24322

B.Sc. Third Semester Degree Examination

CHEMISTRY

Paper III

(New Syllabus)

Time : 3 Hours] [Max. Marks : 80

Instructions :

1) *Section A contains questions from Inorganic, Organic and Physical Chemistry.*

2) *Section B contains questions from Inorganic Chemistry, Section C contains questions from Organic Chemistry and Section D contains questions from Physical Chemistry.*

3) *Answer all the four sections A, B, C and D.*

SECTION – A

Answer any **TEN** of the following questions :

(10 × 2 = 20)

1. **Why transition metals are less reactive than the alkali and alkaline earth metals?**

2. **Give electronic configuration of (a) Mo and (b) W.**

3. **The first ionization energy of Hg is higher than that of Cd. Give reasons.**

4. Classify the following as Lewis acids or Lewis bases giving reasons :

   (a) BF_3 (b) NH_3

   (c) Cl^- (d) Zn^{+2}

5. Define Spontaneous process with an example

6. Define Nernst's Distribution law

7. What are alkenyl halides? Give an example

8. Write Reimer-Teiman reaction

9. Define aliphatic acids with an example

10. Write HVZ reaction

11. Write BET equation.

12. Define entropy and free energy

SECTION - B

Answer any TWO of the following questions : **(2 × 10 = 20)**

13. (a) Give the comparative treatment of 4d and 5d series elements with their 3d analogues with respect to (i) ionic radii (ii) oxidation state and (iii) color. (6)

    (b) Actinides have a greater tendency to form complexes than Lanthanides. Explain. (4)

14 (a) Discuss Lanthanide contraction giving causes and its consequences (6)

(b) Write a note on Symbiosis. (4)

15 (a) Explain Hard and Soft acids and bases with suitable examples (6)

(b) Explain the catalytic properties of transition elements (4)

SECTION - C

Answer any **TWO** of the following questions (2 × 10 = 20)

16. (a) Explain mechanism of E_1 and E_2 reactions (6)

(b) Write the distinguish tests for primary, secondary and tertiary alcohols by Dichromate test. (4)

17. (a) Describe the mechanism of Pinacol-Pinacolone rearrangement. (6)

(b) Explain (i) Wurtz-Fitting reaction and (ii) Ullmann reaction. (4)

18. (a) Write the methods of preparations of aliphatic mono carboxylic acids. (6)

(b) Write the preparation reactions of Acetyl chloride and Acetamide. (4)

SECTION – D

Answer any **TWO** of the following questions

(2 × 10 = 20)

19. (a) Derive Schrodinger's fundamental wave equation **(6)**

    (b) Give an account of Heisenberg's uncertainty principle. **(4)**

20. (a) Derive Gibbs-Helmholtz's equation **(6)**

    (b) Write a note on Nernst's Heat theorem **(4)**

21. (a) What is Carnot cycle and explain the calculation of efficiency of Carnot engine working between two temperatures T_1 and T_2 **(6)**

    (b) Explain Photoelectric effect. **(4)**
