

Short answers Questions

- Why the system at eutectic point is considered as a mixture not a compound, give at least two reasons.
- Give two applications of Ziegler natta polymerization?
- Write at least two points of difference between thermoplasts and thermosets.
- Define stress corrosion? Give its example.
- Define Lambert beers law?
- Explain pilling bedworth rule to decide nature of oxide film formed in corrosion?
- Define the term viscosity index?
- Define incongruent melting point system?
- What is electroplating .Define?
- What do you understand by reduced phase rule? Explain
- Give any two advantages of demineralization process of water softening?
- Explain, why is the combination of OH^- and HCO_3^- not possible in alkalinity?
- What are the coagulants? Name any two coagulants, frequently used in water treatment?
- What do you mean by condensed system and reduced phase rule?
- Define Pilling-Bedworth rule?
- For a good lubricant ,how the following properties should vary (high or low)?
 1. Iodine value
 2. Flash and fire point
 3. Aniline point
 4. Acid value
- What are SBR? Give two applications of SBR.
- Explain Lambert- Beer's law?
- Define pitting corrosion?
- What are ion exchangers ?Give examples.
- Calculate the hardness in terms of ppm ,if a water sample contains 16.2mg/l $\text{Ca}(\text{HCO}_3)_2$ as an impurity
- What are poisons in catalysis ,Give any two examples?
- What is autocatalysis? Give its two examples.

Long answers Questions

SECTION-A

1. (a) What do you understand by congruent Melting point?

With the help of a neat and labeled phase diagram, explain a system with congruent Melting point.

2. Explain the following terms in connection with catalysis

- a. Prosthetic group
- b. Co-factor
- c. Co-enzyme
- d. Apo-enzyme

3. (a) Describe water system with the help of neat and labeled Phase diagram.

(b) Compare phase diagrams of CO_2 system with water system.

4. Describe Lock and Key hypothesis to explain mechanism of enzyme catalysis.

5 (a) What is catalysis? Discuss the various types of catalysis giving suitable examples.

(b) Explain the following

- i. The subdivision of catalyst increases its catalytic activity.
- ii. A catalyst having a rough surface is more effective in catalyzing the reaction than the one with the smooth surface.
- iii. Activity of a catalyst increases in the presence of a promoter.

6 (a) What do you mean by incongruent melting point? Explain sodium sulphate and water system?

7. Discuss the phase diagram of Pb-Ag system. How it is used in Pattinson's process of desilverisation of argentiferous lead?

SECTION-B

1. (a) Write short notes on the problems, if the boiler feed water contains impurities beyond the prescribed limits.

- i. Scale and sludge formation in boilers.
- ii. Boiler corrosion.
- iii. Caustic embitterment

2. Explain the importance of the following chemical in context of water analysis.

- (i) calgon (ii) bleaching powder

3. (a) Discuss zeolite process and demineralization process for softening of water. Explain why demineralization is preferred over zeolite process.

4. Define alkalinity? What causes the alkalinity in water? Write the procedure for determination of alkalinity of water?

5. A sample of water is alkaline to both phenolphthalein and methyl orange. 100 ml of this water sample required 30 ml $\text{N}/50 \text{H}_2\text{SO}_4$ for phenolphthalein end point and another 20 ml for complete neutralization. Determine the type and amount of alkalinity present.

6. 1.0 gm of CaCO_3 was dissolved in dil. HCl and the solution is diluted to one litre. 50 ml of this solution require 45 ml EDTA solution, while 50 ml of Hard water sample required 18 ml of EDTA solution during titration with ammonia buffer and EBT indicator. On the other hand 50 ml of boiled water sample required 9 ml EDTA solution under same conditions. Calculate each type of hardness in ppm.

7..(a) Explain the functions of lime and soda in lime soda process.

(b) Differentiate hot and cold lime soda process. How can we calculate the quantities of lime and soda for given water sample.

8. (a) 100ml of water sample required 16ml of N/50 H_2SO_4 for neutralization to phenolphthalein end point, after this methyl orange indicator was added and further 20 ml of acid were required for neutralization. Calculate the alkalinity of each type and total alkalinity of the sample in terms of ppm of CaCO_3 equivalents.

9. Write a short note on disinfection by chlorination.

SECTION-C

1 (a) Write short notes on

(i) Sacrificial protection for prevention of corrosion

(ii) Stress corrosion.

2. What is electrochemical corrosion? Explain the mechanism of

(i) H_2 evolution and

(ii) Oxygen absorption in this process

3. What are greases and explain their preparation, classification and properties in detail.

4. Write a short note on Biodegradable lubricants .

5. An oil of unknown viscosity index has a saybolt universal viscosity of 58 sec. at 210°F and of 580sec. at 100°F . The high VI standard (pennsylvanian oil) has saybolt universal viscosity of 58 sec. at 210°F and of 430 sec. at 100°F . The low VI standard (gulf oil)has saybolt universal viscosity of 58 sec. at 210°F and of 780 sec. at 100°F . Calculate the VI of unknown oil.

6. Write short note on

(i) Cathodic protection

(ii) Microbiological corrosion

(iii) Pitting Corrosion

7. (a) Write short notes on following properties of lubricants?

(i) Saponification value

(ii) Aniline value

(iii) Iodine value

8. (i) Discuss the mechanism of hydrodynamic lubrication?

(ii) What are greases? Mention their uses.

SECTION-D

1. Explain the basic principle, instrumentation and applications of thermo gravimetric analysis.

2. Write Short notes on

(a) Ziegler natta polymerization.

(b) Polymeric composites

3. (a) Explain preparation properties and applications of the following (any two)-

(i) Silicones

(ii) Phenol Formaldehyde Resin

(iii) Urea Formaldehyde Resin

4. Write the applications of U.V. and I.R. Spectroscopy.

5. Classify the following into thermoplastic, thermo sets and elastomers:

(a) PVC

(b) PVA

(c) PF

(d) UF

(e) SBR

Also give the methods of preparation, properties and application of any four of the above mentioned.

6. (a) What is thermogravimetric analysis? Describe its principle, technique and important applications.