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**B.Tech. Degree I & II Semester Supplementary Examination in
Marine Engineering April 2021**

**MRE 1104 ENGINEERING CHEMISTRY
(2013 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Discuss on boiler troubles briefly. (7)
 (b) Describe Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). (6)
 (c) Describe the ion exchange process for softening of hard water. (7)
- OR**
- II. (a) Suggest three methods to control air pollution. (6)
 (b) Explain hot lime soda process of softening of hard water with equations and reaction taking place. (8)
 (c) Explain desalination of brackish water by electro dialysis. (6)
- III. (a) Write notes on: (i) Standard hydrogen electrode (ii) calomel electrode. (6)
 (b) Derive Nernst equation for potential of an electrode $M_{(s)}/M^{n+}$. (7)
 (c) Explain a method of determination of EMF of a given cell by potentiometric method. (7)
- OR**
- IV. (a) Explain n-type and p-type semiconductors. (7)
 (b) Write notes on (i) liquid crystals (ii) fullerenes. (7)
 (c) Discuss band theory of metallic bonds. (6)
- V. (a) What are paints? Explain its main constituents? (7)
 (b) State Pilling-Bedworth rule with an example. (5)
 (c) Describe (i) Anodization (ii) Electroplating. (8)
- OR**
- VI. (a) Write notes on pitting corrosion and differential aeration corrosion. (6)
 (b) Explain the difference between chemical and electrochemical corrosion. (8)
 (c) Describe the metallic coatings (i) Tinning (ii) Hot dipping. (6)
- VII. (a) Describe the preparation composition and uses of (i) producer gas (ii) water gas. (8)
 (b) Discuss the proximate analysis of coal and what is its significance. (6)
 (c) Explain the determination of calorific value of a solid fuel by Bomb calorimeter. (6)
- OR**
- VIII. (a) Discuss the refining of the petroleum and its important functions. (7)
 (b) Distinguish between octane number and cetane number and how knocking in a petrol engine can be reduced. (7)
 (c) Write notes on (i) Nuclear Fusion (ii) Nuclear Fission. (6)

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- IX. (a) What are the main differences between addition and condensation polymerization. Give equation for formation of any one polymer by each mechanism. (8)
- (b) Give methods of production and uses of PVC and Nylon. (6)
- (c) Write moulding process (any two) of plastics. (6)

OR

- X. (a) Distinguish between thermoplastics and thermosetting plastics. Give one example for each. Give equation for the preparation. (8)
- (b) Write notes on Polyurethane. (4)
- (c) Give an account of production of High polymers. (8)
