

Reg. No .....

Name .....

23U146

**B. Sc. DEGREE END SEMESTER EXAMINATION : NOVEMBER 2023**  
**SEMESTER 1 : COMPLEMENTARY CHEMISTRY FOR B. Sc. PHYSICS / BOTANY / ZOOLOGY**  
**COURSE : 19U1PCHE1 : GENERAL CHEMISTRY**

*(For Regular 2023 Admission and Improvement / Supplementary - 2022/ 2021/2020/2019 Admissions)*

Time : Three Hours

Max. Marks: 60

**PART A**

**Answer All (1 mark each)**

1. What is induced radioactivity?
2. Name one external indicator?
3. Define normality
4. For a reversible process at equilibrium the entropy change  $\Delta S$  is .....
5. What is free energy?
6. What are the values for magnetic quantum number for 3p-orbital
7. Who put forward the proton transfer theory of acids and bases?
8. Name two examples for Lewis acid.

**(1 x 8 = 8)**

**PART B**

**Answer any 6 (2 marks each)**

9. Give two point of difference between natural and induced radioactivity.
10. What is absolute error and relative error?
11. Mention any four characteristics of entropy?
12. A system gives out 40 J of heat and does 80 J of work. Determine the internal energy change
13. Calculate the de Broglie wavelength of a body of mass 1 kg moving with a velocity of 2000m/s
14. State and explain photoelectric effect.
15. What is Lowry-Bronsted concept of acids and bases?
16. What is a buffer solution? Give an example.

**(2 x 6 = 12)**

**PART C**

**Answer any 4 (5 marks each)**

17. What are the components of a nuclear reactor?
18. Explain complexometric and redox titrations.
19. Explain entropy of fusion, entropy of vaporization and entropy of sublimation with equations.
20. Compare between orbit and orbital.
21. Indicate graphically the shapes of the different d orbitals.
22. Deduce an expression for the dissociation constant of an acid. How the dissociation constant of an acid can be calculated?

**(5 x 4 = 20)**

**PART D**

**Answer any 2 (10 marks each)**

23. a) What are the methods for elimination and minimization of errors?  
b) What are primary and secondary standards? Discuss the criteria for primary standards.
24. Discuss the concept of Gibbs free energy? What is the effect of temperature on spontaneity of a reaction?
25. Discuss briefly on Bohr's theory and Sommerfield's theory of atom.
26. Deduce Henderson equation for an acidic buffer. What would be the pH of a solution obtained by mixing 5g acetic acid and 7.5g sodium acetate and making a volume to 500mL? Dissociation constant of acetic acid is  $1.75 \times 10^{-5}$  at 25°C.

**(10 x 2 = 20)**