Fourth Semester B.Sc. Degree Examination, September 2020

(Non-CBCS – Semester Scheme)

CHEMISTRY

Paper IV

Time : 3 Hours]   [Max. Marks : 60

Instructions to Candidates :

1) The question paper has two Parts A and B. Both the parts should be answered.

2) Write the equations wherever necessary.

PART – A

Answer any **SIX** of the following questions. Each question carries **2** marks :

                                                                                                    (6 × 2 = 12)

1. State group displacement law.

2. What is the crystal coordination number of Sodium in NaCl and Cesium in CsCl?

3. Explain sintering in powder metallurgy.

4. What is annealing of Steel?

5. What is acid rain? How is it formed?

6. What is Clemmensen reduction?

7. Why is Chloroacetic acid is weaker acid than dichloroacetic acid? Explain.

8. How do you convert diethyl malonate into cinnamic acid?

9. Write BET equation and explain the terms in it.

10. Distinguish between homogeneous and heterogeneous catalysis.

PART – B

Answer any **EIGHT** of the following questions. Each question carries **6** marks :

$$(8 \times 6 = 48)$$

11. (a) What are the components of a nuclear reactor? Give the function of any two of them.

    (b) Write a note on nuclear fusion.   **(4 + 2)**

12. (a) Derive the equation : $N_t = N_0 \cdot e^{-\lambda t}$.

    (b) What is Schottky defect?   **(4 + 2)**

13. (a) How is the crystal structure of KCl determined by rotating crystal method?

    (b) Define radius ratio. What is the geometry of crystal if the radius ratio is 0.2?   **(4 + 2)**

14. (a) Derive Bragg's equation.

    (b) Give any two applications of liquid crystals.   **(4 + 2)**

15. (a) How is tungsten powder extracted from Wolframite?

    (b) How do Chromium (Cr) and Manganese (Mn) influence the properties of steel?   **(4 + 2)**

16. (a) Write a note on the following :

       (i) Tempering

       (ii) Case-Hardening

    (b) What are ferrous and non-ferrous alloys?   **(4 + 2)**

17. (a) What are industrial effluents? How are they treated?

    (b) Write any two environmental effects of radioactive waste.   **(4 + 2)**

18. (a) What is aldol condensation? Explain its mechanism.

    (b) Write a note on Wolff-Kishner reduction.   **(4 + 2)**

19. Explain the following reactions with an example for each :

    (a) Esterification

    (b) HVZ reaction

20. (a) (i) Distinguish between tautomerism and resonance.

        (ii) How is adipic acid obtained from EAA?

    (b) How is ferromanganese produced?   (4 + 2)

21. (a) Derive Langmuir adsorption isotherm.

    (b) Explain with an example Perkin's condensation.   (4 + 2)

22. (a) Draw a neat and labelled diagram for water system. Calculate the degrees of freedom at the triple point.

    (b) What are Eutectic mixtures?   (4 + 2)

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