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**Indian Maritime University**  
**(A Central University, Govt of India)**

**Sep/Oct'25 SE**

**Programme Name: B Tech (ME)**

**Semester: I**

**Subject Code: UG11T5103**

**Subject Name: ENGINEERING CHEMISTRY**

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Date: 03.09.2025

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

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10 MCQs (10 × 01 Mark)

**Choose the correct answer**

1. On the basis of mode of formation polymers can be classified:
  - a) as addition polymers only
  - b) as condensation polymers only
  - c) as monomer
  - d) as addition and condensation polymers
2. Which type of plastic can be reshaped upon heating?
  - A) Thermoplastic
  - B) Thermosetting plastic
  - C) Composite
  - D) Elastomer
3. Identify the microscopic forms of corrosion from the following.
  - a) Pipeline Corrosion
  - b) Intergranular Corrosion
  - c) Pitting Corrosion
  - d) Galvanic Corrosion

4. 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

5. 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

6. In the cleansing action of soap which statement is incorrect?

- a) Soap gets dissolved in water
- b) The non polar end gets directed towards outwards and polar end towards centre
- c) Micelle is formed
- d) The dirty cloth is put in a soap solution

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. 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

10. Ion exchange resin is a
- a) Organic polymer with porous structure
  - b) linear
  - c) Soluble
  - d) Low molecular weight

### Section B

Five Questions of 02 Marks each

- 11. Differentiate between thermoplastics and thermosetting plastics.
- 12. What does Biofouling mean?
- 13. State Pilling Bedworth ratio?
- 14. What do you mean by surfactants?
- 15. What is meant by temporary and permanent hardness?

### Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

**(16)(a)** Explain the classification of polymers based on origin, structure, and molecular forces with suitable examples. **(5 Marks)**

**(b)** Discuss the difference between addition and condensation polymerization with examples. **(5 Marks)**

**17.a)** Write down short notes on FRP and GRP materials. ( 4 Marks )

b) What are the types of Refractory materials? Explain its properties. (6 Marks)

**18. (a)** Explain the multi-stage process for converting raw water into potable water, including the removal of impurities at each stage. **(5 Marks)**

**(b)** Describe the ion exchange process for softening water and its significance in maritime applications. **(5 Marks)**

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

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

20. (a) Define corrosion and explain the basic principles behind it. What are the key factors that influence the rate of corrosion? (5 Marks)

(b) What is dry corrosion, and how does it differ from wet corrosion? (5 Marks)

21. a)Describe Classification of Surfactants. ( 6 Marks)

b)Enumerate the Hydrophilic-Lipophile Balance (HLB) concept.( 4 Marks)

22. a) Define the following: Hydrogen ion, Hydroxyl ion, pH, Litmus test ( 4 Marks)

b)Explain Hardness test and Phosphate test( 6 Marks)