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Code No. : 11116 S N

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

Accredited by NAAC with A++ Grade

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

**Applied Chemistry**

(Common to Civil &amp; Mech.)

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.	List any two applications of electrochemical series?	2	1	1	1,2,12
2.	Calculate the specific conductance of an electrolytic solution if the resistance of the solution is 260 ohms in a cell whose cell constant is 0.99/cm.	2	2	1	1,2,12
3.	Write the electrochemistry of Li-V <sub>2</sub> O <sub>5</sub> cell	2	1	2	1,2,7,12
4.	Explain the working principle of a fuel cell and list its merits.	2	1	2	1,2,7,12
5.	Functionality of monomers effects the structure of polymer. Substantiate.	2	3	3	1,2,7,12
6.	How to prepare Buna-S artificial rubber?	2	2	3	1,2,7,12
7.	State cracking and write its significance.	2	3	4	1,2,7,12
8.	What is unleaded petrol? Give any two advantages of it.	2	2	4	1,2,7,12
9.	Suggest one method for desalination of water and explain the principle involved in it.	2	3	5	1,2,7,12
10.	Define phase and degrees of freedom	2	1	5	1,2,7,12
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Explain briefly how to determine strength of a given acid in conductometry titration by selecting appropriate example?	4	2	1	1,2,12
b)	Write the electrode reaction and calculate the EMF of the following cell at 298K. $\text{Ni/Ni}^{2+} (0.1\text{M}) \parallel \text{Cu}^{2+} (0.5\text{M})/\text{Cu}$ The standard reduction potentials of Ni and Cu are -0.25 and 0.34 V, respectively.	4	3	1	1,2,12
12. a)	Explain the electrochemistry and construction of the lead-acid battery?	4	2	2	1,2,7,12
b)	If the weight of the cell is 20 gm, which produces 4 amperes current per hour under a potential gradient of 3.5 V calculate the energy density and power density.	4	3	2	1,2,7,12

Contd... 2

R-202

13. a)	Write the structure of Kevlar. Discuss the synthesis, properties, and applications of the Kevlar?	4	2	3	1,2,7,12
b)	Calculate the number-average molecular weight ( $M_n$ ) and weight-average molecular weight ( $M_w$ ) of a polymer. If 20, 40, 50 and 60 molecules having the molecular mass 5000, 7000, 8000 and 2000 respectively.	4	3	3	1,2,7,12
14. a)	How are fuels classified? Explain with suitable examples?	4	1	4	1,2,7,12
b)	Coal has the following analysis C=84%, S=0.5%, $N_2$ =6%, $H_2$ =5.5%, and $O_2$ =4%. Find the net and gross calorific values with the help of Dulong's formula.	4	3	4	1,2,7,12
15. a)	What are scales and sludges? Suggest and explain a method to prevent their formation.	4	3	5	1,2,7,12
b)	In a complexometric titration, 50ml of a water sample consumed 36ml of 0.1N EDTA before boiling and 14ml of same EDTA after boiling. Calculate total, permanent and temporary hardness of the water sample.	4	3	5	1,2,7,12
16. a)	Describe the determination of pH of a solution using a glass electrode?	4	3	1	1,2,12
b)	Describe the construction and working of a phosphoric acid fuel cell? Mention any two advantages of it.	4	2	2	1,2,7,12
17.	Answer any <i>two</i> of the following:				
a)	Define the term glass transition temperature ( $T_g$ ) and explain the factors that affect $T_g$ ?	4	2	3	1,2,7,12
b)	Explain the terms knocking, octane number, and cetane number?	4	1	4	1,2,7,12
c)	Discuss the phase diagram of the $H_2O$ system?	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	20.0
ii)	Blooms Taxonomy Level - 2	37.5
iii)	Blooms Taxonomy Level - 3 & 4	42.5

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