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Seat No. _____

no. of printed pages : 4

SARDAR PATEL UNIVERSITY
B.Sc. Semester-V Examination [CBCS] NC October-2025
[US05CCHE22] : Inorganic Chemistry

Date: 06/10/2025, Monday

Time: 10.00 A.M. to 01.00 P.M.

Total Marks: 70

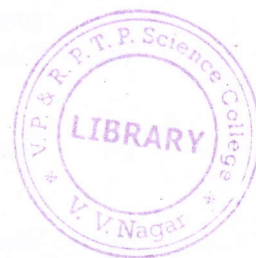
NOTE: 1. Figure to the right indicate full marks of the questions.

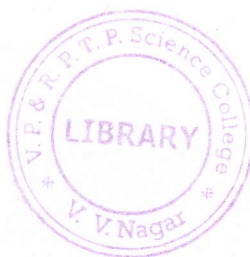
- Que1. Choose the correct option and rewrite the answer of the following. 10
1. Which is the principal axis of rotation present in benzene molecule?
(a) C_6 (b) C_4 (c) C_3 (d) C_2
 2. Infinite fold axis of symmetry is present in which type of molecule?
(a) Octahedral (b) Tetrahedral (c) Linear (d) Pyramidal
 3. Symbol of Rotation-Reflexion is.....
(a) C_n (b) S_n (c) D_n (d) E
 4. According to crystal field theory, the nature of metal-ligand bond is ----
(a) covalent (b) coordinate (c) purely electrostatic (d) all of these
 5. The value of CFSE for d^8 ion in weak ligand field is
(a) $-12Dq$ (b) $-6Dq$ (c) $-6Dq + 3P$ (d) $-12Dq + 3P$
 6. S_N^1 mechanism is known as
(a) dissociation (b) association (c) dissociation (d) formation
 7. The complexes in which the ligand substitution is slow are called.....
(a) inert (b) parallel (c) octahedral (d) labile
 8. Greater stability of chelated complexes is called.....
(a) lability (b) stability (c) chelate effect (d) none of these
 9. The silicone containing polymers have..... thermal stability.
(a) High (b) Low (c) Medium (d) Very low
 10. The long chain vitreous sodium phosphate polymers are used in.....
(a) Rubber (b) Food (c) Electric (d) Ceramic

- Que2. Answer the following questions (any ten) 20
1. Give the comparison between σ_v and σ_h .
 2. Define the terms : (i) Symmetry operation (ii) Principal axis of rotation.
 3. Obtain the point group of Naphthalene.
 4. Explain spectrochemical series.
 5. Give difference between t_{2g} and e_g orbitals.
 6. Give any two limitations of crystal field theory.
 7. What is macrocyclic effect?
 8. Give the limitations of Job's method.
 9. What is activation energy?
 10. Give the general properties of inorganic polymers.
 11. What is nitrides of sulphur?

(P.T.O)

(1)





12. Give the uses of silicones.
- Que.3 Answer the following questions.
- (A) By using the example of H_2O , prove that C_{2v} is an abelian point group. 05
- (B) Give the point group of BCl_3 and NH_3 in detail. 05
- OR
- (A) Giving suitable example, prove that $Sn^{2n}=E$ (n is odd number) 05
- (B) Give an account of D_n and D_{nh} point group. 05
- Que.4 Answer the following questions.
- (A) Discuss crystal field splitting of d-orbitals in octahedral complexes with proper diagram. 05
- (B) Discuss factors affecting the magnitude of Δ_o . 05
- OR
- (A) Discuss the energy level diagram of $[CoF_6]^{-3}$ ion. 05
- (B) Discuss the effect of CFSE on magnetic moment. 05
- Que.5 Answer the following questions.
- (A) Discuss the factors affecting the stability of complexes depends on properties of central metal ion. 05
- (B) Discuss the S_N^2 mechanism in ligand substitution reaction in octahedral complex. 05
- OR
- (A) Discuss the job's method for the determination of composition of a complex. 05
- (B) Discuss the base hydrolysis reaction in octahedral complex. 05
- Que.6 Answer the following questions.
- (A) Discuss the preparation, properties and structure of boron nitride. 05
- (B) Write a note on imides of sulphur. 05
- OR
- (A) Classify the inorganic polymer on the basis of reactions. 05
- (B) Give the preparation, properties and structure of tetrasulphur tetranitride. S_4N_4 05

(2)

[P.T.O.]