(Pages : 3) T – 3225

Reg. No. : .....

Name : .....

Second Semester B.Sc. Degree Examination, August 2024

First Degree Programme under CBCSS

Chemistry

Complementary Course for Botany

CH 1231.3 : INORGANIC AND BIOINORGANIC CHEMISTRY

(2020 Admission onwards)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in one word to maximum two sentences. Each question **1** mark.

1. What are isobars?
2. What is the half-life period of C^{14} isotope?
3. What is the unit of radioactivity?
4. Give an example for an organometallic compound used in medicine.
5. Write the formula for the complex tris (ethylenediamine) cobalt (III) chloride.
6. Which macromolecule serves as the oxygen storage in muscle cells?
7. What is the hapticity of the ligand cyclopentadienyl anion?
8. What is the coordination number of iron in haemoglobin?
9. Name the most abundant transition metal in human body.
10. What is the coordination number of Ti in $[Ti(H_2O)_5Cl]^{2+}2Cl^-$?

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

(Short answer type. Answer any **eight** questions. Each question carries 2 marks)

11. What are ambidentate ligands? Explain with suitable examples.

12. What is meant by half-life period of a radio isotope? Write the mathematical expression for half-life period.

13. Explain the term binding energy.

14. What is respiration? Explain.

15. Define mass defect.

16. Give a method for the preparation of organoboron compounds.

17. What is photosynthesis?

18. What are high spin complexes?

19. Distinguish between inner orbital and outer orbital complexes.

20. Explain carbon fixation and carbon cycle.

21. Distinguish between isotopes and isotones.

22. What are cytochromes? How they are classified?

(8 × 2 = 16 Marks)

SECTION – C

(Short essay type. Answer any **six** questions. Each question carries **4** marks).

23. A freshly cut piece of wood gives 16100 counts of β-ray emission per minute per kg and an old wooden bowl gives 13200 counts per minute per kg. Calculate the age of the old wooden bowl. [The half-life period of ^{14}C is 5568 years.]

24. Give an account on radioisotopes as tracers.

25. Discuss the applications of organometallics in medicine.

26. Discuss the properties of tetrahedral complexes with suitable examples.

27. Discuss about the synthetic applications of Grignard reagents.

28. Write a short note on metalloporphyrins.

29. Explain the bonding in octahedral complexes using valence bond theory.

30. Write a note on the structural features of myoglobin.

31. Write a note on the applications of coordination compounds in qualitative analysis.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. Each question carries **15** marks).

32. Explain

    (a) Neutron activation analysis.

    (b) Nuclear fission.

    (c) Carbon dating.

33. Discuss about the preparation and applications of organometallic compounds of Sn, Li and Hg.

34. Explain

    (a) Essential and trace elements in biological systems.

    (b) Biochemistry of iron toxicity and nutrition.

35. Discuss about the structural and stereo isomerism exhibited by coordination compounds.

(2 × 15 = 30 Marks)