HNO_3 and Conc. H_2SO_4 ?
   c) Tert. butyl chloride reacts with sodium methoxide?

21. Account for the following:
   a) pk_b of aniline is more than ethylamine.
   b) Although amino group is o- and p- directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.
   c) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.

22. a) Complete the following reactions

   i) P_4 + NaOH + H_2O →

   ii) Cl_2 + NaOH (hot,conc.) →

   iii) PCl_5 + H_2O(xs) →

23. Mr. Anil is habitual of drinking alcohol. His father was also addicted to alcohol and died due to damage of liver. His friend Ramesh advised him to leave drinking and start healthy living habits. He was taken to de-addiction center and now his habit is under control.
   a) What values are associated with Ramesh?
   b) What is denatured alcohol?
   c) How will you distinguish between methanol and ethanol by a suitable chemical test.
   d) Why are alcohols soluble in water?

24.a) Illustrate the following with an example:
      i) Rosenmund reduction   ii) Hell-Volhard Zelinsky reaction   iii) Clemmensen reduction
   b) Why do aldehydes and ketones undergo nucleophilic addition reactions? Explain the mechanism of nucleophilic attack on carbonyl group of an aldehyde or ketone.
                                             OR
   a) Write the products formed when propanone reacts with the following reagents:
      i) CH_3MgBr and then H_3O^+ ii) 2,4-DNP   iii) C_6H_5CHO in presence of dil.NaOH
   b) How will you distinguish between the following pairs of compounds by chemical test?
      i) Benzoic acid and Benzaldehyde   ii) Ethanal and Butan-2-one

25.a) Account for the following:

   i) NH_3 has more proton affinity than PH_3.

   ii) F_2 is stronger oxidizing agent than Cl_2

   iii) All the five P-Cl bonds are not equivalent in PCl_5

   iv) Sulphur in vapour state is paramagnetic in nature.

   v) Noble gases have low melting point and boiling point.

<p style="text-align:center">OR</p>

   a) Explain the following observations

   i) +3 O.S. become more and more stable from As to Bi in the group

   ii) The electron gain enthalpy with –ve sign for oxygen (-141 KJ mol^{-1}) is numerically less than that for sulphur (-200 KJ mol^{-1})

   iii) Phosphorous has a greater tendency for catenation than nitrogen

   b) Draw the structure for the following molecules

   i) $H_2S_2O_3$ ii) H_3PO_3

26.a) The electrical resistance of a column of diameter 2 cm and length 22 cm containing 0.01M NaOH solution is 6 x $10^3 \Omega$. Calculate its resistivity, conductivity and molar conductivity.

   b) Explain the variation of molar conductivity with concentration for weak electrolyte

<p style="text-align:center">OR</p>

   a) A copper-silver cell is set up. The copper ion concentration in it is 0.10M. The cell potential measured is 0.422V. Determine the concentration of Ag^+ ions in the cell.

   Given $E^0_{Ag^+/Ag}$= +0.80V ; $E^0_{Cu^{2+}/Cu}$= +0.34V

   b) State Kohlrausch law of independent migration of ions. Write its one application.

<p style="text-align:center">---oOo---</p>