25U120 (Pages: 2) Name : .....

Reg. No : .....

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(FYUGP)

(Regular/Supplementary/Improvement)

CC24UCHE1MN105 - BASIC INORGANIC AND NUCLEAR CHEMISTRY

(Chemistry - Minor Course)

(2024 Admission onwards)

Time: 2.0 Hours Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 3 marks.

1. Explain de Broglie's concept of matter waves with evidence. [Level:2] [CO1]
2. Find out designations of the sublevels having (i) n = 2, l = 1, (ii) n = 4, l = 3 and (iii) n = 3, l= 2 ? [Level:1] [CO1]
3. Write and explain Born-Lande equation. [Level:2] [CO2]
4. Explain the Modern Periodic Law. How does it differ from Mendeleev's Periodic Law? [Level:2] [CO3]
5. State common ion effect. [Level:1] [CO4]
6. Explain the term equivalent mass of an element. What is the relationship between the atomic mass and equivalent mass of an element? [Level:2] [CO4]
7. Define normality of a solution. [Level:1] [CO4]
8. Predict the nucler equation for (i) the emision of an α-particle from Th-232 (ii) the emission of a β-particle from Ra-228. [Level:2] [CO5]
9. Recall the term nuclear fission? Name two nuclei fissionable by thermal neutrons. [Level:1] [CO5]
10. Recall the term isotones. Give an example. [Level:1] [CO5]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer ***all*** questions. Each question carries 6 marks.

11. Explain sp^3 hybridization, taking CH_4 molecules as an example. [Level:2] [CO2]
12. Discuss the formation of σ, σ*, π and π* molecular orbital. [Level:2] [CO2]

13. Explain Schrodinger wave equation. Discuss the significance of the term wave function. [Level:2] [CO1]

14. How does electron affinity vary down a group? Explain the variation. [Level:2] [CO3]

15. Explain the principle of the double burette method of titration. [Level:2] [CO4]

16. Discuss the Ostwald's thory of acid -base indicators. [Level:2] [CO4]

17. Write a brief note on the nuclear reactors in India. [Level:2] [CO5]

18. Discuss rock dating. [Level:2] [CO5]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. Explain the salient features of VSEPR theory. Explain the structure of $BeCl_2$ and H_2O with reference to VSEPR theory. [Level:2] [CO1]

20. (i) Explain complexometric titrations taking EDTA as the chelating agent. [Level:2] [CO2]

    (ii) Discuss metal ion indicators and explain the action of metal ion indicators with a suitable example.

(1 × 10 = 10 Marks)

****