

Indian Maritime University
(A Central University, Govt of India)
Supplementary Examinations – March/April 2025
Programme Name: B Tech (ME)
Semester: I
Subject Code: UG11T5103
Subject Name: ENGINEERING CHEMISTRY

Date: 05.03.2025

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

Section -A

1. Which of the following is not a result of the excess of impurities in boiler-feed?
 - a) Caustic embrittlement
 - b) Decomposition
 - c) Corrosion, priming and foaming
 - d) Scale and sludge formation

2. Erosion Corrosion is the result of ____
 - a) Rapid flow of turbulent fluid
 - b) Cyclic loading
 - c) Contact between metal surfaces in relative motion
 - d) None of these

3. Caustic Embrittlement in boiler is caused by,
 - a) Increase in caustic soda concentration in minute cracks in the boiler
 - b) Increase in entrapped air in the boiler water
 - c) Contamination with oil
 - d) Increase in acidity of boiler water

4. Identify the microscopic forms of corrosion from the following.
 - a) Pipeline Corrosion
 - b) Intergranular Corrosion
 - c) Pitting Corrosion
 - d) Galvanic Corrosion

5. Which of the following two monomers are used in preparation of nylon-6,6 ?

- (a) Hexamethylene diamine and ethylene glycol
- (b) Adipic acid and hexamethylene diamine
- (c) Dimethyl terphthalate and ethylene glycol
- (d) Adipic acid and ethylene glycol

6. Which of the following is a characteristic of synthetic rubber?

- A) High elasticity
- B) Good weather resistance
- C) Low cost
- D) All of the above

7. What is the primary function of surfactants?

- A) Increase viscosity
- B) Decrease surface tension
- C) Enhance pH
- D) Stabilize temperature

8. What does the Hydrophilic-Lipophile Balance (HLB) indicate?

- A) The stability of a suspension
- B) The solubility of a surfactant in oil or water
- C) The viscosity of a solution
- D) The acidity of a liquid

9. Which type of plastic can be reshaped upon heating?

- A) Thermoplastic
- B) Thermosetting plastic
- C) Composite
- D) Elastomer

10. What is the primary cause of corrosion in metals?

- A) Moisture
- B) Temperature
- C) Chemical reactions
- D) All of the above

Section -B

11. What are the major differences between thermoplastics and thermosetting plastics?
12. What are Surfactants? Name types of Surfactants.
13. What are the common methods to remove scale?
14. What does Biofouling mean?
15. What are the effects of corrosion?

Section -C

16.
 - a. What is Break point Chlorination, and why it is essential in water disinfection? (4)
 - b. Explain in brief the desalination and electro dialysis methods for producing fresh water from seawater? (6)
17.
 - a. Define corrosion and explain the basic principles behind it. What are the key factors that influence the rate of corrosion? (6)
 - b. What is dry corrosion, and how does it differ from wet corrosion? (4)
18.
 - a. Explain the mechanism of emulsification by surfactants. What role do surfactants play in stabilizing emulsions? (6)
 - b. What are micro emulsions, and how do they differ from traditional emulsions? (4)
19.
 - a. Describe Classification of Polymer based on source of availability and structure of monomer chain. (6)
 - b. Write down the properties and uses of cross linked polymer Phenol Formaldehyde Bakelite. (4)
20.
 - a. Define the following: Hydrogen ion, Hydroxyl ion, pH, Litmus test (5)
 - b. Explain Hardness test and Phosphate test (5)
21.
 - a. What are the main sources of water? (4)
 - b. Explain phenomenon of Reverse Osmosis and its applications (6)

22.

a. Write short notes on Fatigue and Fretting corrosion (4)

b. What does selective leaching mean? Explain Dezincification and Decarburization.(6)

TAM