

- (c) What causes alkalinity of water ? Give basic reaction shown by alkalinity causing ions. 5

Unit IV

7. (a) Integrate the applications of MRI to comment on its importance and necessity in medical field. 9
- (b) Explain the basic principle of fluorescence why molecular fluorescence occur at longer wavelength than the exciting radiation. 6
8. (a) Integrate the applications of diffraction and scattering techniques to explain why are they important in surface characterization. 9
- (b) How many rotational and vibrational degree of freedom are there in the following : 6
- (i) Non-linear H_2S molecules
- (ii) Linear CO_2 molecules.

18A10

B. Tech. EXAMINATION, June 2023

(Second Semester)

(C-Scheme) (Main & Re-appear)

(Common for All Branches)

CH101C

CHEMISTRY

Time : 3 Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 9 is compulsory. All questions carry equal marks. Draw neat diagrams wherever applicable.

Unit I

1. (a) Draw the molecular diagram of NO^+ molecular ion. Write down the electronic configuration, find bond order and also predict its magnetic behavior. 8
- (b) Give some applications of Crystal field theory. 4
- (c) Why $\text{Ni}^{2+}[(\text{H}_2\text{O})_6]^{2+}$ is green but $[\text{Ni}^{4+}(\text{CN})_5]^{2+}$ is colourless. 3
2. (a) Summarize the variations of ionic sizes and electron affinities across the periodic table. 7
- (b) Illustrate the Band structure of solids. How doping effects the structure of solids ? 8

Unit II

3. (a) Explain the optical isomerism in Allenes. 8
- (b) Give Fischer projection with suitable example. 4

- (c) Write a note on electrophilic addition reaction. 3

4. (a) What is peroxide effects ? Why does not vinyl chloride undergoes nucleophilic substitution reaction ? 6
- (b) Demonstrate all the conformations of *n*-butane with their order of stability. 4
- (c) Outline the synthesis of Aspirin with its uses. 5

Unit III

5. (a) Drive the van der Waal's equation for state of real gases. 7
- (b) Why do alcohol boil at higher temperature than aldehydes ? 5
- (c) Explain the term induced dipole. 3
6. (a) Illustrate the term free energy, how standard free energy change related to equilibrium constant ? 6
- (b) Discuss the mechanism of microbial. 4

(Compulsory Question)

9. (a) Why does F-H have higher ionic character ? 2
- (b) Show, why are electron affinity values of 18th group elements zero ? 2
- (c) Categorize SN_1 and SN_2 reaction with examples. 2
- (d) Illustrate eclipsed confirmation with suitable example. 2
- (e) Why NaCl is bad conductor of electricity in its solid form ? 2
- (f) Describe second law of thermodynamics. 2
- (g) Summarize the principle/s of spectroscopy. 2
- (h) State Bragg's Law. 1

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- (h) State Bragg's Law. 1