

20-4
FN

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 73406

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Second Semester

Civil Engineering

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

(Common to All Branches)

(Regulations 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define electrode potential.
2. What is a reference electrode?
3. Give the mechanism of corrosion by absorption of oxygen.
4. Justify, how corrosion is formed by caustic embrittlement.
5. Distinguish between Coal and Coke.
6. Name the reagents used for absorbing CO_2 , CO and O_2 in flue gas analysis.
7. What is the number of degrees of freedom of a closed system in which $\text{CaCO}_3(\text{s})$ is in equilibrium with $\text{CaO}(\text{s})$ and $\text{CO}_2(\text{g})$?
8. State condensed phase rule and give justification for using it.
9. Mention any two applications of UV spectroscopy.
10. State the principle involved in colorimetric analysis.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive Nernst's Equation. (8)
(ii) Explain using graphs the conductometric titrations of
(1) a strong base with a strong acid and (4)
(2) a weak base with a strong acid. (4)

Or

- (b) (i) How is the emf of a cell determined? Explain in detail any one application of emf measurement. (8)
(ii) Construct the following cells and give expression for the potential in terms of Nernst' Equation.
(1) a concentration cell. (4)
(2) a cell consisting of an ion selective electrode and Zn electrode in contact with Zn^{2+} ions. (4)
12. (a) Why corrosion to be prevented? Discuss the methods of corrosion control. (16)

Or

- (b) What is paint? What are its constituents? Explain the functions of each constituent. (16)
13. (a) (i) How is metallurgical coke manufactured by Otto Hoffmann's method? What are the important by products recovered from coke oven gas? (8)
(ii) Describe the significance of ultimate analysis of coal. (4)
(iii) List the fractions of hydrocarbons collected between boiling range of $30^{\circ}C$ — $400^{\circ}C$ by fractional distillation of crude oil. (4)

Or

- (b) (i) What is hydrogenation of coal? Write the Fischer-Tropsh process of manufacture of liquid fuels from solid fuels. (8)
(ii) Write in detail chemical reactions involved in the manufacture of producer gas and mention its chemical composition. (8)
14. (a) Elaborate the application of phase rule to one component water system. (16)

Or

- (b) Explain the single homogeneous phase containing two components lead and silver. (16)

15. (a) (i) Explain the principle and determination of iron by colorimetry. (8)
(ii) State Beer's law. Write the applications of UV visible spectroscopy. (8)

Or

- (b) (i) Write and explain the applications of flame photometry. (8)
(ii) Discuss the principle and instrumentation of atomic absorption spectroscopy. (8)
-