

VTM NSS COLLEGE, DHANUVACHAPURAM

Department of Chemistry

Question bank for S1 Botany (Course code: CH 1131.3)

Analytical and Environmental Chemistry

Section B (2 mark questions)

1. Name two indicators used in complexometric titrations.
2. What is a primary standard? Give an example.
3. The energy and subshell of an electron is described using which quantum numbers?
4. What is hybridisation?
5. Define Bohr Bury's rule.
6. Give the electronic configuration of Cr and Cu.
7. Give schrodinger wave equation and explain the terms.
8. Sketch $d_{x^2-y^2}$ and d_{xy} orbitals
9. Write down the hybridisation and shape of NH_3 and CH_4 molecules.
10. State two types of hydrogen bonding with examples
11. Ice has less density than water. Why?
12. Name the indicator used in the titration of HCl and NH_4OH . Why?
13. How will you prepare 250 ml 0.35 N H_2SO_4 solution?
14. What are the advantages of redox titrations?
15. Explain the significance of Ψ and Ψ^2
16. What are primary air pollutants? Give two examples.
17. What is Rydberg equation?
18. Explain the stability of half filled and completely filled orbitals.
19. Discuss Fajan's rule
20. Bond angle of water is different from normal tetrahedral bond angle. Why?
21. What is molarity?
22. What is the difference between equivalence point and end point?
23. Give two factors which determine the lattice energy of an ionic compound.
24. What is a secondary standard? Give one example
25. Distinguish between sigma and pi bonds

26. What is energy sequence rule?
27. What is meant by bond order?
28. What is zeolite and calgon?
29. What is acid rain? Mention its adverse effect.
30. A solution is prepared by dissolving 2g NaOH in distilled water to give 250 mL solution. Calculate the molarity of the solution.
31. Compare the lattice energy of the crystals LiCl and MgO
32. What is eutrophication?
33. Explain Beer-Lambert law.
34. Mention two sources of heavy metal pollution in water bodies.
35. Write a method to remove hardness of water.
36. How does the strength of intermolecular forces affect the boiling point of a liquid?
37. How can we prepare 2M, 500 ml NaOH solution (Mol wt. of NaOH = 40)
38. What are COD and BOD?
39. What is fly ash? Mention its sources
40. How does the concept of hybridisation explain the geometry of acetylene molecule?

Section C (4 mark questions)

41. What is an ionic bond? Discuss the factors which favour the formation of ionic bond.
42. What are the causes of hardness of water? Describe one method for the removal of hardness.
43. Explain the dsp^3 hybridisation
44. How is water purified by reverse osmosis?
45. Calculate the ground state electronic energy of hydrogen atom.
46. Define VSEPR theory. What are the applications and its limitations?
47. Explain the principle of dichrometric titrations
48. Briefly discuss the energetic of ionic bond formation
49. Describe how hydrogen bonding affects the boiling point of compounds.
50. Describe the Born-Haber cycle considering the formation of NaCl
51. Discuss the theory of redox indicators
52. Explain the formation of photochemical smog
53. Distinguish permanent and temporary hardness.

54. State and explain Fajan's rule
55. Explain the action of zeolites in hard water.
56. Differentiate bioaccumulation and biomagnification.
57. Explain principle of permanganometric titrations
58. What is reverse osmosis? How it is useful in waste water treatment?
59. Explain the formation of molecular orbitals of LCAO method with an example.
60. Explain sp^3d^2 hybridisation.
61. What are the effects of hard water in boilers?
62. What are the significance of Pauli's exclusion principle?
63. How fertilizers and pesticides cause soil pollution?
64. Describe the titration curve of a strong acid with weak base
65. Distinguish between orbit and orbital
66. Discuss the theory of acid-base indicators
67. Derive expression for the frequency of spectral lines of hydrogen atom.
68. Explain atomic spectra of hydrogen atom.
69. State the Heisenberg's uncertainty principle and its significance.
70. Explain the shape of SF_6 molecule
71. Water (H_2O) exists as liquid while hydrogen sulphide (H_2S) is a gas at room temperature. Why?
72. Discuss hydrogen bond with examples.
73. Define dipole moment. What is the dipole moment of CO_2 ?
74. Give an account on green house effect
75. Explain the action of phenolphthalein indicator.
76. Briefly discuss iodometric and iodimetric titrations
77. Discuss the effects of fluorocarbons on ozone layer.
78. Write a note on industrial waste management.
79. Discuss energetic of chemical bond formation using hydrogen molecule as example.
80. Draw and explain the titration curve of a weak acid - strong base titration with suitable example. Mention the indicator used.

Section D (15 mark questions)

81. (a) What are the postulates of Bohr theory?
(b) Explain different series in hydrogen spectra.
(c) Discuss the stability of half filled and completely filled orbitals.
82. (a) Discuss briefly the removal of hardness of water.
(b) How many types of pollutions have generally been noticed?
(c) Describe pollutant.
83. Explain hydrogen bond and its consequences.
84. What is titration curve? Discuss the titration curve for the neutralisation of
(a) strong acid \times strong base
(b) strong acid \times weak base
85. What are quantum numbers? Discuss.
86. (a) What are the environmental effects of pesticides? Discuss.
(b) What are pollutants? How are they classified? What are the sources of important air pollutants?
(c) Explain water pollution. What are the major water pollutants? How do they affect water?
87. Discuss the MO diagram of O_2 molecule, its bond order, stability and magnetic behaviour.
88. Define hybridisation and its characteristics. Explain sp , sp^2 , sp^3 and dsp^2 hybridisation with examples.
89. (a) Discuss the formation and importance of ozone layer.
(b) Briefly explain green house effect.
(c) How carbon monoxide affect human body? Explain.
90. (a) Write on ozone layer depletion.
(b) What are particulates? What are the sources of particulates?
(c) Write a note on acid rain.
91. (a) Discuss Bohr's theory, its merits and demerits.
(b) Explain the origin of atomic spectra.
92. (a) What is Hund's rule of maximum multiplicity? Apply this rule to explain the electronic configuration of nitrogen atom and hydrogen atom.
(b) Explain the significance of four quantum numbers.
(c) What are the limitations of Bohr Theory?

93. (a) What are sp^3d , sp^3d^2 , sp^3d^3 hybridisations?
(b) Write the geometry of $BeCl_2$, PCl_5 , SF_6 , IF_7 .
(c) Which is more polar - HF or HCl. Why?
94. (a) What are polar and non polar covalent bonds?
(b) Discuss the consequences of hydrogen bonding.
(c) Discuss inter and intra molecular hydrogen bonding with examples.
95. (a) Draw the MO diagrams of N_2 and O_2 molecules
(b) Which is paramagnetic? Why?
(c) Calculate the bond order.
96. (a) Explain Beer's law and Lambert's law.
(b) Discuss the principle of calorimetry
(c) Explain the calorimetric estimation of iron.
97. (a) What are acid-base indicators?
(b) Explain the use of indicators in acid-base titrations.
(c) Write the action of methyl orange indicator.
98. Explain the terms DO, BOD and COD. How will you determine them experimentally?
99. Write an essay on ozone depletion, its causes, consequences and control measures.
100. What is meant by hybridisation? Deduce the hybridisation and geometries of IF_7 and NH_3 .