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Code No. : 11116 S BO

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. I-Semester Supplementary Examinations, August-2023

Engineering Chemistry

(Common to EEE &amp; ECE)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Identify the species that have undergone oxidation and reduced respectively in the following reaction: $\text{Cu} + \text{HCl} \rightarrow \text{CuCl}_2 + \text{H}_2$	2	3	1	1,2,12
2.	What are the specific chemicals required to construct a calomel electrode? What is saturated in saturated calomel electrode?	2	1	1	1,2,12
3.	Differentiate reversible and irreversible cells.	2	3	2	1,2,7,12
4.	Write the electrode reactions takes place at anode and cathode in Zn-Ag <sub>2</sub> O battery.	2	2	2	1,2,7,12
5.	What is an elastomer? Give an example.	2	1	3	1,2,7,12
6.	Write the chemical structure of monomeric unit of PVC and enlist the applications of PVC.	2	1	3	1,2,7,12
7.	List out few advantages of composite materials over conventional materials.	2	1	4	1,2,7,12
8.	Describe the working principle of membranes.	2	1	4	1,2,7,12
9.	Explain the effect of quantum confinement in nanomaterials.	2	3	5	1,2,7,12
10.	Define thermo-tropic liquid crystals and classify them based on molecular ordering present in them.	2	1	5	1,2,7,12
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Illustrate the principle involved in conductometric titration between HCl vs NaOH along with neatly labeled graph. How do you find the equivalence point from the graph?	4	2	1	1,2,12
b)	What is electrochemical series? Discuss its applications.	4	1	1	1,2,12
12. a)	Describe the construction and working principle of Lead acid battery. Mention the limitations and applications.	4	3	2	1,2,7,12
b)	Discuss about the working principle of a fuel cell. Illustrate the construction and working of phosphoric acid fuel cell.	4	3	2	1,2,7,12

Contd... 2

13. a)	Differentiate thermoplastic and thermosetting polymers? Give the appropriate reason for the ban on plastic covers with less than 50 micron thickness.	4	2	3	1,2,7,12
b)	Explain the mechanism of conduction in p-doped polyacetylene along with band diagrams.	4	3	3	1,2,7,12
14. a)	Illustrate the Hand layup method for the synthesis of composite materials with a neat labelled diagram.	4	2	4	1,2,7,12
b)	Discuss the synthesis of polyethersulphone and how it is casted as membrane?	4	2	4	1,2,7,12
15. a)	Illustrate the Sol-Gel method for the synthesis of nanomaterials along with the reactions involved.	4	3	5	1,2,7,12
b)	Explain the molecular ordering in cholesteric liquid crystal and how they works as thermometers.	4	2	5	1,2,7,12
16. a)	Construct and calculate the emf of a galvanic cell using Zinc rod placed in 0.1 N ZnSO <sub>4</sub> solution and silver rod placed in 0.01 N AgNO <sub>3</sub> solution at 298 K.	4	3	1	1,2,12
b)	Construct a lithium ion cell and write discharging cell reactions at anode and cathode respectively. Enlist the merits and applications of the cell.	4	3	2	1,2,7,12
17.	Answer any <i>two</i> of the following:				
a)	Calculate the number average and weight average molecular mass of a polymer sample that contains 30% molecules with 20000 molecular mass, 20% molecules with 25000 molecular mass, 35% of molecules with 40000 molecular mass and remaining with 30000 molecular mass.	4	3	3	1,2,7,12
b)	What are fiber reinforced composites? Classify them. Explain the synthesis of Glass fibers and mention their properties and applications.	4	2	4	1,2,7,12
c)	Describe the structure, types, properties and applications of carbon nano-tubes.	4	2	5	1,2,7,12

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	40%
iii)	Blooms Taxonomy Level - 3 & 4	40%

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