TH241080MINB

Reg. No.....

Name.....

**FYUG PROGRAMME EXAMINATION, NOVEMBER 2024**

**(2024 Admission Regular)**

**SEMESTER I – MINOR B COURSE (CHEMISTRY)**

**CH1DSCB101B24- FUNDAMENTALS OF CHEMISTRY- I**

**Time: 1.5 Hours** **Maximum Marks: 50**

**PART A**

**I. Answer all questions (MCQ). Each question carries 1 mark.**

| Q.No: | QUESTIONS | CO | LEVEL |
|---|---|---|---|
| 1. | Select the number of nodes in the 2s- orbital.<br>a) 0<br>b) 1<br>c) 2<br>d) 3 | 1 | U |
| 2. | Recognize the number of values of spin quantum numbers possible for an electron.<br>a) 2<br>b) 3<br>c) 4<br>d) 5 | 1 | R |
| 3. | Identify the electron releasing group from the following.<br>a) -OH<br>b) $-NO_2$<br>c) $-SO_3H$<br>d) -CHO | 3 | U |
| 4. | Choose the correct answer in terms of atomic radii variation in the periodic table.<br>a) The atomic radius increases as you move from left to right across a period due to decreased screening effect.<br>b) The atomic radius remains constant across a period and increases down a group.<br>c) The atomic radius increases as you move down a group due to increased screening effect overpowering nuclear charge. | 4 | Ap |

| | | | |
|---|---|---|---|
| | d) The atomic radius decreases as you move from right to left across a period due to the addition of electron shells. | | |
| 5. | Recall the group of elements in the periodic table that are characterized by variable oxidation states, high ionization energy, and high electronegativity.<br>a) s-block elements<br>b) p-block elements<br>c) d-block elements<br>d) Noble gases | 4 | R |

(5×1=5)

**II. Answer all questions in one word. Each question carries 1 mark.**

| Q.No: | QUESTIONS | CO | LEVEL |
|---|---|---|---|
| 6. | Restate Pauli's exclusion principle. | 1 | U |
| 7. | Indicate primary, secondary and tertiary carbocations in the increasing order of stability. | 3 | U |
| 8. | Explain the term hybridization. | 2 | U |
| 9. | Report the intermediate generated by the homolytic fission. | 3 | U |
| 10. | Calculate the screening constant of a 3d electron in Fe (Z=26). | 4 | Ap |

(5×1=5)

**PART B**

**III. Answer any six questions in one paragraph. Each question carries 5 marks.**

| Q.No: | QUESTIONS | CO | LEVEL |
|---|---|---|---|
| 11. | Describe the characteristics of an atomic orbital. | 1 | U |
| 12. | Explain the main postulates of Bohr model of atom. List any one of the merits and limitations of the model. | 1 | U |
| 13. | Explain the process of hybridization of ethyne. | 2 | U |
| 14. | Illustrate the inductive and resonance effects in organic molecules. | 3 | U |
| 15. | Compare the electron density of benzene, phenol and nitrobenzene. | 3 | U |

| | | | |
|---|---|---|---|
| 16. | Explain hyperconjugation and list any three applications. | 3 | U |
| 17. | Describe the principle of Pauling's scale of electronegativity. | 4 | U |
| 18. | Predict the electronic configuration, group, period and block of an element with atomic number 32. | 4 | Ap |

(6×5=30)

## PART C

**IV. Answer any one question. The question carries 10 marks.**

| Q.No: | QUESTIONS | CO | LEVEL |
|---|---|---|---|
| 19. | a) Describe Aufbau principle and Hund's rule with examples.<br>b) Explain Heisenberg's uncertainty principle and dual nature of matter. | 1 | U |
| 20. | a) Examine the factors contributing to the diagonal relationship between Be and Al in the periodic table.<br>b) Interpret the change in electronegativity as you move across a period and down a group in the periodic table, and identify the underlying factors that influence these variations. | 4 | Ap |

(1×10=10)

CO : Course Outcomes Level : R – Remember, U – Understand, Ap- Apply, An- Analyze, E- Evaluate, C- Create