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N – 4257

Reg. No. : .....

Name : .....

**First Semester B.Sc. Degree Examination, June 2022**

**Career Related First Degree Programme under CBCSS**

**Group 2 (a) : Biochemistry and Industrial Microbiology**

**Complementary Course – I**

**CH 1131.7 : BASIC THEORETICAL AND ANALYTICAL CHEMISTRY**

**(2020 Admission Onwards)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

Answer all questions. Each question carries 1 mark.

1. Define Hund's rule.
2. Give one example for SP hybridization.
3. Give the expansion of VSEPR.
4. What is the indicator used in complexometric titration.
5. Write one adverse effect of ozone depletion.
6. What is smog?
7. What is half-life period?
8. Write one example for a molecule having hydrogen bond.

P.T.O.

9. What are alpha rays?
10. Write any two types of electromagnetic radiation.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Write the de Broglie relation and explain the terms
12. Explain uncertainty principle.
13. What is meant by hybridization?
14. Define dipole moment.
15. Explain Born-Haber cycle.
16. Write the Schrodinger wave equation.
17. What is packing fraction?
18. Explain decay constant
19. Write two types spectroscopy technique.
20. What is the condition for a molecule to show rotational spectroscopy?
21. What is force constant?
22. Explain common ion effect.
23. Distinguish between normality and molality .
24. Explain greenhouse effect.

25. What is meant by primary standard?

26. What is n/p ratio?

**(8 × 2 = 16 Marks)**

### SECTION – C

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

27. Give a description on shape of different orbitals

28. Comment on stability half-filled and completely filled orbitals.

29. Explain valance bond theory.

30. Distinguish between covalent bond and ionic bond.

31. Briefly outline the applications of radioactivity.

32. Explain nuclear fission and nuclear fusion reaction with examples.

33. Comment on different modes of decay for radioactive materials.

34. Explain radioactive equilibrium and on the significance of n/p ratio.

35. Explain the selection rule in microwave spectroscopy.

36. Distinguish between iodometry and iodimetry.

37. Describe various types of air pollutants.

38. What are the factors that cause soil pollution.

**(6 × 4 = 24 Marks)**

### SECTION – D

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

39. Illustrate on different segments of environment.

40. (a) Write the principle of colorimetry.

(b) Discuss theory of acid base indicators.

41. Give an illustration on :
- (a) Microwave spectroscopy
  - (b) Infrared spectroscopy
42. Explain nuclear reaction induced by
- (a) Projectiles
  - (b) Neutrons
  - (c) Gamma rays
43. (a) Explain  $sp^3d$  and  $sp^3d^2$  hybridization with example.
- (b) Describe different types of hydrogen bonding in molecule.
44. (a) Describe postulates of Bohr Theory.
- (b) Explain formation of photochemical smog.

(2 × 15 = 30 Marks)