

Reg. No. :

Question Paper Code : 71408

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

Second Semester

Civil Engineering

CY 2161/CY 24/080010002 — ENGINEERING CHEMISTRY – II

(Common to all Branches – Except Marine Engineering)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write down the electrode representation of calomel electrode. What is the reaction that takes place when it acts as a reduction electrode?
2. Define the term 'electrochemical series'. How is it useful in corrosion studies?
3. What is 'Pilling-Bedworth rule' in corrosion studies?
4. Write a note on electroplating?
5. How do you define the 'calorific value' of
 - (a) a solid fuel
 - (b) a gaseous fuel in British system?
6. Explain with a suitable example the term 'theoretical air for combustion'.
7. State and explain the term 'Component of a system' in phase rule studies.
8. Write down the composition of
 - (a) brass
 - (b) bronze.



9. Write down the 'Beer-Lamberts' law as an equation and explain the terms therein.
10. Define the terms chromophores and auxochromes.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive an expression for the emf of a reversible electrochemical cell. (8)
- (ii) Write a detailed note on 'Weston cadmium cell'. (8)

Or

- (b) (i) What is meant by standard Hydrogen gas electrode? How do you use it in the measurement of pH of a solution? (8)
- (ii) Explain the conductometric titration of HCl Vs NaOH. (8)

12. (a) (i) Enumerate the factors influencing corrosion. (8)
- (ii) Write a note on :
- (1) Sacrificial anode (4)
- (2) Impressed current method of controlling corrosion. (4)

Or

- (b) (i) What are the constituents of a good paint? What are the functions of the constituents? (8)
- (ii) Explain the terms :
- (1) differential aeration corrosion (4)
- (2) galvanic corrosion. (4)

13. (a) (i) What are ultimate analyses of coal? Describe the analysis of Nitrogen in coal. (8)
- (ii) Describe the process of fractionation of crude petroleum with a neat figure. (8)

Or

- (b) (i) What do you understand by the terms octane number and cetane number? Explain. (8)
- (ii) How would you manufacture water gas from coal? Explain with a neat figure. (8)

14. (a) (i) Draw the phase diagram of water system and explain the application of phase rule for the transformation of one phase to another. (8)
- (ii) How would you construct the phase diagram of a bimetallic eutectic system by thermal analysis method? (8)

Or

- (b) (i) Draw the phase-diagram of stainless steel and mark the areas and lines. (8)
- (ii) Write a note on
- (1) ferrous alloys (4)
- (2) non-ferrous alloys. (4)
15. (a) (i) Draw the block diagram of an IR spectrophotometer and explain the components. (8)
- (ii) Explain the principles of flame photometry. How do you estimate the amount of sodium in a solution by flame photometry? (8)

Or

- (b) (i) What do you mean by absorption spectroscopy? How do you estimate the concentration of Ni in a solution by atomic absorption spectroscopy? (8)
- (ii) What are different types of electronic transitions that can occur in an organic molecule? (8)

