

2021-24

Time : 3 hours

Full Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A
(Compulsory)

1. Answer the following questions : $1 \times 10 = 10$
- (a) Write the electronic configuration of Mn^{2+} ion.
 - (b) Which functional group is present in glucose and in fructose ? (excluding – OH)
 - (c) Write an example of a strong ligand.
 - (d) Draw the Haworth Projection Formula for alpha-D-glucose.

- (e) Give one example of reducing sugars.
- (f) Calculate the Spin only magnetic moment of Sc^{+2} .
- (g) Which type of isomerism is shown by (MA_3B_3) type complexes ?
- (h) Write an example of a disaccharide.
- (i) Find the oxidation number
Co in $[Co(OX)_3]^{3-}$.
- (j) Give an example of non-essential amino acids.

2. Write short note on any one of the following : 5
- (a) Drug action receptor theory
 - (b) Basic postulates of CFT.

Group – B

Answer any four questions of the following :

3. (a) What are d-block elements ? Why are they called transition elements ? $1+2 = 3$
- (b) Briefly explain : $3 \times 4 = 12$
- (i) Why d-block elements exhibit variable oxidation states ?

- (ii) Why the compounds of d-block elements are mostly coloured ?
- (iii) Why the enthalpy of atomization of d-block elements are very high ?
- (iv) Why d-block elements can behave as catalysts ?

4. Write short notes on any three of the following :
5×3 = 15

- (a) Jahn-Teller distortion
- (b) Inner and outer orbital octahedral complex
- (c) Crystal field stabilization energy
- (d) Spectrochemical series
- (e) Drawbacks of Valence Bond Theory

5. (a) What are Carbohydrates ? 3
- (b) How does D-glucose reacts with the following reagents ? 3×4 = 12
- (i) Br₂ water
 - (ii) HCN
 - (iii) HNO₃
 - (iv) Red P / Conc. HI

6. Write explanatory notes on any three of the following : 5×3 = 15

- (a) Transfects
- (b) Nucleoside and nucleotide
- (c) Stereo isomerism in complex compounds
- (d) Zwitter ion and Isoelectric point
- (e) Saponification number and Iodine number

7. Answer the following questions : 5×3 = 15

- (a) What are lipids ? How are they classified ?
- (b) What are enzymes ? Briefly discuss the on mechanism of enzyme action.
- (c) Write a short note on Merrifield solid-phase peptide synthesis.

8. Write the IUPAC name, find the hybridisation and draw the shape of the following complexes : 3×5 = 15

- (a) [Ni (Co)₄]
- (b) [Ni Cl₄]⁻²
- (c) K₄ [Fe (CN)₆]
- (d) [Cr (Co)₆]⁺³
- (e) [Co (NH₃)₆]³⁺

