

A

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: R2Y06

B.E. / B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Second Semester

Computer Science and Engineering

R21UCY206– PRINCIPLES OF CHEMISTRY IN ENGINEERING

(Common to IT,CSD,AI&DS,CSE(AI&ML),Cyber Security & IOT branches)

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The indicator used in hardness of water determination titration is _____ CO1- U
(a) Ethylene Diamine Tetra Acetic Acid (b) Erio Chrome Black-T
(c) Hydrogen bond (d) Metallic bond
2. Water which does not produce lather readily with soap solution is _____ CO1- U
(a) Hard water (b) Soft water (c) Heavy water (d) Distilled water
3. Wet corrosion is otherwise called as _____ CO1- U
(a) Chemical cell (b) Electro chemical corrosion
(c) Oxidation reaction (d) Liquid metal corrosion
4. Corrosion of metals can be prevented by _____ CO1- U
(a) Alloying (b) Addition of inhibitors (c) Coating (d) All of the above
5. Octane number is a rating of _____ CO1- U
(a) Diesel knocking (b) Petrol knocking (c) Petrol cracking (d) Diesel cracking
6. Alkaline battery is an example of _____ CO1- U
(a) Secondary battery (b) Capa-battery (c) Primary battery (d) Inverter

7. Which one of the following is an example for top-down approach? CO1- U
 (a) Ball milling technique (b) Sol-gel process
 (c) Both a and b (d) None of the above
8. The size range of nanomaterials _____ CO1- U
 (a) 1–10 nm (b) 1–100 nm (c) 100-1000 nm (d) 1–10 μm
9. The liquid crystal molecules are _____ CO2- U
 a) Isotropic (b) Anisotropic (c) Monotropic (d) Polyotropic
10. Green chemistry is also called as _____ CO2- U
 (a) Life chemistry (b) Environmental chemistry
 (c) Organic chemistry (d) Sustainable chemistry

PART– B (5 x 2= 10 Marks)

11. Why hardness is expressed in terms of CaCO_3 equivalents? CO1-U
12. Zn reacts with dil. H_2SO_4 to give H_2 . But Ag does not why? CO1-U
13. Comment on octane and cetane number CO1-U
14. Write notes on CVD process. CO1-U
15. What is the working principle of OLED? CO2-U

PART– C (5 x 16= 80 Marks)

16. (a) A well water contains the carbonate hardness and pond water contains non-carbonate hardness of a sample of water containing the dissolved salts as given below in mg/lit $\text{Mg}(\text{HCO}_3)_2=7.3$; $\text{Ca}(\text{HCO}_3)_2=40.5$; $\text{CaSO}_4=13.6$; $\text{MgCl}_2=21.75$ and $\text{NaCl}=50$. Analyze the total hardness of well water. CO5-Ana (16)
- Or
- (b) Sample water contains >35000 ppm of dissolved solids, identify and explain a suitable method for the conversion it to drinking water? CO5-Ana (16)
17. (a) Apply the knowledge of free energy (ΔG) and find the single reduction potential formula for the following reaction CO4-App (16)
 $\text{M}^{n+} + n\text{e}^- \longrightarrow \text{M}$
- Or
- (b) Demonstrate the uses of anode materials in sacrificial anodic protection and impressed current cathodic protection methods. CO4-App (16)

18. (a) Demonstrate the working principle of light water nuclear power plant with a neat diagram. CO4-App (16)
- Or
- (b) Construct the Pb acid battery with reactions and applications. CO4-App (16)
19. (a) Relate the effect of size reduction on the chemical reactivity of nanoparticles. CO1-U (16)
- Or
- (b) Illustrate the applications of nanomaterials in medical field. CO1-U (16)
20. (a) In terms of energy, LCD and OLED which is best? Justify your answer with working principle and functions. CO2-U (16)
- Or
- (b) Elaborate the twelve principles of green chemistry? CO2-U (16)

