

**B.Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2019****SEMESTER - 1: CHEMISTRY (COMPLEMENTARY COURSE IN PHYSICS/BOTANY/ZOOLOGY)****COURSE: 19U1PCHE1 – GENERAL CHEMISTRY***(For Regular 2019 admission)*

Time: Three Hours

Max. Marks: 60

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

1. The number of spherical nodes in 2s orbital is .....
2. Series of hydrogen spectrum lies in the visible region
3. What is the sum of pH and pOH in aqueous solution?
4. Emission of ..... from a radioactive element does not bring any change in charge or mass.
5. Radiocarbon dating is based on the radioactivity of .....
6. The error that can be presumably avoided or corrected are called.....
7. An example of a primary standard substance is .....
8. The total energy of the universe is ..... (1 × 8 = 8)

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

9. Sketch  $dx^2-y^2$  and dxy orbitals.
10. Explain briefly photoelectric effect.
11. Explain Lowry –Bronsted concept of acid and base with examples.
12. Define induced radioactivity with one example.
13. Find out the packing fraction of  ${}^{40}_{18}\text{Ar}$ , if actual isotopic mass of argon is 39.962384 amu.
14. Define the terms Molality and molarity
15. Distinguish between accuracy and precision.
16. State first law of thermodynamics. Give its mathematical expression. (2 × 6 = 12)

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

17. Discuss the shortcomings of Bohr Theory.
18. Explain common ion effect with applications.
19. Write a note on binding energy.
20. Explain the theory of acid-base titrations.
21. Write a note on different types of error. How are they minimized?
22. Derive the expression for work done in the reversible isothermal expansion of an ideal gas. (5 × 4 = 20)

## SECTION D

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

23. (a) Explain the significance of various quantum numbers used to designate orbitals. (6)  
(b) Discuss Pauli's exclusion principle and explain with examples, how it can be used to determine the maximum number of electrons that can occur in any orbital. (4)
24. (a) Explain the concept of solubility product with applications. (6)  
(b) Estimate the molar solubility of  $\text{Ag}_2\text{CrO}_4$  in pure water if the solubility product constant for silver chromate is  $1.1 \times 10^{-12}$ . (4)
25. (a) Explain Radio carbon dating. (4)  
(b) Discuss nuclear fission and fusion. (3)  
(c) The amount of  $^{14}\text{C}$  in a sample of wood is found to be one-third of its amount present in a fresh piece of wood. Calculate the age of wood ( $t_{1/2} = 5577$  years). (3)
26. Write briefly on:  
(a) Entropy and its physical significance. (3)  
(b) Discuss the limitation of first law of thermodynamics and explain second law of thermodynamics based on entropy. (3)  
(c) What is spontaneity? How will you predict spontaneity in terms of entropy and free energy? (4)
- (10 x 2 = 20)

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