

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MAY 2017**Second Semester****Core Course—THEORETICAL AND INORGANIC CHEMISTRY**

(Common for B.Sc. Chemistry Model I, Model II B.Sc. Petrochemicals B.Sc. Chemistry
Environment and water Management)

[2013 Admission onwards]

Time : Three Hours

Maximum Marks : 60

Part A

Answer all questions.

Each question carries 1 mark.

1. What is a value of nuclear reaction ?
2. Identify X in the reaction : ${}_{92}^{235}\text{U} + {}_0^1\text{n} \rightarrow {}_{35}^{87}\text{Br} + 3 {}_0^1\text{n} + \text{X}$.
3. What is AUFBAU principle ?
4. Write the possible value of l for an electron in 3p. orbital ?
5. What is solvation enthalpy ?
6. Draw the shape of ClF_3 Molecule ?
7. What is meant by hydrogen bonding ?
8. Ionic radius of pb^{2+} is greater than that of pb^{4+} why ?

(8 × 1 = 8)

Part B

Answer any six questions.

Each question carries 2 marks.

9. Describe the preparation trans-Uranic elements ?
10. Differentiate between Half life and Average life of a nuclear reaction ?
11. What is meant by magic number.
12. State Heisenberg's uncertainty principle ? What are its significance ?
13. Discuss the significance of 4 and 4² ?

Turn over

14. State Fajan's Rule ?
15. What is meant by Resonance Energy ? Explain ?
16. Discuss the hybridisation in the NH_3 Molecule ?
17. Define Ionisation Energy ?
18. Discuss the hybridisation in BeF_2 ?

(6 × 2 = 12)

Part C

*Answer any four questions.
Each question carries 4 marks.*

19. Explain Geiger Nuttal rule ?
20. What are radioactive tracers ? Explain carbon dating and Rock dating ?
21. Describe Slater's Rule ? Discuss their important applications ?
22. Discuss the spectrum of Hydrogen atom ?
23. What are the factors influencing the Formation of ionic compounds ?
24. Write down the Born Haber cycle of NaCl ? Discuss its application ?

(4 × 4 = 16)

Part D

*Answer any two questions.
Each question carries 12 marks.*

25. (a) Discuss in detail nuclear shell model and the liquid drop Model for nuclear structure ?
(b) Derive Bohr's equation for energy of electron in Hydrogen atom ?
26. (a) Derive Bohr's equation for the energy of electron in hydrogen atom ? Discuss Limitations of Bohr's Theory.
(b) Discuss Slater's Rule. Discuss their applications ?
27. (a) Derive Born-Landé equation ?
(b) What is valence Bond Theory explain ?
28. (a) Explain the term electron affinity ? Discuss the Factors which influences the electron of an atom ?
(b) Draw the molecular level diagram of $\text{O}_2 + \text{NO}$ Molecule ? Calculate bond order and comment on their magnetic properties ?

(2 × 12 = 24)