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**Question Paper Code : 31326**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

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. List the important differences between a Galvanic cell and an electrolytic cell.
2. Calculate the reduction electrode potential of copper when it is in contact with 0.5 M copper sulphate solution at 298 K. The  $E^\circ$  value of copper is 0.34 V.
3. Give the mechanism of corrosion by absorption of oxygen.
4. Justify, how corrosion is formed by caustic embrittlement.
5. Calculate the calorific value of a fuel sample of coal with the following data :
  - (a) Mass of coal : 0.6 g
  - (b) Water equivalent of calorimeter : 2200 g
  - (c) Specific heat of water :  $4.187 \text{ kJ kg}^{-1}\text{C}^{-1}$
  - (d) Increase in temperature :  $6.52^\circ\text{C}$
6. Write the mechanism of knock in petrol engines.
7. Discuss on degrees of freedom with example.
8. Mention about peritectic point in phase diagram of  $\text{Mg}_2\text{SiO}_4 - \text{SiO}_2$ .
9. State briefly about the working of a calorimeter.
10. Give the salient features of the technique of differential thermal analysis.

PART B — (5 × 16 = 80 marks)

11. (a) Describe in detail about primary standard hydrogen electrode and calomel electrode. (8 + 8)

Or

- (b) Elaborate the determination of pH of a solution using glass and a common silver-silver chloride reference electrode.

12. (a) With example, explain the concept of differential aeration corrosion. (2 + 14)

Or

- (b) List out the methods of protecting metals from corrosion. Discuss on any two important suitable methods. (2 + 7 + 7)

13. (a) Explain the types of petrol cracking.

Or

- (b) (i) Write briefly about the techniques to prevent knocking. (8)  
(ii) Explain the methods of production of synthetic petrol. (8)

14. (a) Elaborate the application of phase rule to one component water system.

Or

- (b) Explain the single homogeneous phase containing two components lead and silver.

15. (a) Explain the working principle of infrared (IR) spectroscopy.

Or

- (b) Explain with the flow diagram about flame photometer.