

Reg. No. :

Name :

III Semester B.Sc. Degree (C.B.C.S.S.-O.B.E.- Regular/Supplementary/
Improvement) Examination, November 2024
(2019 to 2023 Admissions)

COMPLEMENTARY ELECTIVE COURSE IN CHEMISTRY/POLYMER
CHEMISTRY

3C03CHE/PCH(PS) : Chemistry (For Physical Science)

Time : 3 Hours

Max. Marks : 32

SECTION – A

Very short answer type. **Each** question carries **1** mark. Answer **all 5** questions.

1. What is the essential condition for a molecule to absorb microwave radiation ?
2. Define an open system.
3. Give an example for a polydentate ligand.
4. What is meant by pseudomolecular reactions ?
5. Distinguish between isotopes and isobars with examples. (5×1=5)

SECTION – B

Short answer type. **Each** carries **2** marks. Answer **any 4** questions out of 6.

6. Define the term zero point energy.
7. State the first law of thermodynamics and give its mathematical expression.
8. Write the points of Werner's theory to explain the bonding in coordination compounds.
9. Distinguish between order and molecularity of a reaction.
10. Distinguish between nuclear fission and nuclear fusion.
11. Define R_f value. How it is useful in the characterization of a compound ? (4×2=8)

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SECTION – C

Short essay type. **Each** carries **3** marks. Answer **any 3** questions out of 5.

12. Explain spin-spin splitting with reference to NMR spectroscopy.
13. Explain the term C_p and C_v . Show that $C_p - C_v = R$ for one mole of an ideal gas.
14. Explain the separation of isotopes by diffusion methods.
15. Derive the integrated rate equation for a first order reaction.
16. Explain the principle and application of column chromatography. (3×3=9)

SECTION – D

Essay type questions. **Each** carries **5** marks. Answer **any 2** questions out of 4.

17. What are the salient features of Valence Bond Theory for bonding in complexes ? On the basis of VBT, account for the fact that $[\text{Fe}(\text{CN})_6]^{3-}$ is weakly paramagnetic while $[\text{Fe}(\text{CN})_6]^{4-}$ is diamagnetic.
18. Discuss the principle and applications of gas chromatography.
19. What is meant by spontaneous process ? Explain the criteria for spontaneity and equilibrium in terms Gibbs energy change.
20. What are the main postulates of collision theory of reaction rates ? How does collision explain the effect of temperature on the rate of a reaction ? (2×5=10)