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Reg. No. : .....

Name : .....

Second Semester B.Sc. Degree Examination, December 2021

First Degree Programme Under CBCSS

Chemistry

Complementary Course for Zoology

CH 1231.4 – INORGANIC CHEMISTRY

(2020 Admission Regular)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. Which is the most abundant transition metal in human body?
2. When a nuclide decays by β - emission, what happen for neutron number?
3. Give a method for the preparation of Grignard reagent.
4. Which macromolecule serves as the oxygen storage in muscle cells?
5. Give an example for a pair of isotopes.
6. What is the half-life period of C^{14}?
7. Give the structural formula of ferrocene.
8. Predict the product formed when CH_3MgX reacts with dry ice followed by acid hydrolysis.

P.T.O.

9. Give the IUPAC names of $[Fe(H_2O)_6Br]SO_4$.

10. What is the hybridization of Ni in $[Ni(CN)_4]^{2-}$?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. Distinguish between isotopes, isobars and isotones.

12. Define mass defect.

13. Among the metal carbonates and metal carbonyls, which is an organometallic compound and why?

14. What are ligands? Explain with example.

15. What is the significance of n/p ratio?

16. Give a method for the preparation of orgnomercury compound.

17. Differentiate between hapticity and denticity of a ligand in organometallic chemistry.

18. Name any two trace elements in bioinorganic chemistry.

19. What are metalloporphyrins?

20. What are the uses of orgnosilicon compounds?

21. What is Bohr's effect?

22. How coordination number is related to geometry of coordination compounds?

23. What is the role of cytochromes in cellular respiration?

24. Explain why square planar complexes do not show optical activity.

25. Define coordination number. What is the coordination number of Ti in $[Ti(H_2O)_5Cl]^{2+}2Cl^-$.

26. Explain why zinc complexes are generally colourless?

(8 × 2 = 16 Marks)

SECTION – C

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

27. Write a note on neutron activation analysis.

28. Calculate the fission energy released for the following reaction.

    ${}_{92}U^{235} + {}_{0}n^{1} \rightarrow {}_{56}Ba^{141} + {}_{36}Kr^{92} + 3{}_{0}n^{1}$. Atomic mass (in amu) of $U^{235} = 235.044$, $Ba^{141} = 140.908$, $Kr^{92} = 91.905$ and mass of ${}_{0}n^{1} = 1.009$.

29. Explain nitrogen fixation process.

30. The activity of C-14 in an old sample of wood is found to be one-fourth of that in a fresh piece of wood. Calculate the age of the wood if the half-life of C-l4 is 5730 years.

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

32. Discuss about the classification of organometallic compounds.

33. Discuss about the synthesis and application of organolithium compounds.

34. Write a short note on the role of chlorophylls in photosynthesis.

35. Explain the colour of transition metal complexes.

36. Explain high spin complexes with examples.

37. Explain carbon cycle.

38. Explain magnetic properties of tetrahedral complexes with suitable examples.

(6 × 4 = 24 Marks)

SECTION – D

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

39. Discuss the structural and stereo isomerism in coordination compounds.

40. Discuss the salient features of the valance bond theory of bonding in coordination compounds.

41. Explain

(a) Group displacement law.

(b) Nuclear fission.

(c) Modes of radioactive decay.

42. Write a note on

(a) Radioisotopes as tracers

(b) N/P ratio

(c) Geiger — Nuttal rule.

43. Explain the structures and functions of haemoglobin and myoglobin.

44. Explain the preparation and synthetic applications of Grignard reagent.

(2 × 15 = 30 Marks)
