IMPORTANT QUESTIONS OF ENGINEERING CHEMISTRY (BT-101)

UNIT-I

1. Define Hardness of water. Mention and define various units of Hardness. Write relationships between these units.
2. Discuss principle of EDTA method for determination of hardness of water. Explain estimation of total hardness of water by complexometric method.
3. A 100 ml water sample required 20 ml of N/50 H_2SO4 for neutralization to the Phenolphthalein end point. After Methyl orange was added to this and further acid required was 2.5 ml. Calculate the alkalinity type and extent in terms of $CaCO_3$ equivalent.
4. Calculate total hardness of water sample which shows following analysis :
   $Ca(HCO_3)_2$ – 4.86 mg/L, $Mg(HCO_3)_2$ – 5.84 mg/L, $CaSO_4$ – 6.8 mg/L, $MgSO_4$ – 8.4 mg/L
5. Describe about the followings:
   a) Zeolite process
   b) Ion exchange process with neat diagrams
   c) Alkalinity
6. 100 ml of a water sample requires 18 ml of std EDTA solution. 20 ml of std calcium carbonate (15 g/L) solution required 25 ml of EDTA solution. Calculate temporary and permanent hardness of sample.
7. How is water softened by the soda lime process? Describe with diagram. What are its advantages?
8. Discuss method for determination of alkalinity or hardness in a given water sample.

UNIT-II

1. Explain boiler corrosion.
2. Discuss following boiler troubles: i) Scale and Sludge Formation ii) Caustic embrittlement
3. Describe prevention of Caustic embrittlement. How is potable water disinfected by ozonation?
4. Explain the formation and composition of scales in boilers? How are they different from sludges? What are bad effects?

UNIT-III

1. Explain following properties of lubricants giving their significance:
   i) Cloud & Pour Point
   ii) Steam Emulsion Number
   iii) Functions of Lubricants
2. Write a note on lubricants with special reference to their
   i) classification

ii) mode of action with examples and uses.

3. What is lubricant? With the help of neat diagrams explain the following criteria of lubricants:
   i) Viscosity Index
   ii) Flash and Fire point
4. Describe a mechanism of lubrication that is applied for delicate instruments.
5. Explain Aniline point and saponification number.

UNIT-IV

1. What is Polymerization? Discuss mechanism of Polymerization. Write Preparation, properties and uses of following i) PVC ii) Nylon 6 : 6 iii) Poly Ethylene
2. What is the difference between free radical and ionic polymerization?
3. Write a note on preparation, properties and uses of following polymers:
   a) Bakelite b) Urea formaldehyde resin
4. Write a short note on synthetic rubber with suitable examples and describe vulcanization with reactions.
5. What are living polymers? Explain bio degradable polymers.
6. What are elastomers? Give preparation, properties and uses of BUNA S and BUNA N rubber.
7. Write a note on functionality and differentiate between
   (i) Thermoplastic and Thermosetting polymers
   (ii) Addition and Condensation polymerization

UNIT-V

1. Write a brief note on
   A) Phase diagram of single component system
   B) Rusting of Iron
2. What is oxidation corrosion? How does it take place? Describe mechanism of oxidation corrosion.
3. Define Corrosion and various types and prevention. Explain theory of mechanism of corrosion.
4. Explain pitting corrosion and stress corrosion.
5. Differentiate the following with suitable examples-
   A) Galvanic series and electrochemical series
   B) Phase rule and phase diagram
6. Explain 2 component systems by taking Cu – Ag as an example.
7. Write a note on
   i) Eutectic Point ii) Polarizability iii) Triple Point
8. How much rust $Fe_2O_3.3H_2O$ will be formed when 100 kg of iron have completely rusted away? (Mol. Wt. of rust = 214 gm)

UNIT-VI

1. What is Spectroscopy? Why is it superior over other methods? Discuss Principle, Instrumentation and applications of UV or IR spectroscopy.
2. Describe Principle, Instrumentation process of rotational and vibrational spectroscopy.
3. Explain Lambert and Beers Law.
4. What is electronic spectroscopy? Discuss about electronic transitions and applications of electronic spectroscopy?
5. Define following terms:
   a) Bathochromic shift b) Hypsochromic shift c) Hyperchromic shift
   d) Chromophore

UNIT-VII

1. Explain following terms for elements giving factors affecting and Periodic trends.
   i) Atomic size ii) Electron affinity iii) Ionization Energy
2. How do you explain electro negativity and ionic sizes of s, p block elements with periodic trends.
3. What is a periodic table? Write trends of following in a group and in a period giving suitable reason:
   i) Polarizability ii) Oxidation states

THANK YOU