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END SEMESTER EXAMINATION – APRIL/MAY 2026

CHEMISTRY - IV SEMESTER BSC

25BSC45B: CHEMISTRY IV

Time: 3 Hours. **Max. Marks: 80**

Instruction: *Answer should be written completely in English.*

SECTION - A

Answer any **TEN** questions. Each question carries **TWO** marks. **(10X2=20)**

1. Define phase rule with its components.
2. What is an eutectic system? Mention any two applications.
3. What is Pattinson's process of desilverization?
4. Mention the laws of crystallography.
5. How are ferro chrome, ferro manganese, and ferro silicon produced?
6. What is tempering and annealing of alloys?
7. What are the classifications of chromatographic methods?
8. Write Van Deemter's equation and explain the terms involved.
9. What are the factors affecting the column efficiency?
10. How are aldehydes prepared from acid chlorides?
11. What are the key differences between TLC and column chromatography?
12. Explain how Chromium (Cr) and Nickel (Ni) influence the properties of steel.

SECTION - B

Answer any **SIX** questions. Each question carries **TEN** marks. **(6X10=60)**

13. a. Derive Clausius-Clapeyron equation. (5)
    b. Explain the salient features of silver-lead system. (5)
14. a. Define carbiding and nitriding. (4)
    b. Describe Iron-Carbon phase diagram (6)
15. a. Describe the mechanism and methodology of Thin Layer Chromatography. (5)
    b. Write about the identification and detection of analytes in chromatography. (5)
16. a. Explain Gattermann-Koch aldehyde synthesis. (3)
    b. Write the reaction of HI with tartaric acid. (3)
    c. Explain Hoffmann rearrangement. (4)
17. a. Deduce Gibbs - Helmholtz equation from the equation G = H – TS. (4)
    b. Explain Schottky defect in solids with the help of a neat diagram. (3)
    c. Explain the mechanism of cation and anion exchange in Ion Exchange Chromatography. (3)

18. a. Write a note on the crystal X-ray diffraction method. (5)
    b. Explain the principle of column chromatography with a diagram (5)
19. a. Discuss the criteria for selection of stationary and mobile phases. (4)
    b. Arrange the following in increasing order of their acid strength and give reason:
    (i) benzoic acid (ii) p-nitrobenzoic acid (iii) p-amino benzoic acid (6)
20. a. Derive the Bragg's equation. (3)
    b. What are the types of crystal systems? How are they differentiated? (3)
    c. Explain the mechanism of Clemmensen reduction. (4)