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**Question Paper Code: 41005**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

First Semester

Computer Science and Engineering

14UCY105 - APPLIED CHEMISTRY

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

(Regulation 2014)

Duration: Threehours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- In the electrolysis of  $\text{CuSO}_4$ ,  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$  takes place at
  - Cathode
  - Anode
  - In electrolytic solution
  - Both anode and cathode
- Calculate the emf of a concentration cell at  $25^\circ\text{C}$  consisting of two zinc electrodes immersed in a solution of zinc ions of 0.1 M and 0.01 M concentrations.
  - 0.0295V
  - 0.295V
  - 295V
  - 0.00295V
- In some photochemical reactions low quantum yield is obtained. It is due to
  - Deactivation of reacting molecules
  - occurrence of reverse primary reaction
  - recombination of dissociation fragments
  - all of the above

4. The substance which initiate a photochemical reaction but itself does not undergo any chemical change is called
- (a) Catalyst      (b) fluorescent      (c) sensitizer      (d) none of the above
5. Which of the following metals could provide cathodic protection to iron: Al, Zn, Cu, Ni?
- (a) Al and Zn      (b) Cu and Ni  
(c) Cu      (d) All of the above
6. What is the effect of pH on corrosion?
- (a) Lower the pH, greater is the corrosion  
(b) Higher the pH, greater is the corrosion  
(c) Neutral the pH, lower is the corrosion  
(d) pH has no effect on corrosion
7. When one of the products of a reaction acts as a catalyst for that reaction, the phenomenon is
- (a) catalysis      (b) autocatalysis      (c) promoters      (d) enzyme catalysis
8. What is the effect of adsorption with respect to surface area
- (a) Greater the surface area, greater is the adsorption  
(b) Lesser the surface area, greater is the adsorption  
(c) Greater the surface area, lesser is the adsorption  
(d) none of these
9. Which among the following groups are chromophores
- (a)  $-N=N-$       (b)  $-N=O$       (c)  $-C=O$       (d) All of the above
10. Which among the following is used to find the atomic structure of a crystal?
- (a) XRD      (b) UV-Visible  
(c) AAS      (d) Flame photometry

PART - B (5 x 2 = 10 Marks)

11. Define standard electrode potential.

12. State Stark Einstein Law.
13. Give two examples each of anodic and cathodic inhibitors.
14. Write any two differences between physisorption and chemisorptions.
15. What are the various types of electronics transitions?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Derive Nernst equation .Write any two applications. (8)
- (ii) Explain the following: (i) Irreversible cell. (ii) Calomel electrode. (8)

Or

- (b) (i) With schematic curve explain the principle involved in the potentiometric redox titration with suitable example. (8)
  - (ii) Explain the determination of pH of an aqueous solution using glass electrode. (8)
17. (a) (i) Describe and discuss the Jablonski diagram depicting various photo physical processes. (8)
  - (ii) What is chemiluminescence? Discuss the mechanism of chemiluminescence in anion-cation reactions. (8)

Or

- (b) (i) Write a detailed note on photolithography. (8)
  - (ii) With a neat Jablonski diagram to explain the mechanism of Fluorescence and phosphorescence. (8)
18. (a) (i) What is cathodic protection? How would you control corrosion by sacrificial anodic method? (8)
  - (ii) Give an account of the method used in electroless plating of Ni. (8)

Or

- (b) (i) State and explain the various factors that influence the rate of corrosion. (8)
- (ii) State the constituents of oil paints with examples and their functions. (8)

19. (a) (i) Discuss Freundlich's adsorption isotherm of a gas on a solid. How are the constants of this isotherms obtained? (8)
- (ii) What are the differences between physisorption and chemisorption. (8)

Or

- (b) (i) Give the main points of Langmuir theory of adsorption and deduce Langmuir adsorption isotherm equation. (8)
- (ii) Write briefly about the role of ion exchangers in pollution control. (8)

20. (a) (i) How do you estimate sodium by flame photometry? Explain with neat diagram. (8)
- (ii) Explain the principle and working of a UV- visible spectrophotometer with neat sketch. (8)

Or

- (b) (i) Discuss with a neat diagram, the principle, construction, working and applications of XRD (8)
- (ii) Explain the estimation of nickel by AAS spectrophotometry. (8)

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