

B.Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER/NOVEMBER 2018**SEMESTER –1: CHEMISTRY (COMPLEMENTARY COURSE FOR PHYSICS/BOTANY/ZOOLOGY)****COURSE: 15U1CPCHE1: GENERAL CHEMISTRY***(Common for Regular 2018 admission and improvement 2017/ supplementary 2017/2016/2015 admissions)*

Time: Three Hours

Max. Marks: 60

SECTION A*Answer all questions. Each question carries 1 mark.*

1. What is the maximum number of electrons possible for a sixth principal shell
2. What are the values for magnetic quantum number for 3p-orbital
3. What is the conjugate acid of NH_3
4. Hydrolysis of FeCl_3 yields solution
5. Unit of enthalpy is
6. Give the expression for entropy of vapourisation
7. Define absolute error
8. What is meant by packing fraction (1 × 8 = 8)

SECTION B*Answer any six questions. Each question carries 2 marks.*

9. Calculate the uncertainty in the position of an electron if the uncertainty in its velocity is $5.8 \times 10^5 \text{ ms}^{-1}$. Given $h = 6.6 \times 10^{-34} \text{ J s}$ and mass of the electron = $9.1 \times 10^{-31} \text{ Kg}$
10. Define the term ionic product of water. Is it temperature dependent, Explain?
11. Define third law of thermodynamics
12. What are spontaneous processes? Explain with example
13. State and explain Pauli's exclusion principle
14. A system gives out 40 J of heat and does 80 J of work. Determine the internal energy change
15. Calculate the number of α and β - particles emitted during the conversion of ${}_{90}\text{Th}^{238}$ to ${}_{82}\text{Pb}^{208}$?
16. Define molality and ppm (2 × 6 = 12)

SECTION C*Answer any four questions. Each question carries 5 marks.*

17. Discuss briefly on (a) radio carbon dating (b) radioactive waste disposal
18. Write short notes on (a) photoelectric effect (b) Dual nature of matter
19. Define free energy and explain its significance. Describe criterion for spontaneous, non-spontaneous and equilibrium process in terms of ΔG
20. What are errors? Discuss in detail about the classification of errors
21. Explain the terms solubility and solubility product? Discuss important applications of solubility product.
22. Discuss in detail about the Arrhenius, Lowry-Bronsted and Lewis concept of acids and bases (5 × 4 = 20)

SECTION D

Answer **any two** questions. Each question carries **10** marks.

23. Write notes on
- (a) (i) Fission and fusion reactions (4)
 - (ii) n/p ratio and its significance (3)
 - (b) Calculate the time taken by a radioactive element to decay to 80% of the initial amount.
Given $t_{1/2} = 100$ seconds (3)
24. (a) Discuss in detail about Bohr's atomic model. What are the shortcomings of Bohr's model (6)
- (b) Explain the spectra of Hydrogen atom. Represent the Rydberg equation for Lyman series of Hydrogen atom spectrum. (4)
25. (a) Discuss in detail about different types of titrations (6)
- (b) Represent the Gibbs-Helmholtz equation and derive the expression, $-\Delta G = W_{\max}$. (4)
26. (a) What are buffer solutions? How are they classified? Explain the action of an acidic buffer. Represent Henderson equation for basic buffer (7)
- (b) Enthalpy and entropy changes of a reaction are $32.35 \text{ KJ mol}^{-1}$ and $66.0 \text{ JK}^{-1} \text{ mol}^{-1}$ respectively. Calculate the temperature at which ΔG for the reaction will be zero. Predict whether this reaction is spontaneous below the calculated temperature (3)
- (10 × 2 = 20)
