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Question Paper Code : 53004

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

First Semester

Civil Engineering

CY 101 – ENGINEERING CHEMISTRY

(Common to All Branches)

(Regulation 2007)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Establish the relation between ppm and mg/L.
2. What are the drawbacks of the zeolite process?
3. Calculate the entropy change in the thermodynamic expansion of 2 moles of an ideal gas from the volume of 5 litres to a volume of 50 liters.
4. What is the need for 2nd law of thermodynamics?
5. Write any two significance of EMF series.
6. Give two examples for reference electrodes.
7. What is the function of light water in nuclear power plant?
8. Differentiate between primary and secondary batteries.
9. What is finger print region?
10. Write any two limitations of flame photometer.

PART B — (5 × 16 = 80 marks)

11. (a) (i) State the zeolite process for the removal of hardness of water. (8)
(ii) How is water treated by UV and ozone? (8)
- Or
- (b) (i) Mention any two troubles of boiler feed water. (8)
(ii) What is colloidal and phosphate conditioning? (8)

12. (a) (i) Derive Van't Hoff isotherm. (8)
(ii) What is the mathematical derivation of 1st law and 2nd law of thermodynamics? (8)

Or

- (b) (i) One mole of an ideal gas expands isothermally to twice its original volume at 29°C. Calculate the entropy change during the process. (6)
(ii) Derive Gibb's-Helmholtz equation. And also mention its significance. (10)

13. (a) (i) Derive Nerns't equation for emf of a cell. (10)
(ii) Find out the oxidation potential of Zn/Zn²⁺ = 0.2M electrode at 25°C, standard oxidation potential of Zn/Zn²⁺ is 0.763 volt. (6)

Or

- (b) (i) Write notes on Glass electrode. (8)
(ii) How will you find out the amount of HCL and CH₃COOH using conductivity meter? Discuss. (8)

14. (a) (i) Discuss the theoretical principles involved in the generation of power by nuclear fission. (8)
(ii) What is Hydrogen-Oxygen fuel cell? Describe. (8)

Or

- (b) (i) How is current discharged and recharged in lead acid storage battery? Discuss. (8)
(ii) Explain about lithium battery. (8)

15. (a) (i) What are laws of light? Derive the mathematical relation between them. (8)
(ii) How is iron estimated by calorimetric analysis? (8)

Or

- (b) (i) What is the principle of flame photometer? Explain. (6)
(ii) Write briefly the instrumentation of AAS. (10)