

# Engineering Chemistry Question bank

## Unit-I: Water Chemistry

### Marks-2

1. Define hardness of water. What are the two types of hardness?
2. Write any two units of hardness of water.
3. Draw the structure of M-EDTA complex.
4. Draw the structure of disodium salt of ethylenediaminetetraacetic acid.
5. Define scale and sludge.
6. Define priming and foaming.
7. What is caustic embrittlement?
8. What types of salts are present in permanent hard water?
9. Enlist the salts present in temporary hard water?
10. Distinguish between scales and sludge.
11. Define alkalinity.
12. Enlist the chemical compounds present in alkaline water.
13. Name the two indicators used in titration method of determination of alkalinity of water.
14. List out the five different combinations by which water becomes alkaline.

### Marks-5

1. Explain the method of determination of hardness of water by EDTA titration.
2. What is ion exchange process? Explain with diagram.
3. Explain the process of determination of alkalinity of water by titration method.
4. Explain the factors responsible for the corrosion of a boiler.
5. Calculate the temporary and permanent hardness of water sample containing  $\text{Mg}(\text{HCO}_3)_2 = 7.3\text{mg/L}$ ,  $\text{Ca}(\text{HCO}_3)_2 = 16.2\text{mg/L}$ ,  $\text{MgCl}_2 = 9.5\text{mg/L}$ ,  $\text{CaSO}_4 = 13.6\text{mg/L}$
6. Calculate the temporary and total hardness of a water sample containing  $\text{Mg}(\text{HCO}_3)_2 = 73\text{mg/L}$ ,  $\text{Ca}(\text{HCO}_3)_2 = 162\text{mg/L}$ ,  $\text{MgCl}_2 = 95\text{mg/L}$ ,  $\text{CaSO}_4 = 136\text{mg/L}$ .
7. 50ml standard hard water containing 1 mg of  $\text{CaCO}_3$  per ml consumed 25 ml of EDTA. 50 ml of hard water sample consumed 25 ml of same EDTA, 50 ml of boiled water sample consumed 15 ml of same EDTA using EBT indicator. Calculate temporary, permanent and total hardness of water in ppm.

## **Unit-II: Fuels and Biofuels**

### **Marks-2**

1. What are fuels? Give its classification depending on .
2. Define calorific value?
3. Define gross and net calorific value.
4. What do you mean by proximate analysis?
5. What is bio-fuel?
6. Enlist any two applications of ethanol as fuel.
7. Give any four advantages of using hydrogen gas as fuel.

### **Marks-5**

1. Give the significance of proximate analysis in details.
2. What is fractional distillation? Explain the distillation of crude oil by fractional distillation method.
3. How will you determine the amount of C and H present in coal sample? Explain in details.
4. How will you determine the amount of %moisture and %ash present in coal sample? Explain.
5. What are the properties and applications of Hydrogen gas as fuel?

## **Unit-III: Lubricants**

### **Marks-2**

1. Define lubricant. What is its classification?
2. What are the different types of lubricants?
3. Give the properties and uses of graphite.
4. Give the properties and uses of grease.
5. Define viscosity and viscosity index.
6. What is pour point and cloud point.
7. Define fire point and flash point.
8. What do you mean by acid value of lubricant?
9. What is the relation between viscosity index and temperature?

### **Marks-5**

1. Explain determination of flash and fire point of lubricant oil using Pensky-Martin apparatus.
2. Draw neat labeled diagram and explain determination of cloud and pour point of lubricant oil.
3. How will you determine viscosity index of lubricant oil using Redwood viscometer apparatus? Explain in details.
4. An oil sample under test has Saybolt universal viscosity 64 Sec. at 210<sup>0</sup> F and 564 Sec. at 100<sup>0</sup>F. The low viscosity standard (Gulf oil) possesses viscosity of 64 Sec. at 210<sup>0</sup> F and 774Sec. at 100<sup>0</sup>F. The high viscosity standard (Pennsylvania oil) possesses viscosity of 64 Sec. at 210<sup>0</sup> F and 414Sec. at 100<sup>0</sup>F. Calculate the viscosity of oil under test.

## **Unit-IV: Engineering materials**

### **Marks-2**

1. Define Thermoplastics and thermosetting polymers.
2. Give properties and application of PVC.
3. Give properties and application of Bakelite.
4. What are Biodegradable polymers? What are its properties & applications?
5. Give properties and application of polyvinyl acetate.
6. Give properties and application of polyvinyl alcohol.
6. What is natural rubber?
7. Enlist the types of refractories?

### **Marks5**

1. What is vulcanization of rubber? Explain the process of vulcanization of rubber in details.
2. Comment on refractory materials in details.

## **Unit-V: Corrosion and its prevention**

### **Marks-2**

1. Define corrosion. What is dry and wet corrosion?
2. What is pitting and intergranular corrosion?
3. What is stress corrosion?
4. What are disadvantages of corrosion?

5. What is oxide layer formation on metal? What are its different types?
6. What is sacrificial anodic protection?
7. What is impressed current cathodic protection?
8. Differentiate between dry and wet corrosion.

**Marks5**

1. Explain the role of design and material selection in corrosion control.
2. What do you mean by cathodic protection? Explain with mechanism.
3. What is hot dipping? Explain galvanizing with neat labeled diagram.
4. What is hot dipping? Explain tinning with neat labeled diagram.
5. Distinguish between galvanizing and tinning.
6. Describe the process of powder coating with neat labeled diagram.
7. Explain electroplating with neat labeled diagram.

**Unit-VI: Phase Rule**

**Marks-2**

1. Define alloys. What is purpose of alloying metal?
2. Give the composition, properties and applications of Duralumin.
3. Give the composition, properties and applications of stainless steel.
4. Define component, degrees of freedom, and phase.
5. State Gibbs Phase rule. Give its equation.
6. State reduced phase rule.
7. What is Triple point in water system?
8. What is Eutectic system in Pb-Sn system?

**Marks-5**

1. Explain water system as a one component system with neat labeled diagram.
2. Explain lead- tin system as a two component system with neat labeled diagram.