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Question Paper Code: 51005

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

First Semester

Computer Science and Engineering

15UCY105 - APPLIED CHEMISTRY

(Common to EEE, ECE, EIE ,IT and Biomedical Engineering)

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The number of types of bonds between two carbon atoms in calcium carbide is CO1- R
(a) Two sigma, two Pi (b) One sigma, two Pi (c) One sigma, one Pi (d) Two sigma, one Pi
2. The bond order in oxygen is _____. CO1- R
(a) 1 (b) 2 (c) 3 (d) 4
3. Difficult to monitor and very dangerous form of corrosion CO2- R
(a) Galvanic (b) Pitting (c) Crevice (d) Stress
4. Using the data given below find out the strongest reducing agent. CO2- R
 $E^{\circ}Cr_2O_7^{2-}/Cr^{3+} = 1.33V$, $E^{\circ}Cr^{3+}/Cr = - 0.74V$, $E^{\circ}Cl_2/Cl^- = 1.36V$, $E^{\circ}MnO_4^-/Mn^{2+} = 1.51V$.
(a) Cl^- (b) Cr (c) Cr^{3+} (d) Mn^{2+}
5. Primary batteries are examples of _____. CO3- R
(a) Reversible cells (b) Fuel cells (c) Sensors (d) Irreversible cells
6. Which is the best and simple method to determination of fluorine in ground water? CO3- R
(a) Atomic Absorption spectrometry (b) Spectrophotometer
(c) Flame photometry (d) Ion-selective electrode

7. Absorption of a molecule shifted towards longer wavelength is _____ CO4- R
 (a) Blue shift (b) Red shift (c) Green shift (d) Yellow shift
8. Which of the following transitions is the highest energy transition? CO4- R
 (a) n to σ^* (b) n to π^* (c) σ to σ^* (d) π to π^*
9. The graph obtained on plotting weight and temperature corresponds to CO5- R
 (a) DTA (b) TGA (c) Flame photometry (d) DSC
10. The fibre which is made from acrylonitrile as monomer CO5- R
 (a) Rayon (b) Acrylic fibre (c) Nylon (d) PVC

PART – B (5 x 2= 10 Marks)

11. State Pauli Exclusion principle CO1- R
12. Identify the types of corrosion in the following and explain the mechanism (i) Iron knife with a wooden handle (ii) Welded stainless steel parts CO2- R
13. Differentiate primary cells and secondary cells CO3- R
14. A compound with molecular formula $\text{CH}_2=\text{CH}-\text{CHO}$ absorbs at 217 nm ($\epsilon_{\text{max}} = 16,000$). What is the weight concentration in (g/ml) required to observe an absorbance of 0.8 when the cell length is 1 cm? CO4- R
15. Give the synthesis and uses of Nylon 66 CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) (i) Draw the molecular shape and predict the bond angles for PF_3 , COCl_2 and $(\text{CH}_3)_2\text{C}=\text{O}$ molecules CO1- App (8)
- (ii) Explain about the intra and inter molecular hydrogen bonding and how it affects the properties of liquids. CO1- App (8)
- Or
- (b) Explain the concept of bonding in a Homo and hetero diatomic molecule using MO Theory CO1- App (16)
17. (a) (i) Explain the role of oxygen as a promoter as well as an inhibitor of corrosion with suitable examples. CO2- App (8)
- (ii) Differentiate between electroplating and electroless plating of nickel with their mechanisms CO2- App (8)
- Or
- (b) How are metals protected against corrosion by modifying the metal and the environment? Discuss in detail. CO2- Ana (16)

18. (a) (i) Describe the construction of Ni-Cd battery with relevant reactions occurring during discharge. Mention its applications CO3- Ana (8)
- (ii) Elaborate in detail about glucose biosensors CO3- Ana (8)
- Or
- (b) Construct and explain the working principle of an electrochemical biosensor and glucose biosensor. Give the merits and demerits of both sensors. CO3- Ana (16)
19. (a) Discuss the importance and principles of Green chemistry CO4- U (16)
- Or
- (b) (i) Explain with a schematic diagram the working of Differential Scanning Calorimetry (DSC). List the merits of DSC. CO4- Ana (8)
- (ii) Discuss with a neat diagram, the principle and construction of Thermogravimetry apparatus. CO4- Ana (8)
20. (a) (i) Explain about the tacticity of polymers CO5- U (8)
- (ii) Explain the various forms of conducting poly aniline with structure and write about their conducting mechanism CO5- U (8)
- Or
- (b) What are liquid crystals? Discuss the applications of liquid crystals in the field of electronics. CO5- U (16)

