

(Pages : 4)

N – 4056

Reg. No. : .....

Name : .....

First Semester B.Sc. Degree Examination, June 2022

First Degree Programme Under CBCSS

Chemistry

Complementary Course for Home Science

CH 1131.5 — INORGANIC AND ANALYTICAL CHEMISTRY

(2020 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions in one word/one sentence. Each question carries 1 mark.

- 1s orbital has \_\_\_\_\_ nodes.
- Bohr's theory of atom is based on \_\_\_\_\_.
- The  $n/p$  ratio of stable nuclei vary between 1 and \_\_\_\_\_.
- The number of heme groups in haemoglobin is \_\_\_\_\_.
- Give 2 examples of secondary standards used in volumetry.
- Name the indicator used in oxalic acid against NaOH titration is \_\_\_\_\_.
- Write the electronic configuration of Cr. (Atomic No. 24).
- Name an external indicator used in estimation of Fe in dichrometry.

P.T.O.

9. The designation of an electronic level with  $n = 4$  and  $l = 2$  is \_\_\_\_\_.
10. Isotones contain the same number of \_\_\_\_\_.

(10 × 1 = 10 Marks)

### SECTION – B

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

11. Define molarity of the solution. Give the expression.
12. State and explain Pauli's exclusion principle.
13. Write the time independent Schrodinger equation and explain the terms.
14. Define a nuclide. Write the general expression for a nuclide.
15. Define equivalent mass of an acid. How is the eq. mass of an acid related to its molecular mass?
16. Define an organometallic compound. Give the name and formula of one such compound.
17. What is meant by a metalloporphyrin? Give an example.
18. Calculate the mass of oxalic acid required to prepare 250 ml of 0.1 N solution.
19. Explain the oxygen transport activity of haemoglobin.
20. Differentiate between equivalence point and end point of a titration.
21. Explain the term mass defect with an example.
22. What is meant by Bohr's effect?
23. Give any 2 biological impacts of organic arsenic compounds.
24. Define half-life period of a radionuclide. What is its significance?

25. Which is more stable  $C_2H_5Na$  or  $C_5H_5Na$ . Give reason.
26. Distinguish between orbit and orbital.

(8 × 2 = 16 Marks)

SECTION – C

Answer any six questions. Each question carries 4 marks.

27. Discuss the Hund's rule of maximum multiplicity with a suitable illustrative example.
28. Mention any four differences between myoglobin and haemoglobin.
29. What are the potential requirements required for a redox indicator?
30. What is meant by a standard solution? Mention the characteristics of a standard solution.
31. What is principal quantum number and what is its significance?
32. Discuss the characteristics of a redox indicator.
33. Describe the role of haemoglobin in the transport of  $O_2$  and  $CO_2$ .
34. Explain why we are using dil.  $H_2SO_4$ , not any other acids for the permanganometric titrations.
35. Explain the working of a Geiger-Muller Counter.
36. Mention the advantages of  $K_2Cr_2O_7$  over  $KMnO_4$  as an oxidizing agent in redox titrations.
37. Write a note Radioactive equilibrium.
38. Mention the classification of organometallic compounds based on hapticity.

(6 × 4 = 24 Marks)

## SECTION – D

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

39. Discuss the structure and physiological functions of haemoglobin and myoglobin.
40. Write notes on : (a) n/p ratio, (b) mass defect, (c) binding energy. (5 + 5 + 5)
41. Explain :
- (a) The working of a redox indicator taking diphenylamine as an example.
- (b) Ostwald theory of acid base indicators. (7.5 + 7.5)
42. Explain :
- (a) The postulates of Bohr theory and its limitations.
- (b) How Bohr's theory explains the formation of the line spectrum of hydrogen. (8 + 7)
43. (a) Distinguish between primary and secondary standards as applied to volumetry.
- (b) Explain the double burette method used in titrimetric analysis. (8 + 7)
44. (a) Briefly discuss the application of radioisotopes in medicine and archeology.
- (b) The amount of  $^{14}\text{C}$  present in an old piece of wood is found to be one-sixth that present in fresh piece of wood. Calculate the age of wood if  $t_{1/2}$  of carbon is 5668 years. (7.5+7.5)

(2 × 15 = 30 Marks)