

Reg. No. :

Question Paper Code : 77106

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Second Semester

Civil Engineering

CY 6251 — ENGINEERING CHEMISTRY -II

(Common to all Branches except Marine Engineering)

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write any two disadvantages of hardwater in boilers.
2. What are boiler compounds?
3. Write the nernst equation for the cell,
 $Z_n(s)/Z_{n(ag)}^{2+}/Mg_{(ag)}^{2+}/Mg_{(s)}$.
4. What is dry corrosion?
5. What are the limitations of $H_2 - O_2$ fuel cell?
6. Write a nuclear fission reaction.
7. Define refractoriness.
8. What is the composition of Boro silicate glass?
9. What is the drawback of sulphur in coal?
10. What is CNG? Mention its calorific value.



PART B — (5 × 16 = 80 marks)

11. (a) (i) What is reverse osmosis? How is it useful for desalination of brackish water? Explain with a diagram. (2 + 2 + 4)
- (ii) What are sludge and scale in boilers? How are they formed? Suggest any two methods to prevent their formation. (2 + 2 + 4)

Or

- (b) (i) What are zeolites? How are they used in softening of water? Use a diagram for your explanation? (2 + 2 + 4)
- (ii) Explain the internal conditioning of water? Take two examples for your explanation. (6 + 2)

12. (a) (i) Explain the terms, cell potential and single electrode potential and describe the method of determination of electrode potential. (4 + 4)
- (ii) Discuss the importance of design and material selection in controlling corrosion. (8)

Or

- (b) (i) What is electrochemical series? Write any two of its practical applications. (2 + 6)
- (ii) What is electroless plating? Explain the plating of Nickel by this process. (2 + 6)

13. (a) (i) What is a photovoltaic cell? Explain the construction and working of a photovoltaic cell with a diagram. (2 + 6)
- (ii) How is wind energy harnessed? What are its advantages and limitations? (2 + 3 + 3)

Or

- (b) (i) Explain the construction, working and uses of a nuclear reactor with a neat diagram. (8)
- (ii) What are the compounds of Ni-cd battery? Explain its construction and advantages. (3 + 5)

14. (a) (i) What are abrasives? How are they classified? Explain the properties of any two in each category. (2 + 2 + 4)
- (ii) How is Portland cement manufactured? Give a neat diagram of the process. (4 + 4)

Or

- (b) (i) Describe any four important properties of refractories. (4 × 2)
- (ii) How is glass manufactured? Explain the process giving chemical reactions involved. Give a neat diagram also. (2 + 4 + 2)

15. (a) (i) Define gross and net calorific values. Calculate gross and net calorific values of a coal sample containing 84% carbon, 1.5% sulphur, 6% nitrogen, 5.5% hydrogen and 8.4% oxygen. (3 + 5)
- (ii) What is meant by proximate analysis of coal? What are the quantities estimated in this analysis and their significance? (2 + 6)

Or

- (b) (i) What is metallurgical coke? How is it superior than coal? Describe any one method of manufacturing metallurgical coke. (2 + 2 + 4)
- (ii) What is meant by knocking in petrol engines? How is knocking prevented? (4 + 4)