

CODE - 043 (S) B
2016

Time: 3 hrs.

M.M.:70

General Instructions:

- All questions are compulsory.
- QNo. 1 to 5 are very short answer questions and carry 1 mark each.
- QNo. 6 to 10 are short answer questions and carry 2 marks each.
- QNo. 11 to 22 are also short answer questions and carry 3 marks each.
- QNo. 23 is a value based question and carry 4 marks.
- QNo. 24 to 26 are long answer questions and carry 5 marks each.
- Use log tables if necessary, use of calculators is not allowed.

- Which is more paramagnetic and why?
 Fe^{2+} or Fe^{3+}
- Draw Haworth structure of B-D glucose.
- What is F-center? Give an example.
- A reaction is of second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is
i) tripled ii) one-fourth.
- Which of the two is more basic and why?
 CH_3NH_2 or PhNH_2 ?
- Explain the variation of molar conductivity with concentration for weak electrolyte. Draw the graph.
- Write the main products when
1) n-butyl chloride is treated with alcoholic KOH.
2) Methyl chloride is treated with AgCN.

OR

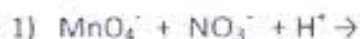
Aryl halides are less reactive than alkyl halides towards nucleophilic substitution reactions. Explain.

- The following results have been obtained during the kinetic studies of the reaction: $2\text{A} + \text{B} \rightarrow \text{C} + \text{D}$

Experiment	[A] mol/l	[B] mol/l	Initial rate of formation of D mol/l/min
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law and the rate constant for the reaction.

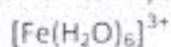
9. Complete and balance the following reactions:



10. i) Draw the geometrical isomers of complex $[\text{Co}(\text{en})\text{Cl}_2(\text{NH}_3)_2]^{2+}$. Which of them is optically inactive?

ii) On the basis of crystal field theory, write the electronic configuration for d^4 ion, if $\Delta_0 < P$.

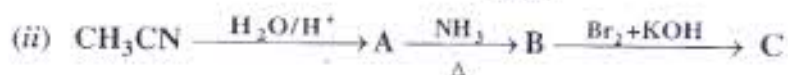
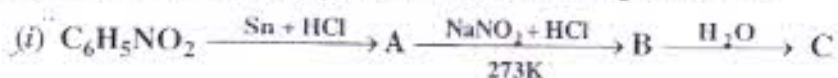
iii) Write the hybridization type and magnetic behaviour of the complex



11. 1) Explain 'Ferrimagnetism'. Give an example.

3) A compound is formed by two elements M and N. The element N forms ccp and atoms of M occupy $1/3^{\text{rd}}$ of tetrahedral voids. What is the formula of the compound?

12. Give the structures of A, B and C in the following reactions:



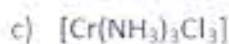
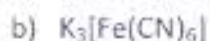
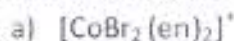
13. Copper crystallizes in fcc lattice and has a density of 8.930 g/cm^3 at 293 K. Calculate the radius of copper atom. ($N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

14. Write the mechanism of the reaction of HI with methoxymethane

OR

Give two reactions that show the acidic nature of phenol. Compare acidity of phenol with that of ethanol.

15. Write IUPAC names of following compounds:



16. An aqueous solution containing 1.248 g of barium chloride (Molar mass = 208.34 g/mol) in 100 g of water boils at 100.0832°C . Calculate the degree of dissociation of barium chloride. (K_b for water = 0.52 K kg/mol)

17. Give chemical tests to distinguish between the following pairs of compounds:

a) Propanone and propanal

b) Pentan-2-one and Pentan-3-one

c) Formic acid and acetic acid

18. A first order reaction takes 40 minutes for 30% decomposition. Calculate $t_{1/2}$.

19. Account for the following:

- 1) NH_2 group of aniline is acylated before carrying out nitration.
- 2) $(\text{CH}_3)_2\text{NH}$ is more basic than $(\text{CH}_3)_3\text{N}$ in an aqueous solution.
- 3) Primary amines have higher boiling points than tertiary amines.

20. An organic compound 'A' on treatment with CHCl_3/KOH gives two compounds 'B' and 'C'. Both B and C give the same product 'D' when distilled with zinc dust. Oxidation of D gives E having molecular formula $\text{C}_7\text{H}_6\text{O}_2$. The sodium salt of E on heating with sodalime gives F which may also be obtained by distilling A with zinc dust. Identify A to F.

21. Distinguish between ideal and non ideal solutions giving examples.

OR

State Henry's law. Give its three important applications.

22. Explain the following:

- 1) Allyl chloride is hydrolysed more readily than n-propyl chloride.
- 2) Chloroform is stored in closed dark coloured bottles completely filled so that air is kept out.
- 3) Thionyl chloride method is preferred for preparing alkyl chlorides from alcohols.

23. In school, Meena fainted in playground. Her physical education teacher Geetanjali took her to a doctor. The doctor found that she was suffering from anaemia. He gave iron supplement along with folic acid. The girl belongs to poor family. Geetanjali helped her financially to have proper diet. She recovered fast and thanked her teacher. After reading the passage, answer the following questions:

- i) What values are associated with Geetanjali?
- ii) Which vitamin deficiency causes pernicious anaemia?
- iii) Why should we take green leafy vegetables?
- iv) Which fruit is the source of iron?

24. Assign reasons for the following:

- 1) The enthalpies of atomization of transition elements are high.
- 2) The transition metals and many of their compounds act as good catalysts.
- 3) From element to element, the actinoid contraction is greater than the lanthanoid contraction.
- 4) Zn has lowest enthalpy of atomisation in 3d series.
- 5) The E^0 value for the $\text{Mn}^{3+}/\text{Mn}^{2+}$ couple is much more positive than that for $\text{Cr}^{3+}/\text{Cr}^{2+}$ couple or $\text{Fe}^{3+}/\text{Fe}^{2+}$ couple.

OR

A violet compound of manganese (A) decomposes on heating to liberate oxygen and compounds (B) and (C) of manganese are formed. Compound (C) reacts with KOH in the presence of potassium nitrate to give compound (B). On heating compound (C) with conc. H_2SO_4 and NaCl , chlorine gas is

liberated and a compound (D) of manganese along with other products is formed. Identify compounds A to D and write balanced chemical reactions involved

25. (a) Briefly explain the following reactions:

- 1) Cannizzaro's condensation
- 2) Clemmensen's Reduction

(b) How the following conversions are carried out :

- 1) Ethanal to propanone
- 2) Acetic acid to propanoic acid
- 3) Benzyl alcohol to phenylethanoic acid

26. a) Write the reactions taking place at cathode and anode in a fuel cell.

b) A galvanic cell consists of a metallic zinc plate immersed in 0.1 M $Zn(NO_3)_2$ solution and metallic plate of lead in 0.02 M $Pb(NO_3)_2$ solution. Calculate the emf of the cell. Write the chemical equations for the electrode reactions and represent the cell.

Given $E^{\circ}Zn^{2+}/Zn = -0.76V$

$E^{\circ}Pb^{2+}/Pb = -0.13V$