SCHOOL OF ENGINEERING AND TECHNOLOGY
D.C. COURT JUNCTION, DIMAPUR
END-TERM EXAMINATIONS, July - Dec. 2022.

Course Code:	G1T05	Semester	I	Total:	60 Marks
Course Name:		Engineering Chemistry		Time:	3 hrs

Instruction for the Candidates:
1. Read the question paper carefully before answering.
2. The question paper consists of **Three Sections**. All Sections are compulsory.

PART – A

1. Choose the correct answer. $1 \times 10 = 10$

i. The element with highest ionization energy

   a. Li   b. Na

   c. K   d. Be

ii. Which statement is not true for Planck's quantum theory?

   a. Radiant energy emitted discontinuously

   b. Wavelength is inversely proportional to energy

   c. Energy are emitted or absorbed in terms of whole number

   d. None of the above

iii. In CFT, the connection between the metal atom and the ligands is

   a. Covalent bond   b. Ionic bond

   c. Coordinate bond   d. All the above

iv. The bond order for H_2^- is,

   a. 0   b. 0.5

   c. 1   d. 1.5

v. The carbonyl group has

   a. 1 σ bond and 1 π bond,   b. 2 σ electrons & 2 π electrons,

   c. 2 σ bonds and 2 π bonds,   d. Both a and b.

vi. Which of the following element is added to improve the properties of natural rubber?

a. carbon,   b. silicone,

c. sulphur,   d. all the above.

vii. Which one is not a synthetic polymer?

a. Nylon   b. Polyester

c. Wool   d. Epoxy

viii. Nylon 6, 6 is prepared from

a. Acetylene and HCl   b. Tetrafluoroethene

c. Adipic acid and Hexamethylene diamine   d. Acetylene and acetic acid.

ix. _____ is used for separation of mixture compound based on polarity.

a. Chromatography   b. Mass spectroscopy

c. NMR spectroscopy   d. IR spectroscopy

x. The absorption of _____ causing an electron excitation.

a. IR   b. UV/Vis

c. NMR   d. all the above

PART – B

Answer any eight questions $2.5 \times 8 = 20$

2. Write short notes on phase rule with one example.

3. Define photochemical reaction and catalytic promoters.

4. Define coordination compound and ligand.

5. Write short notes on hydrogen bonding and conjugation.

6. What is Markovnikov's rule? Give reaction.

7. What are natural and synthetic polymer? Give example.

8. What are biopolymer? Write one advantage of biopolymer over synthetic polymer.

9. Write short notes on Beer-Lambert's law.

10. Explain electron ionization method in mass spectroscopy.

PART – C

Answer any five questions $6 \times 5 = 20$

11. What is chemical kinetics? Derive the equation, $\log \frac{K2}{K1} = \frac{Ea}{2.303R}\left[\frac{T2-T1}{T1T2}\right]$.

12. Explain the magnetic properties and structural geometry of $[Cr (Cl)_5F$.

    Explain Jahn-Teller distortion of octahedral complexes.

13. Explain with mechanism of Cannizaro's reaction and nitration of benzene.

14. What are Buna rubber? Explain the preparation of Buna S and Buna N.

15. Write the preparation and uses of any two.

    I. Polyvinyl chloride, II. Polylactic acid, III. Urea-formaldehyde resin.

16. Explain in brief, instrumentation in GC. Explain any two factors that affecting IR frequency of carbonyl stretching vibration.

17. What are chromophores? Suggest the structure of a compound with molecular formula C_8H_8O. It shows following ^1H NMR signal.

    i) 2.5 δ 'd' (2H)

    ii) 7.6 δ 's' (5H)

    iii) 9.9 δ 't' (1H)