

BACHELOR'S DEGREE EXAMINATION, OCTOBER 2025
2025 ADMISSIONS REGULAR
SEMESTER I - MINOR - B (CHEMISTRY)
CH10SCB101B24 - Fundamentals of Chemistry-I

Time : 1.5 Hours

Maximum Marks : 50

Part A

Answer all questions. Each question carries 1 mark.

(1x10=10)

1. State Pauli's exclusion principle. [CO1,Remember]
2. State Uncertainty principle. [CO1,Remember]
3. Identify the possible values of azimuthal quantum number (l) for the given value of principle quantum number n = 2. [CO1,Understand]
4. Define dipole moment. [CO2,Understand]
5. Explain the term catenation. [CO2,Understand]
6. State bond polarity. [CO2,Understand]
7. Identify the reactive intermediate that has a trigonal planar geometry?
 A) A methyl carbanion ($:\text{CH}_3^-$)
 B) A tertiary carbocation ($(\text{CH}_3)_3\text{C}^+$)
 C) A methyl free radical (CH_3^\cdot)
 D) Both B and C [CO3,Remember]
8. Describe any one synthesis method of free radicals. [CO3,Understand]
9. Predict the product of heterolytic fission. [CO3,Understand]
10. Restate Modern periodic law. [CO4,Understand]

Part B

Answer any 2 questions from the bunch of CO1. Each question carries 5 mark.

(5x2=10)

11. State de Broglie's hypothesis and explain the relation between wavelength and momentum of a moving particle. [CO1,Understand]
12. Identify the uncertainty in velocity of an electron if the uncertainty in its position is 100 pm. (Mass of the electron = 9.1×10^{-31} Kg). [CO1,Understand]
13. Explain the reason for filling electrons in 2p orbital before 3s orbital. [CO1,Understand]

Part B

Answer any 2 questions from the bunch of CO2. Each question carries 5 mark.

(5x2=10)

14. Illustrate the sp hybridisation with the help of suitable example. [CO2,Understand]
15. Explain the role of organic chemistry in the development of modern medicines, giving any specific examples. [CO2,Understand]
16. Explain sp³ hybridisation with the help of a suitable example. [CO2,Understand]

Part B

Answer any 2 questions from the bunch of CO3. Each question carries 5 mark.

(5x2=10)

17. Compare the stability of the $(\text{CH}_3)_3\text{C}^\cdot$ (tertiary) free radical and the CH_3^\cdot (methyl) free radical, and explain the reason for the difference. [CO3,Understand]
18. Explain how the inductive effect polarizes a carbon chain and provide an example of an electron withdrawing group and an electron-releasing group. [CO3,Understand]

19. Outline, a) the +I effect with suitable examples. b) the structure and hybridisation of free radicals.

[CO3,Understand]

Part C

Answer any 1 question from the bunch of CO4. Each question carries 10 mark.

(10x1=10)

20. a) Explain the Slater's rules. b) Calculate the Z_{eff} for the last electron in Na^+ ion and a 2p electron in the Nitrogen atom.

[CO4,Understand]

21. Explain the classification and characterization of elements depending upon their configurations with suitable examples-- s block, p-block, d-block and f-block.

[CO4,Understand]