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Question Paper Code: 31105

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

First Semester

Computer Science and Engineering

01UCY105 – APPLIED CHEMISTRY

(Common to EEE, ECE, EIE, ICE and IT branches)

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Distinguish between electrolytic and electrochemical cells.
2. What are reversible and irreversible cells?
3. Define Grothus-Draper law of photochemistry.
4. What is photosensitization?
5. Iron is corroded faster than aluminium even though Fe is placed below Al in electrochemical series. Why?
6. What are inhibitors? Give an example each for anodic and cathodic inhibitors.
7. What are the factors, which influence adsorption of gases on solids?
8. State why the presence of a catalytic poison destroys the activity of the catalyst.
9. Calculate the molar absorptivity of 1.0×10^{-4} M solution, which has an absorbance of 0.20, when the path length is 5 cm.
10. What are chromophores? Give few examples.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Derive Nernst equation for the electrode potential. (8)
(ii) What is potentiometric titration? Explain the redox titration between Fe^{2+} and $\text{Cr}_2\text{O}_7^{2-}$ solutions. (8)

Or

- (b) (i) Write a note on Electrochemical series. Explain its significance. (8)
(ii) Write notes on (1) Calomel electrode and (2) Glass electrode. (8)
12. (a) (i) Derive the kinetics and mechanism of $\text{H}_2\text{-Cl}_2$ reaction. (8)
(ii) Define Stark-Einstein law of photochemical equivalence. How quantum yield is determined experimentally? (8)

Or

- (b) (i) Discuss the importance of Jablonski diagram. (8)
(ii) Write notes on (1) photo lithography and (2) thin film coating. (8)
13. (a) (i) Write short notes on: (1) Pitting corrosion (2) Waterline corrosion. (8)
(ii) Explain the environment based factors which influence the rate of corrosion. (8)

Or

- (b) (i) What are the objectives of electroless plating? Discuss the theory of electroless plating of Nickel. (8)
(ii) What are cathodic and anodic protections for controlling corrosion? Discuss their merits and demerits. (8)
14. (a) (i) How demineralization of water is carried out? Explain the process with neat sketch. (8)
(ii) Write the applications of activated carbon in pollution abatement. (8)

Or

- (b) (i) What are adsorption isotherms? Explain various types of adsorption isotherms. Discuss the various applications of adsorption in various fields. (8)
(ii) Stating the assumptions based on which it is derived, derive the Langmuir adsorption isotherm. Interpret the results at low pressure and high pressure. Mention its demerits. (8)

15. (a) (i) What are the important processes that occur in the flame of flame emission spectroscopy? Discuss the instrumentation and estimation of sodium by flame photometry. (8)
- (ii) Describe the procedure for the estimation of nickel by AAS. (8)

Or

- (b) (i) Explain the main features of working of UV-Visible spectrometer with a neat block diagram. (8)
- (ii) Discuss with a neat diagram, the principle, instrumentation, working and applications of XRD. (8)
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