Hall Ticket Number:

Code No. : 12222 AS N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. II-Semester Advanced Supplementary Examinations, September-2023

Material Chemistry

(Common to CSE, AIML & IT)

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.	Differentiate electrolytic cell and galvanic cell?	2	3	1	1,2,12
2.	The Cell constant of the cell is 0.0117 cm-1. The resistance of a cell containing 0.01 M KCl solution is 5.60 ohms. What is the specific conductivity of 0.01 M KCl solution?	2	3	1	1,2,12
3.	Write the anodic and cathodic reactions of Zn-C battery	2	1	2	1,2,7,12
4.	What is reserve battery? Give an example	2	1	2	1,2,7,12
5.	Define glass transition temperature and enlist the factors affect on it.	2	2	3	1,2,7,12
6.	Give an example for homo chain and hetero chain polymer.	2	1	3	1,2,7,12
7.	What are the advantages of composites over conventional materials?	2	3	4	1,2,7,12
8.	State liquid crystal and enlist the conditions required to exhibit liquid crystalline behaviour.	2	2	4	1,2,7,12
9.	Explain quantum confinement effect for nanomaterial?	2	1	5	1,2,7,12
10.	What is the principle involved in SEM?	2	2	5	1,2,7,12
	Part-B (5 × 8 = 40 Marks)				
11. a)	Explain the principle involved in conductometric titration of strong acid v/s strong base? Draw the graph of the titration and how is end point obtained? Explain	4	2	1	1,2,12
b)	The EMF of the Zn and Cd cell is found to be 0.33 V at 298 K. The concentration of Zn^{2+} is 0.1 M and standard reduction potential of Zn and Cd are -0.76 and -0.40 V respectively. Write cell reactions and calculate the concentration of Cd^{2+}	4	3	1	1,2,12
12. a)	Explain the construction of lead-acid battery. Discuss the charging and discharging process using the chemical equations	4	2	2	1,2,7,12
b)	Explain with neat diagram the methanol-oxygen fuel cell? Give its advantages.	4	2	2	1,2,7,12
13. a)	Demonstrate the synthesis of Bakelite using the chemical reactions involved and give its properties and applications.	4	3	3	1,2,7,12
b)	Differentiate between thermoplastics and thermosets and mention two example for each.	4	3	3	1,2,7,12

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14. a)	Explain the preparation methods of composite materials using resin transfer method with labelled diagram.	4	2	4	1,2,7,12
b)	Discuss the classification of composites based on matrix and dispersed phases.	4	1	4	1,2,7,12
15. a)	Illustrate the synthesis of graphene using chemical vapor deposition method. Enlist the applications of graphene	4	2	5	1,2,7,12
b)	How are nanomaterials prepared using top down and bottom up approach?	4	3	5	1,2,7,12
16. a)	What is electrochemical series? Explain its applications.	4	1	1	1,2,12
b)	Explain the construction of Li-ion battery. Write electrode reactions during charging and discharging.	4	3	2	1,2,7,12
17.	Answer any ***two*** of the following:				
a)	Explain the conduction mechanism involved in polyacetylene	4	2	3	1,2,7,12
b)	Distinguish between chiral nematic and smectic liquid phases	4	2	4	1,2,7,12
c)	Explain with a suitable example, how the electrical, mechanical, optical and catalytic properties of nanomaterials differ from those of the same material in bulk size.	4	3	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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