

B. Tech Degree I & II Semester Examination in Marine Engineering June 2011

MRE 104 ENGINEERING CHEMISTRY

Time : 3 Hours

Maximum Marks : 100

- I. a) Explain degree of hardness of water and its determination by EDTA method. (8)
 b) What are the different methods used in internal conditioning of boiler feed water? (6)
 c) How does the organic matter in water determined? (6)
- OR**
- II. a) Describe the Permutite process of softening of water. (8)
 b) What are the methods used for the desalination of brackish water? Explain the advantage of these methods. (6)
 c) Explain caustic embrittlement. How can it be avoided? (6)
- III. a) Explain dry corrosion of metals with mechanism. (8)
 b) What is cathodic protection? Explain the different methods of cathodic protection with examples. (6)
 c) What are corrosion inhibitors? Explain with examples how anodic and cathodic inhibitors provide protection against corrosion. (6)
- OR**
- IV. a) What is electrochemical corrosion? Describe its mechanism. (8)
 b) Describe any six methods of corrosion control. (6)
 c) Explain i) galvanic corrosion ii) pitting corrosion (6)
- V. a) Explain with a neat diagram, the working of hydrogen - oxygen fuel cell. (8)
 b) What are electrochemical series and explain its application? (6)
 c) What is p^H ? How is p^H of an electrolyte determined using hydrogen electrode? (6)
- OR**
- VI. a) Derive Nernst equation for electrode potential. How is it useful? (8)
 b) Describe the construction and working of a calomel electrode. (6)
 c) A hydrogen electrode is immersed in a solution of $pH=3.5$ and the half cell is SHE. Calculate the emf of the cell, if the two half cells are connected by a salt bridge. (6)
- VII. a) What are the advantages and disadvantages of liquid and gaseous fuels over solid fuels? (8)
 b) Explain proximate analysis of coal and its importance. (6)
 c) Describe Fischer-Tropsch method for the preparation of synthetic petrol. (6)
- OR**
- VIII. a) What is water gas? Explain its preparation. (8)
 b) Calculate the weight and volume of air required for the combustion of 3 kg. of carbon. (6)
 c) Briefly explain the manufacture of coal gas. (6)
- IX. a) Explain (i) compression moulding (ii) injection moulding of plastics (8)
 b) Distinguish between thermoplastic and thermo setting plastic. (6)
 c) What are the different ingredients used for the moulding of plastic? (6)
- OR**
- X. a) What are polyester resins? Explain the preparation with equation, properties and uses of Dacron. (8)
 b) Write a note on compounding of rubber. (6)
 c) What are the unique properties of plastic? (6)