# Shree H. N.Shukla Group of colleges
## (Affiliated to Saurashtra University & Gujarat Technological University)

**Lt. Shree Cimanbhai Shukla**

## B. Sc. Chemistry Semester-6
## C-601 – Chapter-1,2,3,4,5,6
## Question bank

Shree H.N.Shukla College Campus, Street No. 2, Vaishali Nagar, Nr. Amrapali Railway Crossing, Raiya Road, Rajkot. Ph. (0281)2440478, 2472590

Shree H.N.Shukla College Street No. 3, Vaishali Nagar, Nr. Amrapali Railway Crossing, Raiya Road, Rajkot. Ph. (0281)2440478, 2472590

Shree H.N.Shukla College B/H Markeketing yard N/R Lalpari lakeBhichari Road Rajkot.Ph. (0281)2471645 Mo,9998381777 90990631550

**Question for one mark**

1) Which quantum number is related with the orientation of orbitals?
2) What is the use of coupling scheme?
3) What is resultant spin quantum number?
4) What is spin multiplicity?
5) What is spin multiplicity for S = 2?
6) For $P^2$ electrons, what is L value?
7) What is orbital multiplicity?
8) What is orbital multiplicity for L = 2
9) What is another name of L S coupling scheme?
10) Which value is derived by L — S coupling?
11) What is the symbol of spectroscopic state?
12) For $^1S$ state, what is J value?
13) For $d^2$ system, what will be spin multiplicity?
14) What is L-value for $^3F$ state?
15) For $P^2$ system, what is the order of energy of $^1D$, $^3P$ and $^1S$
16) What is the range of J and j values?
17) Give equation to calculate microstates.
18) In $^3F_2$ how many microstates are available?
19) For S = 1 and L = 2, how many microstates are available?
20) Give any one rule given by Hund for the determination of ground state term symbol
21) Give statement only of John-Teller theory.
22) What is John-Teller stabilization energy?
23) What is the relation between $\delta1$ $\delta2$ and $\Delta$ for tetragonal distortion?
24) Give Hole-foymalytic pair of orbitals.
25) What is position and negatron in Hole-formation theory?
26) Which type of splitting will be observed in ground term of a $d^n$ and $d^{10-n}$ in presence of similar field?
27) Give mathematical equation for Laporte's spin selection rule
28) Give mathematical representation of symmetry selection' rule.
29) According to symmetry selection rule, which transitions are forbidden?
30) Which transitions are allowed according to spin selection rule?
31) What is the main application of Orgel diagram?
32) For S = 1 and L = 2, what is term symbol?
33) Draw the figure representing asymmetric band.
34) Draw the figure representing sharp or intense band.
35) Which types of electronic transitions have the highest intensity?
36) Which electronic transitions have very weak intensity?
37) Define : Magnetic field
38) Give equation for pole strength induced per unit area
39) What is unit intensity of a magnetic field?
40) Give equation for the magnetic induction B.
41) What is volume susceptibility?
42) What is the value of P and K for diamagnetic substance?
43) For P > 1 and K is +ve, what will be the magnetic nature of substance?
44) What is the relation between Xpara and temperature for paramagnetic compound?
45) Give equation of spin magnetic moment.
46) Give equation of orbital magnetic moment.
47) Which type of substance has dipoles aligned with the applied magnetic field?
48) Which type of compounds have very high magnetic moment and magnetic susceptibility
49) Which method is used to determine magnetic susceptibility?
50) What is the effect of temperature change on diamagnetic compounds?

51) What is molar magnetic susceptibility?
52) What is FAT?
53) Which oil is used in Varnishes?
54) Which oils is used as hydraulic fluid / Lubricants?
55) What is Stand Oil?
56) How blow oil is prepared
57) What is use of Blown oil?
58) Which type of oil is used as Enamels?
59) Which compound is used for purifying oil?
60) What is use of Anthracite?
61) How the oil could be made free from Fat?
62) What is the iodine value range allying oil?
63) Name some nondrying oils.
64) Cotton seed oil comes under which class of oil?
65) Write steps only related with refining of cotton seed oil.
66) What is Dlinting?
67) Why cotton seed flakes are cooked in cooker?
68) What percent of oil is extracted by solvent extraction process?
69) Which solvent is used for extraction of oil?
70) What is oil winterization?
71) What is foots?
72) Which impurities poison the catalyst?
73) Name different methods of hydrogenation of oils.
74) Define IODINE value.
75) What is acid value of oil meant for?
76) Give mathematical equation of acid value.
77) What is determined by WIJS method?
78) Name different chemicals required for determination of Iodine Value of Oil.
79) Define the saponification value of oil.
80) Compare saturation with saponification value.
81) Compare iodine value and acid value with unsaturation.
82) What is Soap?
83) Name different types of Soap.
84) What is Hard soap?
85) Define : Soft soap
86) What is the use of soft soap?
87) What is the product of hydrolysis of oil or fat?
88) Name some natural oil sources used to make soap.
89) Name the raw materials to prepare soap.
90) What is resin / rosin?
91) Which main constituent is present in rosin?
92) Name the best saponifying material used to prepare medicinal soap.
93) What is the use of NaCl in soap
94) Name the substance used for stabilizing fragrances.
95) Give examples of natural fragrances.
96) What should be added to give pink colouration to soap?
97) Name few colouring agent with colour imparted to the soap.
98) What is importance of filler in soap?
99) Give some examples of filling agent.
100) Sodium triphosphate is used for what purpose in soaps?
101) Name the binding agent also used as softening agent soaps.
102) What is superfating agent? Name it.
103) Why plant extracts are used in soaps?

104) Give few name of germicides used in soaps.
105) What is added in hydrolyser tower in continuous process?
106) Which important by product is obtained in soap manufacture?
107) Name different components used in shaving cream.
108) How transparent soap is prepared?
109) What is rendering?
110) What is surfactant?
111) Name different types of detergents.
112) Give name of anionic detergent.
113) What is Zwitter ion? It comes under which class of detergent?
114) Name the brightening agent used in detergents.
115) Which component is used as antidandruff agent in detergent?

**Answer the following questions in short [2 Marks]**

116) Define following terms.
(i) Spectral term symbol (ii) Spin multiplicity (ii) Orbital multiplicity (iv) Microstates
117) Calculate S. MS, L, ML, J and MJ for following terms,
(i) 3F (ii) 5D (iii) 1S (iv) 4F (v) 1G
118) Derive ground state spectral term or Derive Russll-Saunders term
(i) Cu +2 (ii) Ti +3 (iii) Ni +2 (iv) Mn +2 (v) Fe +2 (fi) d2 (vii) d3 (viii) d4 (ix) d7
119) Calculate microstates for
(i) Cr+3 (ii) Mn +5 (iii) Fe +3 (iv) d1 (v) d2
120) Give reason,{CoC1412- is darken than[Co (H206)]
121) What is Orgel diagram?
122) Give only mathematical form of both the selection rules.
123) Give Orgel diagram of 2D state for d' system in Oh field. OD )
124) Give Orgel diagram of d' system in Oh field.
125) Define the term.
(i) Magnetic field (ii) Unit pole (iii) Pole strength (iv) Magnetic induction
(v) Intensity of magnetisation (vi) Magnetic permeability (vii) Main 'c Susceptibility
(viii) Neel temperature (ix) Curie temperature
126) Define magnetically diluted substance.
127) Define magnetically concentrated compound.
128) Define Oil?
129) What will be hydrolysis product of oil?
130) How will you get fatty acids from oil?
131) What do you mean by Rancidity?
132) What is drying oil? Give one example?
133) Name some of the edible oils?
134) What is use of Blown oil?
135) Define stand oil?
136) How boiled oil is formed?
137) What do you mean by expression?
138) Name some solvents used successfully for extraction of oil?
139) Why solvent extraction is required.
140) Define winterization?
141) What is hard oil?
142) Name the catalyst used in oil reduction?
143) Show the reaction of reduction of format?
144) Which is the best method for hydrogenation of oil?
145) What do you mean by saponification value?
146) How S.V. could be helpful for differentiating different oils.
147) Define Acid value?

148) How will you compare Oleic, Linoleic & linolenic acids according to their Iodine value?
149) Arrange the I.V. according to increasing unsaturation 85,103,128 & 190 what does it indicates.
150) Define soap.
151) What is hard soap?
152) What is soft soap?
153) Name the Glycerides use for soap manufacturing.
154) What is Rosin or resin? What is its constitution?
155) What is use of Rosin in soap manufacture?
156) Define saponification?
157) What is importance of NaCl in soap manufactures?
158) What do you mean by fragrance stabilizers? What could be used as fragrance Stabilizer in soap?
159) Name the flavouring components of soap?
160) What is filler and give its properties?
161) Name some Binding agents. What is their importance?
162) Name some germicides used in soap.
163) What is basic principle of soap manufacturing?
164) Witt could be used to form natural soaps?
165) Enlist the raw materials used in soap manufacture.
166) What are the properties of good toilet soap?
167) Give formulation for medicated soap?
168) Give different methods for manufacture of soap?
169) What is Detergent?
170) Classify different type of Detergents & Give example of each.
171) What is use of Benzotriazol in detergents?

**Answer the following questions: [3 Marks]**
172) Write a short note.
(i) s-s coupling (ii) l-l coupling (iii) l-s coupling (iv) Microstate
173) What is elongation about any axis?
174) What is Jahn-Teller effect?
175) Draw only diagram giving splitting of d-levels due to Jahn –Teller effect for d9 system.
176) Give only splitting of 'D' term in oh and Td field for all hole formalytic pairs.
177) Draw only Orgel diagram for 'F' state OR 'D' state.
178) Discuss spin selection rule.
179) Discuss Orbital / Laporte / symmetry selection rule. )
180) Write a short note "characteristics of d-d spectrum".
181) Write a short note.
(i) Paramagnetism (ii) Ferro and Antiferro magnetic compound
182) Orbital angular momentum \of
183) Discuss effect of temperature on magnetic body
184) Explain the expression method of extracting oil from cotton seed.
185) Draw & explain the block diagram of solvent extraction method for extraction of oil?
186) How oil is purified explain?
187) Explain with diagram, the process of manufacturing of solid oil?
188) Give the methods of manufacturing Ni catalyst used for hydrogenation.
189) Explain how iodine value is determined.
190) How will you find the saponification value of oil? Explain.
191) Explain the method to determine Acid value of oil give formula also.

**Answer the following questions in detail [5 Marks]**

192) Discuss Russell-Saunders coupling scheme.
193) Discuss l-l coupling in $P^3$ system with vector representation.
194) Derive all possible spectral states for $P^2$ system and arrange them in order of Energy.
195) Discuss Hund rules for the determination of ground state term symbol.
196) Derive allowed spectral terms for $d^2$ system using pegion hole diagarn and arrange them in order of stability.
197) Derive all possible spectral terms for $d^2$ using vector diagram and allowed terms using Hand's rule.
198) Discuss Jahn-Teller effect / theorem.
199) Discuss splitting of d-orbitals in square planar complexes.
200) Discuss Jahn-Teller distortion in d8 or $Ni^{+2}$ systems.
201) Discuss about "Hole formalism".
202) Explain selection rules of absorption / d-d spectrum.
203) W1,-t is Orgel diagram? Discuss Orgel diagram for D state.
204) Discuss Orgel diagram for 'F' state.
205) Discuss about Relaxation or Violation about selection rule.
206) Write a short note on "Type of electronic transitions in metal complexes".
207) Discuss electronic transition spectrum of $Cu^{+2}$ or $d^9$ system Oh field.
208) Discuss electronic spectrum of $[Ti(H_2O)_6]^{3+}$
209) Discuss electronic / d-d spectrum of $[Ni(H_2O)_6]^{2+}$
210) Discuss Gouy method for the determination of magnetic susceptibility.
211) Explain diamagnetism and derive the equation for diamagnetic momentum.
212) Derive equation for total magnetic momentum of a paramagnetic substance.
213) Describe Batch process of soap manufacturing?
214) How following soaps could be manufactured.
215) (1)     Toilet soap.     (2)     Transparent soap.
     (3)     Liquid soap.     (4)     Shaving soap.
216) (5)     Medicated soap.
217) Describe continuous process of soap manufacture. Explain how glycerine is recovered from spentlye. Explain cold process of soap manufacturing.
218) Explain the classification of detergents? With their reactions?
219) What are the ingredients used in manufacture of detergents other than surfactants. What are different methods of synthesis of Anionic detergents.
220) Explain alfol method and Weise method of synthesis of detergent. What is nonionic detergent & explain its manufacture.
221) Explain how shampoo is manufactured?
222) Differentiate soaps from detergents.