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# Question Paper Code : 13004

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 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. Why should natural water not be fed to boiler?

2. What is the main advantage of reverse osmosis process over ion exchange process?

3. Why is calgon conditioning is better than phosphate conditioning?

4. What is the need for 2nd law of thermodynamics?

5. Calculate the entropy change accompanying the transfer of 10460 joules of heat from a body A at 300°C to body B at 77°C.

6. Why zinc reacts with sulphuric acid to give hydrogen gas but silver does not react?

7. Differentiate between galvanic series and emf series.

8. Distinguish between primary and secondary batteries.

9. Mention any two deviations of Beer-Lambert's law.

10. Mention any one limitation of AAS.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain Reverse osmosis with a neat diagram. (8)

(ii) How will you remove hardness by zeolite process? (8)

Or

(b) (i) Explain briefly any two troubles of boiler feed water. (8)

(ii) What is colloidal and carbonate conditioning? (8)

12. (a) (i) Derive the expression for entropy change in isothermal expansion of an ideal gas. (8)

(ii) 5 mole of an ideal gas expands reversibly from a volume of 8 $dm^3$ at a temperature of 27°C. Calculate the change in entropy ($\Delta S$) R= 8.314 $JK^{-1}mol^{-1}$ (1 liter = 1 $dm^3$). (8)

Or

(b) (i) Bring out clearly the criteria for reversibility and irreversibility in terms of S, E, H and G. (8)

(ii) Derive Gibb's Helmholtz equation. (8)

13. (a) (i) What is single electrode potential? Give example. (8)

(ii) Derive Nerns't equation. (8)

Or

(b) (i) Write notes on glass electrode. (8)

(ii) What is conductometric titration? Give one example. (8)

14. (a) (i) Explain the construction of Lead acid storage battery. Give the reactions that occur during discharge. (8)

(ii) What are fuel cells? (8)

Or

(b) (i) Explain briefly Lithium battery. (8)

(ii) What is colloidal and carbonate conditioning? (8)

15. (a) (i) Derive the mathematical relationship between Beer-Lambert's law. (6)

(ii) Write the principle and instrumentation of UV-Visible spectroscopy. (10)

Or

(b) (i) How will you estimate sodium by flame photometry? (8)

(ii) Write the principle of AAS. (8)