

**B Sc PROGRAMME-CHEMISTRY COMPLEMENTARY COURSE**  
**CH1CMT01 – BASIC THEORETICAL AND ANALYTICAL CHEMISTRY**  
**(Common for Students who have opted Life Sciences, Family & Community Science, Physical**  
**Sciences and Geology as core)**  
**MODEL QUESTIONS**  
**First Semester CBCS Examination**

Time : 3 Hrs

Total Marks : 60

**PART A**

**(Answer any 10 questions. Each question carries 1 mark)**

1. Define and explain Hund's rule of maximum multiplicity.
2. Derive de Broglie equation and explain the terms.
3. Define and explain Aufbau principle.
4. What is meant by ionization enthalpy?
5. Define molarity, molality and normality.
6. What are  $K_a$ ,  $K_b$ ,  $pK_a$  and  $pK_b$ ?
7. What are significant figures? Explain with examples.
8. What are the differences between precision and accuracy?
9. What are primary and secondary standards? Give examples.
10. Define  $R_f$  value. What is its significance?
11. Name the important adsorbents used in column chromatography.
12. Briefly discuss the classification of chromatographic methods.

(10 x 1 = 10 marks)

**PART B**

**(Answer any 6 questions. Each question carries 5 marks)**

13. Write a brief note on Dual nature of matter and radiation.
14. State and explain Heisenberg's uncertainty principle.
15. State and explain Modern Periodic Law.
16. Discuss the important postulates of Bohr atom model and its limitations.
17. Write a note on periodicity in properties such as: Atomic radii, ionic radii, electron affinity, and electro negativity.
18. Explain the structure of the Long form of Periodic Table.
19. Write a note on the preparation of standard solution. Illustrate with an example.
20. Explain the principle of fractional distillation. Illustrate with an example.
21. Write a note on the principle and instrumentation of ion-exchange chromatography.

(6x 5 = 30 marks)

### **PART C**

**(Answer any 2 questions. Each question carries 10 marks)**

22. Discuss various types of bonding and briefly explain the theories of chemical bonding with special reference to covalent bonding.
23. Write an essay on the quantum numbers and shapes of atomic orbitals.
24. Discuss the concept of chemical equilibrium. Explain Arrhenius, Lowry-Bronsted and Lewis theories..
25. Write an essay on the principles of volumetric analysis with special mention of acid-base and redox titrations.

(2 x 10 = 20 marks)