

**Indian Maritime University**  
**(A Central University, Govt of India)**  
**End Semester Examinations– December 2025**  
**Programme Name: B Tech (ME)**  
**Semester: 1<sup>ST</sup>**  
**Subject Code: UG11T5103**  
**Subject Name: ENGINEERING CHEMISTRY**

Date: 11.12.2025

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Questions in Sections A& B are Compulsory.  
(ii) Attempt any 5 Questions in Section-C.

**Section A**

(Ten MCQs of 01 Mark each – Choose the correct answer as applicable.)

1. Which of the following types of polymers has the strongest inter particle forces?  
a. Elastomers  
b. Fibers  
c. Thermoplastics  
d. Thermosetting polymers
2. The process of coating iron or steel sheet with a thin coat of zinc to prevent iron from rusting is called \_\_\_\_\_  
a. Tinning  
b. Galvanisation  
c. Metal cladding  
d. Electroplating
3. Permanent hardness is caused by \_\_\_\_\_  
a. Bicarbonates  
b. Chlorides and sulphates  
c. Carbonates  
d. Hydroxides
4. Alum is used in water treatment as —  
a. Coagulant  
b. Softener  
c. Disinfectant  
d. pH controller
5. What is the common property of both detergents and surfactants?  
a. They have a polar structure  
b. They reduce surface tension  
c. They are hydrophobic  
d. They are inorganic compounds

6. A good dispersant must be —
- |                          |              |
|--------------------------|--------------|
| a. Soluble in the medium | b. Insoluble |
| c. Highly viscous        | d. Solid     |
7. EDTA method is used to determine:
- |              |                 |
|--------------|-----------------|
| a. pH        | b. Hardness     |
| c. Turbidity | d. Conductivity |
8. Corrosion between the dissimilar metals is called as \_\_\_\_\_
- |                        |                                 |
|------------------------|---------------------------------|
| a. Galvanic corrosion  | b. Dry corrosion                |
| c. Oxidation corrosion | d. Concentration cell corrosion |
9. Dry corrosion occurs due to:
- |  |                |
|--|----------------|
| a. Gaseous attack in absence of moisture | b. Electrolyte |
| c. Microbial attack                      | d. None        |
10. Nylon-6 is manufactured from
- |  |
|--|
| a. Caprolactam                               |
| b. Maleic anhydride and Hexamethylenediamine |
| c. Adipic acid and Hexamethylenediamine      |
| d. Sebacic acid and Hexamethylenediamine     |

### Section B

(Five Questions of 02 Marks each)

11. What are refractory materials? Write their on-board application.
12. Differentiate between Thermoplastic and Thermosetting Polymers? Any 3 Points
13. Write short notes on FRP and GRP.
14. What is Cause of Priming and Foaming?
15. What are anionic and nonionic surfactants?

### Section C

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

16. Give Classification of Polymers in detail (10 mark)
17. a. Explain the terms briefly: rubber, plastic and composites.  
 b. Define the fabrication of plastics and explain the compression molding of plastics.

(5 + 5 marks)

18. a. Describe the step-by-step process of converting raw water into potable water. Also detail the impurities removed at each stage of the process.  
b. Explain the process of softening water using the ion exchange process. Mention the type of resin used and its function.

(5 + 5 marks)

19. a. Explain the methods of reverse osmosis and electro-dialysis for desalinating seawater and producing fresh water.  
b. What is the purpose of breakpoint chlorination in making water safe to drink?

(5 + 5 marks)

20. What are the various types of Corrosion?

(10 marks)

21. a. Explain the different coating techniques used to prevent corrosion of metals.  
b. Explain the principle of cathodic protection and describe how it prevents corrosion in ships.

(5 + 5 marks)

22. a. Explain the role of surfactants in preparation of solid/liquid dispersions.  
b. What are micro emulsions? How they are used for oil removal?

(5 + 5 marks)

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