K25FY4326 Pages: 2 Reg No:.....
Name:.....

First Semester FYUGP Degree (Reg/Sup) Examination November 2025

KU1DSCCHE111 - FUNDAMENTALS OF THEORETICAL and NUCLEAR CHEMISTRY

2024 Admission onwards

Time : 1.5 hours Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. Write two conditions for orbitals to undergo hybridization.
2. Draw and explain the molecular geometry of NH_3 using VSEPR theory.
3. What are isobars? Write two examples.
4. Why do isotopes have almost identical chemical properties but different physical properties?
5. What does the term precision mean in an analytical determination?
6. Explain the significance of material safety sheets of chemicals.
7. State Pauli's exclusion principle and Hund's rule of maximum multiplicity.
8. Why does fluorine have a lower electron affinity than chlorine?

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Section B

Answer any 4 questions. Each carry 6 marks.

9. Explain the classification of determinate and indeterminate errors in analytical chemistry.
10. Explain the principle of acidimetry and alkalimetry with examples.
11. Discuss the hazardous symbols and signs in the physical and chemical laboratories.
12. What are quantum numbers? Discuss the significance of each quantum number.
13. Explain the terms atomic radius and covalent radius. How does ionic radius vary down a group?
14. Define electronegativity. Discuss its variation in the periodic table.

Section C

Answer any 1 questions. Each carry 14 marks.

15. (a) Explain the concept of hybridization and its role in determining molecular geometry by using CH_4, C_2H_4, and C_2H_2 as examples.
b)Distinguish between i)atomic orbitals and molecular orbitals ii)sigma and pi bonds

16. (a) Explain the different methods for nuclear waste disposal.

(b)
- (i) Explain the liquid drop model for nuclear fission reaction.
- (ii) 100 mg of Co-60 is stocked in a laboratory as a gamma ray source. It has a half-life of 5.26 years. Calculate the amount left after one year.

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