**S.T.E.T. WOMEN’S COLLEGE, MANNARGUDI**

**UNDER GRADUATE – III B.Sc., CHEMISTRY – SEMESTER - VI**

**PHYSICAL CHEMISTRY – II (16SCCCH9)**

**QUESTION BANK**

**SECTION - A**

1. Define conductors.
2. Define Insulators.
3. What are the types of conductor?
4. Write the Distinguish between metallic conductors and electrolytic conductors.
5. What are mixed conductors ?
6. What are semi conductors ? Give example.
7. State Ohm’s Law.
8. State Faraday’s First law of electrolysis.
9. Define electrochemical Equivalent.
10. State Faraday’s second law of electrolysis.
11. Define specific Resistance.
12. Define specific Conductance.
13. Define conductance.
14. Define Equivalent conductivity.
15. What is molar conductance?
16. What is Electrolytic dissociation ?
17. Define Degree of Ionisation .
18. Write the ostwald dilution law.
19. Define Ionic motrility.
20. State Kohlrausch’s law.
21. What is strong & weak electrolytes ?
22. What is walder’s rule?
23. Write Debye - Huckle onsagar theory.
24. What is transport number ?
25. State Hittorf’s rule.
26. What are the advantages of conducto metric titrations?
27. Define common ion effect.
28. Define Electrophoretic effect
29. What are galvanic cells ?
30. Define half cell.
31. Distinguish between galvanic and electrolytic cell ?
32. What is cell reaction ?
33. What is electrochemical series ?
34. What are concentration cells ?
35. What are the types of concentration cell?
36. Define concentration cell without transport.
37. Define concentration cell with transport.
38. What is liquid junction potential?
39. What are Reversible & Irreversible cell ?
40. What is EMF ?
41. What are the types of Reversible electrodes ?
42. What is Redox electrode ?
43. Define single electrode potential ?
44. Define Activity and Activity coefficient.
45. Define corrosion ?
46. What are the types of corrosion ?
47. What is Electrochemical corrosion ?
48. What are the methods of preventing corrosion ?
49. What are potentiometric titrations ?
50. What are the titrations are suitable by potentiometrically.
51. What is salt bridge ?
52. What is the function of salt bridge ?
53. What is quinhydrone electrode ?
54. What are the merits of quinhydrone electrode ?
55. Define electrode potential.
56. Define oxidations reduction Potential.
57. Why SHE is not used as a reference electrode ?
58. Define standard electrode potential.
59. What is reference electrode ? Give example.
60. What is photochemical Reaction ?
61. Define photochemistry.
62. What is photo physical process ? Give example.
63. What is fluorescence ?
64. Define Phosphorescence.
65. What are the possible electronic transitions in molecules ?
66. State Grothes – Dropper law.
67. Define Einstein’s law of photo chemical Equivalence.
68. Define Quantum yield.
69. Give the example of photochemical Reaction.
70. State steady state principle.
71. Define photosensitization.
72. Give the example for photosensitizers.
73. Mention the importance of photosensitization.
74. What are Radiative & Non Radiative transition ?
75. State Lamber’s Beer law.
76. State Lambert Law.
77. State Beer law.
78. What is Einstein photochemical Equivalence.
79. Write the examples of fluorescent substances.
80. What is primary and secondary process.
81. Define cold light or Luminescence.
82. Define quenching.
83. What are fluorescent Indicators ?give an example .
84. What is chemiluminescence.
85. What is bio luminescence?
86. What are lasers ?
87. Mention the uses of Laser .
88. Define symmetry elements.
89. What is symmetry operation ?
90. Define point groups.
91. What is Abelian and non Abelian group?
92. Define class.
93. What is subgroup?
94. Define proper axis of symmetry.
95. Define improper axis of symmetry ?
96. What is plane of symmetry ?
97. Define vertical & horizontal plane.
98. Define Axis of improper Rotation.
99. Define centre of symmetry.
100. What is Dihedral group ?
101. Define spectroscopy.
102. What is Absorption & emission spectrum ?
103. What is electromagnetic spectrum ?
104. What are the characteristics of electromagnetic spectrum?
105. What are the reaction in an Absorption spectrometer.
106. Write the selection rule for vibration & rotational transition.
107. What are allowed & forbidden transitions?
108. Define Band with & intensity.
109. Define Dipolemoment.
110. Define force constant.
111. What is Rigid Rotator & Harmonic oscillator?
112. What are overtone?
113. What are combination bands?
114. What are the types of transitions?
115. Define the term Predissociation.
116. What is stretching vibration?
117. What is symmetric & Antisymmetric stretching ?
118. What are the types of bending vibrations ?
119. Define zero point energy.
120. Write the conditions for a molecule to be active in microwave region.
121. Define hormonicity and unhormonicity.
122. What are P.Q.R branches ?
123. What is Rayleigh scattering and Raman scattering ?
124. What are the stokes & Antistokes lines?
125. What is Raman frequency?
126. Mention the condition for a molecule to be Raman active.
127. What is Raman effect ?
128. Write the selection rule for Raman spectra.
129. What is polarized light?
130. Define polarized and depolarized raman lines .
131. What is finger print region ?
132. What is fermi resonance?
133. Define NMR spectroscopy.
134. What is Larmor Processional frequency?
135. Define saturation.
136. What is spin-spin relaxation ?
137. Define the term i). shielding ii). deshielding
138. Define chemical shift.
139. What are the factors influencing chemical shift?
140. What are equivalent and Non equivalent protons?
141. What is spin-spin coupling ?
142. Define coupling constant.
143. What is TMS? why choosing TMS as a internal standards
144. What is space effect ?
145. In alkynes, resonance occurs at higher field give reason ?
146. Aldehydic & Aromatic Protons are much more deshielded. Give reason
147. What is the effect of Ring current ?
148. How can you distinguished intermolecular and intramolecular

Hydrogen bonding by NMR technique

1. Mention the solvents used in NMR, spectroscopy
2. What is ∫ & τ scale ?
3. What is meant by Nuclear magnetic Resonance ?
4. What is precessional frequency ?
5. Define flipping.

**SECTION – B**

1. How can you measure equivalent conductance using Kohlraush’s bridge?
2. Explain the postulates of Arrhenious theory.
3. Derive ostwald dilution law.
4. Explain the variation of Equivalent conductance with concentration.
5. Discuss the following i).wein effect

ii). Falkenhagen effect

1. Explain the determination of solubility product of a sparingly soluble salt ?
2. What is Kohlraush’s law ? Explain it application.
3. What is EMF ? and explain its measurement.
4. Derive nernst equation
5. Discuss the following i, SHE ii, standard electrode potential.
6. What is concentration cell ? Explain without transport.
7. What are the different types of reversible electrodes ? Illustrate with suitable examples.
8. How will you determine pH using quinhydrone electrode ?
9. What is corrosion ? and explain the electrochemical theory of corrosion.
10. What are the methods of preventing corrosion ?
11. Write the comparison between thermal and photochemical reactions.
12. What is photosensitization and quenching ?
13. Explain symmetry elements & symmetry operations.
14. What are the postulates of groups ?
15. Illustrate the point group of c2v. with suitable example.
16. Illustrate the point group of c3v. with suitable example.
17. Explain the calculation of inter- nuclear distance in di atomic molecules.
18. Explain the following

i). Zero point energy

ii). force constant

iii). Fundamental bands & overtones

1. Explain the conditions & theory of electronic spectroscopy.
2. Discuss quantum theory of Raman effect.
3. Explain Rayleigh scattering & Raman scattering.
4. Write the comparision of Raman and IR spectra.
5. Define the term

i). Equivalent & non equivalent protons

ii). shielding & deshielding

1. Discuss the relaxation process in NMR.
2. Explain spin-spin coupling in NMR by taking suitable example.

**SECTION – C**

1. Derive Debye - Huckel onsagar equation for strong electrodes.

2. Explain the determination of transport number by Hittorf’s and moving

boundary method.

1. Discuss the application of conductance measurements.
2. Explain conductometric titrations.
3. Discuss the application of Gibb’s Helmholtz equation.
4. What is electrochemical series? Mention its significance.
5. Discuss potentiometric titrations.
6. Explain the consequences of light absorption by Jablonski diagram.
7. Explain the Law’s of photochemistry ?
8. Derive the Kinetics of photochemicals reaction between H2 & Cl2.
9. Derive the Kinetics of photochemicals reaction between H2 & Br2.
10. Discuss the following with suitable example.

i). Fluorescence and phosphorescence

ii). Chemiluminescence

1. What is laser ? explain the uses of laser.
2. Explain group theory and optical activity.
3. Explain Rotational spectra of diatomic molecules treated as rigid rotator.
4. Discuss the principles and theory of electronic spectroscopy.
5. Discuss the following

i). Franck condon principle

ii). Predissociation

1. Write the structural determination from Raman and IR spectroscopy.
2. Explain the principle & theory of NMR spectra.
3. What is chemical shift? Enumerate the various factors influencing chemical shift.