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Question Paper Code: 51005

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

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. Arrange the covalent bond configurations sp^3-sp^3 , sp^2-sp^2 and $sp-sp$ in increasing order of strength. CO1- R
(a) $sp^3-sp^3 < sp-sp < sp^2-sp^2$ (b) $sp^2-sp^2 < sp^3-sp^3 < sp-sp$
(c) $sp^3-sp^3 < sp^2-sp^2 < sp-sp$ (d) $sp-sp < sp^2-sp^2 < sp^3-sp^3$
2. The bond order in oxygen is _____. CO1- R
(a) 1 (b) 2 (c) 3 (d) 4
3. Dry corrosion is a process of contact of two metals CO2- R
(a) Indirectly (b) Directly (c) Oppositely (d) Reversibly
4. Using the data given below find out the strongest reducing agent. CO2- R
 $E^\ominus Cr_2O_7^{2-}/Cr^{3+} = 1.33V$, $E^\ominus Cr^{3+}/Cr = - 0.74V$, $E^\ominus Cl_2/Cl^- = 1.36V$, $E^\ominus MnO_4^-/Mn^{2+} = 1.51V$.
(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. In ion – selective electrodes the change in p^H is sensed by CO3- R
(a) pellet electrode (b) reference electrode
(c) glass membrane (d) glass electrode

7. What is the range of visible region? CO4- R
 (a) 200-400 nm (b) 400-1000 nm (c) 400-850 nm (d) 400-750 nm
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 number of bonding sites in a monomer is referred to as its CO5- R
 (a) functionality (b) tacticity (c) Co-polymers (d) degree of polymerisation
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. Distinguish between ionic compounds and covalent compounds. 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 solution of thickness 3 cm transmits 30% of incident light. Calculate the concentration of the solution, given extinction Co efficient $\epsilon = 4,000 \text{ dm}^3 \text{ mol}^{-1} \text{ cm}^{-1}$ CO4- App
15. Give the synthesis and uses of Nylon 66 CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) What do you mean by hybridization? Explain with diagram the formation of Oxygen (O_2) and Hydrogen (H_2) using molecular orbital theory. CO1- U (16)
- Or
- (b) Explain the concept of bonding in a Homo and hetero diatomic molecule using MO Theory CO1- U (16)
17. (a) Describe in detail the measurement of single electrode potential by Poggendorff's method. CO2- U (16)
- Or
- (b) How are metals protected against corrosion by modifying the metal and the environment? Discuss in detail. CO2- U (16)
18. (a) (i) Explain $\text{H}_2\text{-O}_2$ fuel cell. Give its merits and demerits CO3- U (8)
 (ii) What are chemically modified electrodes? Explain their types. CO3- U (8)

Or

- (b) Describe the construction and working of lead acid storage battery. CO3- U (16)
Compare the lead acid storage battery with that of the fuel cell.
19. (a) Summarize the working principles of thermo gravimetric analysis CO4- U (16)
Or
- (b) (i) Explain with a schematic diagram the working of Differential CO4- U (8)
Scanning Calorimetry (DSC). List the merits of DSC.
(ii) Explain the thermo gravimetric analysis of any one chemical CO4- U (8)
compound with neat block diagram.
20. (a) (i) Discuss the methods available in chemical and electrochemical CO5- U (8)
doping of conducting polymer in detail
(ii) What is OLED? Explain its structure, advantages and CO5- U (8)
disadvantages of OLED.
Or
- (b) What are liquid crystals? Discuss the applications of liquid crystals in CO5- U (16)
the field of electronics.

