INDIAN SCHOOL SOHAR
SECOND TERM EXAM
CHEMISTRY

STD: XII MARKS: 70
Date:28-11-2016 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 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 structure of crossed Aldol product formed when benzaldehyde reacts with acetophenone in the presence of dilute alkali.

2. Write the IUPAC name for the linkage isomer of $[Co(NH_3)_5NO_2]Cl_2$

3. Refractive index of a solid is observed to have the same value along all directions. Comment on the nature of this solid. Would it show cleavage property?

4. Write the formula of tear gas.

5. Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25

6. Ionic solids which have anion vacancies due to metal excess defect, develop color. Explain with the help of a suitable example.

7. Explain the terms : a) Electrophoresis b) coagulation

8. Using valence bond theory, predict the hybridization and magnetic property of the following:
   a) $[Cr(H_2O)_6]^{3+}$ (Z = 24) b) $[Ni(CN)_4]^{2-}$ (Z = 28)

9.a) What is meant by denaturation of proteins?
   b) What is the structural difference between a nucleoside and nucleotide?

10. Write the name(s) and structure(s) of the monomers of the following polymers:
    a) Neoprene b) Buna-S

    OR

    Differentiate between the mode of formation of an addition polymer and condensation polymer. Give one example for each.

11. How would you account for the following:-
    a) Frenkel defects are not found in ionic solids of nearly equal sizes of cations and anions.
    b) Schottky defects lower the density of a crystalline solid.
    c) Impurity doped silicon is a semiconductor.

12. What is an adsorption isotherm? Explain Freundlich adsorption isotherm.

13. What is crystal field splitting energy? How does the magnitude of Δ_o decide the actual configuration of d orbitals in a coordination entity ?

14.a) Gold (atomic radius = 0.144 nm) crystallises in a face-centred unit cell. What is the length of a side of the cell in cm ?

b) Explain the terms i) Antiferromagnetism ii) Ferrimagnetism.

15. Write chemical equations for each of the following when

a) Acetic acid is heated with conc. H_2SO_4.

b) Ethanal is treated with zinc-amalgam and conc. HCl

c) Ethanoic acid reacts with ammonia followed by heating.

16.a) Explain the fact that in aryl alkyl ethers the alkoxy group activates the benzene ring towards electrophilic substitution and directs the incoming substituents to ortho and para positions in benzene ring.

b) While separating a mixture of ortho and para nitrophenols by steam distillation, name the isomer which will be steam volatile. Give reasons.

17. Account for the following:

a) CN^- is an ambidentate ligand.

b) Benzylic halides show high reactivity towards S_N1 reactions.

c) Although chlorine is an electron withdrawing group, yet it is ortho-para directing in electrophilic aromatic substitution reactions.

18.a) Why is actinoid contraction greater than lanthanoid contraction?

b) Name the d-block elements which are not transition elements and justify.

c) What happens when pH of dichromate solution is increased?

OR

a) To what extent do the electronic configurations decide the stability of oxidation states in the first series of transition elements? Illustrate your answer with examples.

b) Predict which of the following will be colored in aqueous solution?

Sc^{3+}, Mn^{2+}, Co^{2+}, Fe^{3+} (Z = 21for Sc, 25 for Mn, 27 for Co, 26 for Fe)

19.a) Measurement of which colligative property is preferred for determination of molar mass of biomolecules and why?

b) Henry's law constant (K_H) for the solution of methane in benzene at 298K is $4.27x10^5$ mmHg. Calculate the solubility of methane in benzene at 298K at 760mmHg.

20. Three electrolytic cells A, B and C containing solutions of $ZnSO_4$, $AgNO_3$ and $CuSO_4$ respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and zinc were deposited?
(Atomic mass of Cu=63.5, Zn=65, Ag=108 $gmol^{-1}$)

21. Define half life of a reaction. Write the expression of half life for the following reactions:
a) zero order b) 1^{st} order reaction.

22. Write the role of

a) I_2 in Van Arkel method of refining.

b) Cryolite in the extraction of aluminium.

c) Dilute NaCN in the extraction of silver.

23. Recently a ban is imposed on the use of any kind of polythene bags in Delhi. Polythene is non-biodegradable and creates an environmental garbage but some polythene manufacturing units opposed this decision.

a) What values are missing in the polythene manufacturing traders? (Any two)

b) What are biodegradable polymers?

c) Give an example for such a polymer and write the reaction for its preparation.

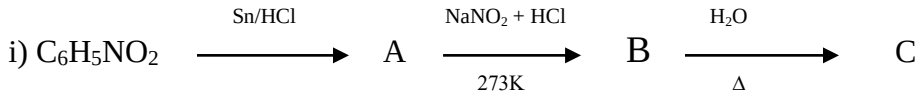
24. a) Illustrate the following reactions giving suitable example in each case:

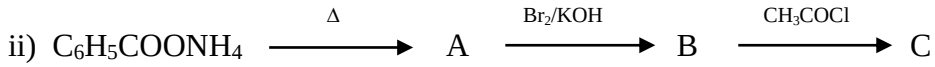
i) Ammonolysis ii) Coupling reaction iii) Acetylation of amines

b) Describe Hinsberg method for the identification of primary, secondary and tertiary amines. Also write the chemical equations of the reactions involved.

OR

a) Write the structures of A, B and C in the following reactions:





b) Write the structures of main products when benzene diazonium chloride reacts with the following reagents:

i) HBF_4 / Δ ii) Cu / HBr

25.a) Explain the meaning of the following terms:

i) Invert sugar ii) Polypeptide iii) Enzymes

b) Write 3 such behaviours of glucose which cannot be explained by an open chain structure of glucose molecule. What alternative structure has been proposed for the glucose molecule?

OR

a) Write the reactions involved when D-glucose is treated with the following reagents:

i) HCN ii) Br_2 water

b) What are nucleic acids? Mention 2 of their important functions.

26.a) Give reasons:

i) Pentahalides of group 15 are more covalent than their trihalides.

ii) PH_3 has lower boiling point than NH_3.

iii) Amongst hexahalides of sulphur, hexafluorides are the only stable halides.

b) What is anomalous behavior of oxygen due to? Justify your answer giving suitable examples.

OR

a) Write balanced chemical equations for the following reactions:

i) White P_4 is heated with conc. NaOH solution in an inert atmosphere of CO_2.

ii) SO_2 is passed through acidified solution of potassium permanganate.

b) Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the oxidizing power of F_2 and Cl_2.