



Reg. No. :

| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|

Question Paper Code : X60405

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Second Semester

Civil Engineering

CY 2161/080010002/CY 24 – 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. Construct a cell with Fe and Mg at standard conditions and calculate the Emf developed. Given : $E^\circ(\text{Fe}^{2+}/\text{Fe}) = -0.44 \text{ V}$ and $E^\circ(\text{Mg}^{2+}/\text{Mg}) = -2.37 \text{ V}$.
2. Zinc reacts with dilute H_2SO_4 to give hydrogen but Ag does not – Explain.
3. What is corrosion ? What are its types ?
4. What is electroless plating ?
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. State briefly about the working of a calorimeter.
10. Give the salient features of the technique of differential thermal analysis.



11. a) i) What is an ion selective electrode ? Explain its principle and working. (6)
- ii) Derive an expression for Nernst equation. The emf of a cell measured by means of a hydrogen electrode against a saturated calomel electrode at 298 K is 0.4188 V. If the pressure of the $H_2(g)$ was maintained at 1 atm, calculate the pH of the unknown solution, given the potential of reference calomel electrode is 0.2415 V. (10)
- (OR)
- b) i) Draw the conductometric titration curve of strong acid versus strong base and explain it. (4)
- ii) Explain with suitable examples any two applications of emf series. (4)
- iii) Explain the potentiometric titration of $FeSO_4$ vs. $K_2Cr_2O_7$ with a neat diagram. (8)
12. a) i) Discuss the factors associated with the metal which affects the rate of corrosion. (8)
- ii) How is corrosion protection of underground iron pipelines and railway lines carried out ? (8)
- (OR)
- b) i) State the constituents of an oil paint with examples and explain their functions. (8)
- ii) Explain metallic coating of nickel by
- 1) Electroplating and
 - 2) Electroless plating. (8)
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) i) State the phase rule. Explain the various terms involved in it with examples. (8)

ii) Discuss in detail the application of phase rule to systems involving eutectic compound formation. (8)

(OR)

b) i) Discuss the heat treatment methods and their effects on alloys. (8)

ii) Write short notes on Non-ferrous alloys. (8)

15. a) Discuss the principle, construction and working mechanism of the UV visible spectroscopy. (16)

(OR)

b) Explain the following :

i) Estimation of Ni by AAS. (8)

ii) Estimation of Na by flame Photometry. (8)
