

6. Match the items given in column I with that in column II: [1]

Column I	Column II
(a) Molar Conductivity	(i) the conductance of the solution placed between two electrodes unit distance apart and having area of cross-section large enough to accommodate one g-equivalent of electrolyte.
(b) Resistivity	(ii) the conductance of the solution placed between two electrodes unit distance apart and having area of cross-section large enough to accommodate one mole of electrolyte.
(c) Equivalent Conductivity	(iii) Conductance of one centimetre cube of the conductor.
(d) Conductivity	(iv) Resistance offered by the conductor of 1 cm length with area of cross section equal to 1cm^2 .

a) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

b) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

c) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)

d) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)

7. In alkyl halide: [1]

a) All of these

b) the carbon atom of C-halogen bond bears a partial positive charge

c) the halogen atom bears a partial negative charge

d) the carbon-halogen bond of alkyl halide is polarized

8. DNA and RNA contain four bases each. Which of the following bases is not present in RNA? [1]

a) Thymine

b) Cytosine

c) Guanine

d) Adenine

9. The role of a catalyst is to change _____. [1]

a) gibbs energy of reaction

b) equilibrium constant

c) enthalpy of reaction

d) activation energy of reaction

10. Methyl ketones are usually characterized by: [1]

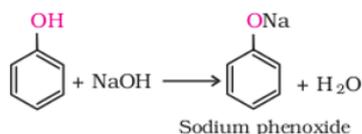
a) Benedict's reagent

b) Iodoform test

c) Schiff's test

d) Tollen's reagent

11. In the reaction [1]



a) Phenols are acidic in nature.

b) They can donate a proton to a stronger base

c) Cleavage of O - H bond

d) All of these

12. Aniline does not undergo one of the following: [1]

a) Bromination

b) Nitration

c) Sulphonation

d) Friedal Craft Reaction

13. **Assertion (A):** In the presence of an enzyme, the substrate molecule can be attacked by the reagent effectively. [1]

Reason (R): Active sites of enzymes hold the substrate molecule in a suitable position.

- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.

14. **Assertion (A):** Oxidation of ketones is easier than aldehydes. [1]

Reason (R): C-C bond of ketones is stronger than the C-H bond of aldehydes.

- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.

15. **Assertion (A):** Quaternary ammonium salt on reaction with base give Hofmann's alkene as major product. [1]

Reason (R): When leaving groups are poor then partial anionic character develop in transition state.

- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.

16. **Assertion (A):** Alcohols are dehydrated to hydrocarbons in the presence of acidic zeolites. [1]

Reason (R): Zeolites are porous catalysts.

- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false. d) A is false but R is true.

Section B

17. Give an example of solid solution in which the solute is a gas. [2]

18. Why E^\ominus values for Mn, Ni, and Zn are more negative than expected? [2]

19. **Answer the following:** [2]

(i) If half life period of a first order reaction is X and $\frac{3}{4}$ th life period of the same reaction is Y, how are x and y related each other? [1]

(ii) Is it possible to determine or predict the rate law theoretically by merely looking at the equation? [1]

20. State two advantages of H₂ - O₂ fuel cell over ordinary cell. [2]

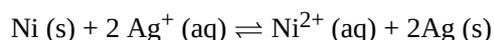
OR

How does fuel cell operate? Why we prefer it over other conventional fuel cells? Write complete reaction which takes place with respect to Hydrogen-Oxygen fuel cells.

21. Formic acid reduces Tollen's reagent. Explain. [2]

Section C

22. Calculate the maximum work and log Kc for the given reaction at 298 K : [3]

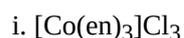


Given:

$$E_{\text{Ni}^{2+}/\text{Ni}}^\ominus = -0.25 \text{ V}, E_{\text{Ag}^+/\text{Ag}}^\ominus = +0.80 \text{ V}$$

$$1F = 96500 \text{ C mol}^{-1}$$

23. Write the structures and names of all the stereoisomers of the following compounds: [3]





24. Write the structures of the isomers of alcohols with molecular formula $\text{C}_4\text{H}_{10}\text{O}$. Which of these exhibits optical activity? [3]

OR

How may the following conversion be carried out:

i. Propene to propan-2-ol

ii. Anisole to phenol.

25. Describe the following: [3]

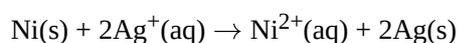
i. Acetylation

ii. Cannizzaro reaction

iii. Cross aldol condensation

iv. Decarboxylation

26. Calculate $\Delta_r G^\circ$ and $\log K_c$ for the following cell: [3]



Given that $E_{\text{cell}}^\circ = 1.05\text{V}$, $IF = 96,500 \text{ Cmol}^{-1}$.

27. How the following conversions can be carried out? [3]

i. 2-Chloropropane to 1-propanol

ii. Isopropyl alcohol to iodoform

iii. Chlorobenzene to p-nitrophenol

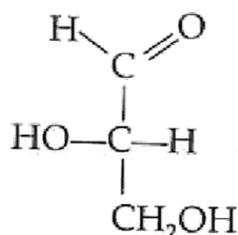
28. The half-life for a first order reaction is $5 \times 10^4 \text{ s}$. What percentage of the initial reactant will react in 2h? [3]

Section D

29. **Read the text carefully and answer the questions:** [4]

Carbohydrates can exist in either of two conformations, as determined by the orientation of the hydroxyl group about the asymmetric carbon farthest from the carbonyl group.

By convention, a monosaccharide is said to have D configuration if the hydroxyl group is attached to the asymmetric carbon atom adjacent to the CH_2OH group is on the right hand side irrespective of the position of the other hydroxyl groups. On the other hand, the molecule is assigned L configuration if the $-\text{OH}$ group is attached to the carbon adjacent to the CH_2OH group is on the left hand side.



- (i) Identify the configuration of carbohydrate in the above structure.

OR

Which type of monosaccharide D-L or both is present in majority in human body?

(ii) What is the relation between D-Glyceraldehyde and L-Glyceraldehyde?

(iii) What are the two functional group present in typical carbohydrate?

30. **Read the text carefully and answer the questions:** [4]

Valence Bond Theory (VBT) According to this theory, the metal atom or ion under the influence of ligands can use its $(n-1)d$, ns , np or ns , np , nd orbitals for hybridisation to yield a set of equivalent orbitals of definite geometry such as octahedral, tetrahedral, square planar. the geometry of a complex is predicted from the knowledge of its magnetic behaviour on the basis of the valence bond theory. The magnetic moment of coordination compounds can be measured by magnetic susceptibility experiments. The results can be used to obtain information about the number of unpaired electrons and hence structures adopted by metal complexes. VB theory suffers from the shortcomings, It involves a number of assumptions, It does not give a quantitative interpretation of magnetic data, It does not explain the colour exhibited by coordination compounds, It does not give a quantitative interpretation of the thermodynamic or kinetic stabilities of coordination compounds.

- (i) CO is a stronger complexing reagent than NH_3 .
- (ii) The molecular shape of $\text{Ni}(\text{CO})_4$ is not the same as that of $[\text{Ni}(\text{CN})_4]^{2-}$. Give reason.
- (iii) Write the hybridization and magnetic behaviour of the complex $[\text{Ni}(\text{CO})_4]$. (At.no. of Ni = 28)

OR

In the diamagnetic octahedral complex, $[\text{Co}(\text{NH}_3)_6]^{3+}$, the oxidation state of cobalt ion?

Section E

31. **Attempt any five of the following:** [5]
- (i) What is the effect of adding a base to potassium dichromate? [1]
 - (ii) Sc(21), is a transition element but Ca(20) is not. Why? [1]
 - (iii) Name the element which are not really transition elements but are discussed with them. [1]
 - (iv) What is meant by disproportionation of an oxidation state? Give an example. [1]
 - (v) State a consequence of lanthanide contraction shown by transition elements. [1]
 - (vi) Why is the highest oxidation state of a metal exhibited in its oxide or fluoride only? [1]
 - (vii) Out of Cu_2Cl_2 and CuCl_2 , which is more stable and why? [1]
32. State Raoult's law for a solution containing volatile components. What is the similarity between Raoult's law and Henry's law? [5]

OR

What type of non-idealities are exhibited by cyclohexane -ethanol and acetone-chloroform mixture? Give reason.

33. Give one chemical test to distinguish between the following pairs of compounds. [5]
- i. Methylamine and dimethylamine
 - ii. Secondary and tertiary amines
 - iii. Ethylamine and aniline
 - iv. Aniline and benzylamine
 - v. Aniline and N-methylaniline.

OR

State the reactions and reaction conditions for the following conversions :

- i. Benzene diazonium chloride to nitrobenzene.
- ii. Aniline to benzene diazonium chloride.
- iii. Ethylamine to methylamine.

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