A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U1Y05

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

First Semester

Computer Science and Engineering

21UCY105 - APPLIED CHEMISTRY

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

(Regulation 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which one of the following pair of atoms most likely to form an ionic bond? CO1- R

   (a) Na & F (b) C & C (c) N & F (d) F & F

2. Which among the following is weakest bond? CO1- R

   (a) Covalent bond (b) Ionic bond (c) Metallic bond (d) Hydrogen bond

3. Which among the following will have a highest melting point? CO1- R

   (a) NaI (b) NaBr (c) NaCl (d) NaF

4. Temporary hardness is due to CO2- R

   (a) $MgSO_4$ (b) $Ca(HCO_3)_2$ (c) $CaSO_4$ (d) $MgCO_3$

5. Hardness in water expressed in terms of equivalent of **CO2- R**

   (a) $CaCl_2$ (b) $MgCl_2$ (c) $CaCO_3$ (d) $MgCO_3$

6. What does ‘e’ waste stands for **CO3- R**

   (a) Environment waste (b) Electronic waste (c) Equipment waste (d) Energy waste

7. The liquid crystals that posses a thread structure are called CO3- R

   (a) Cholosteric liquid crystals (b) Semantic liquid crystals

   (c) Nematic liquid crystals (d) Isotropic liquid crystals

8. Which of the following in not a characteristic of lithium batteries? CO4- R

(a) It contain non aqueous electrolyte (b) It has high cell voltage

(c) It is operational over limited temperature range (d) It has high energy density

9. During charging, the density of the electrolyte of a lead acid battery CO4- R

(a) Increase (b) Decrease (c) Remaining Same (d) Become Zero

10. A fuel cell is used to convert chemical energy into CO4- R

(a) Mechanical Energy (b) Solar Energy (c) Electrical Energy (d) Potential Energy

PART – B (5 x 2= 10 Marks)

11. State Aufbau principle CO1- R

12. Define Hard Water CO2- R

13. Why is Calgon conditioning better than phosphate conditioning? CO2- Ana

14. What is liquid crystal phase? CO3- R

15. How does a fuel cell differ from a galvanic cell? CO4- U

PART – C (5 x 16= 80 Marks)

16. (a) (i) Describe the characteristics properties of Ionic compounds. CO1-U (8)

(ii) Discuss the Hydrogen bonding with its consequences CO1-U (8)

Or

(b) (i) State and explain pauli exclusion principle CO1-U (8)

(ii) Explain the hybridization involved and predict the shape for the following molecule (a) CH_4 (b) C_2H_2. CO1-U (8)

17. (a) How is hardness of water determined by complexomteric method? Write the necessary calculation. CO2- U (16)

Or

(b) (i) Explain the process of scale and sludge formation in boilers. CO2- U (8)

(ii) Discuss the demineralization process by ion exchange process in detail CO2- U (8)

18. (a) (i) With help of a neat diagram explain the reverse osmosis method for desalination of brackish water. CO2- U (8)

(ii) Calculate the temporary and permanent hardness of a water sample containing $Ca(HCO_3)_2$ = 220 mg/lit, $Mg(HCO_3)_2$ = 56 mg/lit, $MgCl_2$ = 130 mg/lit, $MgSO_4$ = 84 mg/lit and $CaSO_4$ = 98 mg/lit, Atomic weight: Ca = 40, Mg = 24, C = 12, S = 32, O = 16, H = 1, Cl = 35.5. CO2- U (8)

Or

	(b)	Explain Zeolite process of water softening. Give its advantages and disadvantages.	CO2- U	(16)
19.	(a)	Discuss the structure and applications of liquid crystals	CO3- U	(16)

Or

	(b)	(i) Discuss the importance of green chemistry.	CO3- U	(8)
		(ii) Describe any four methods of disposal of e waste.	CO3- U	(8)
20.	(a)	Explain the construction and application of a lead acid battery along with reaction involved during charging and discharging.	CO4- U	(16)

Or

	(b)	(i) Explain the construction and working of Hydrogen – Oxygen fuel cell.	CO4- U	(8)
		(ii) Describe the working of a dry cell using example of Leclanche cell.	CO4- U	(8)