

***B.Tech. Degree I & II Semester Examination in
Marine Engineering May 2013***

MRE 104 ENGINEERING CHEMISTRY

Time : 3 Hours

Maximum Marks : 100

- I. (a) What are the causes for hardness of water? Describe one method of softening hard water. (8)
- (b) Define pollution and pollutants. What are the causes for air pollution? Describe any four methods to prevent air pollution. (6)
- (c) What are scales and sludges? How are they formed? Explain any four disadvantages of scale formation. (6)

OR

- II. (a) Describe any one method of estimation of hardness of water. (7)
- (b) A sample of water contains
(i) $\text{Ca}(\text{HCO}_3)_2 = 32.4 \text{ mg/L}$
(ii) $\text{Mg}(\text{HCO}_3)_2 = 29.2 \text{ mg/L}$
(iii) $\text{Ca}(\text{SO}_4)_1 = 13.5 \text{ mg/L}$
Calculate temporary and permanent hardness. (6)
- (c) Describe the steps to be taken to purify water for drinking purposes in detail. (7)

- III. (a) Describe (i) Pitting Corrosion (ii) Inter granular corrosion (iii) Stress corrosion. (6)
- (b) Write notes on (i) Cathodic protection (ii) Galvanisation (iii) Electroplating. (6)
- (c) Write any four ingredients of paints and explain their properties and functions. (8)

OR

- IV. (a) Describe any two theories of corrosion taking examples. (5)
- (b) Describe the factors favouring corrosion. (6)
- (c) Write notes on (i) Enamels (ii) Lacquers (iii) Special paints. (9)

- V. (a) Describe the classification of coal. (4)
- (b) Describe the process of refining crude petroleum. What are the important fractions and their uses? (10)
- (c) Describe the manufacture of (i) producer gas (ii) water gas. What are their compositions and uses? (6)

OR

- VI. (a) Describe the manufacture of metallurgical coke. Distinguish between L.T.C and H.T.C. (8)
- (b) Write notes on: (6)
- (i) Flash and fire points
(ii) Synthetic lubricants
(iii) Synthetic petrol
- (c) Write notes on: (6)
- (i) Greases
(ii) Solid lubricants
(iii) Octane number and cetane number.

- VII. (a) Describe the potentiometric method to measure the electromotive force of a cell. (6)
- (b) Describe the setting and working of Edison cell. (5)
- (c) Write notes on: (9)
- (i) Weston Cadmium cell
 - (ii) Lead acid cell
 - (iii) Hydrogen oxygen fuel cell.
- OR**
- VIII. (a) Describe the setting and working of S.H.E. How is it used to measure hydrogen ion concentration of a solution? (7)
- (b) Describe the setting and working of Daniel cell. (6)
- (c) What are concentration cell? Derive an expression for its potential. (7)
- IX. (a) Write the methods of preparation and properties of (6)
- (i) Poly Vinyl Chloride
 - (ii) Nylons
 - (iii) Dacron.
- (b) Write notes on: (6)
- (i) Injection moulding
 - (ii) Compression moulding
 - (iii) Thin film lubrication.
- (c) What is natural rubber? Explain the conversion of latex to smoked rubber. Describe the structure of rubber. (8)
- OR**
- X. (a) Write the methods of preparation, properties and uses of (9)
- (i) Phenol-formaldehyde resin
 - (ii) Neoprene
 - (iii) Poly Urethane
- (b) Describe the classification of high polymers. (2)
- (c) Write notes on: (9)
- (i) Vulcanization of rubber
 - (ii) Thermo plastics and thermosetting plastics
 - (iii) Silicon rubbers.
