VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
B.E. (CBCS) II-Semester Main Examinations, May/June-2019
Chemistry-II

Time: **3** hours

Max. Marks: **60**

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

Q. No.	Stem of the question	M	L	CO	PO
	Part-A (10 × 2 = 20 Marks)				
1.	Define power density, energy density and give their units.	2	1	1	1
2.	Enlist the important advantages of fuel cells.	2	2	1	1
3.	Distinguish between Homo and Copolymers.	2	2	4	1
4.	What are Biodegradable polymers? Give an example.	2	2	2	1
5.	A sample of water on analysis has been found to contain the following in ppm: $Ca(HCO_3)_2$ = 4.86, $Mg(HCO_3)_2$ = 5.84, $CaSO_4$ = 6.80 and $MgSO_4$ = 8.40, calculate the temporary and permanent hardness of water.	2	3	3	1
6.	How do you prevent Scales and Sludges?	2	1	3	1
7.	What are liquid crystals? Mention any two applications.	2	1	4	1
8.	Write any four advantages of composite materials over conventional materials.	2	2	4	1
9.	State and explain Beer-Lamberts law.	2	2	5	1
10.	Sketch the thermogram of $CaC_2O_4.H_2O$ and analyze it.	2	4	5	1
	Part-B (5 × 8 = 40 Marks)				
11.a)	Construct and discuss the electrochemistry of lithium ion cell, give its merits and applications.	5	2	1	1
b)	Describe the construction and working of Phosphoric acid fuel cell.	3	2	1	1
12.a)	Give an overview of the preparation of bakelite from its monomers and write its applications. Explain whether the polymer can be recycled or not.	4	4	2	1
b)	Why natural rubber does needs vulcanization? Explain the chemistry of vulcanization with appropriate reaction. Compare the properties of natural and vulcanized rubber.	4	3	2	1
13.a)	Explain the principle of softening of hard water by Ion-Exchange and Reverse Osmosis process.	4	2	3	1
b)	200 ml of a water sample required 20 ml of 1/50 N HCl with phenolphthalein indicator and another 10 ml of the same HCl with methyl orange indicator. Calculate the type and amount of alkalinity present in the water sample. Substantiate the use of two indicators in this analysis.	4	3	3	1

14.a)	Demonstrate molecular ordering in liquid crystals.	4	2	4	1
b)	Describe the preparation of nanomaterials by Sol-Gel method.	4	2	4	1
15.a)	Suggest and explain a method for the determination of alkali and alkaline earth metals in a given sample.	4	4	5	1
b)	With the help of a block diagram, discuss the principle and working of differential scanning calorimeter.	4	2	5	1
16. a)	Describe the construction and electrochemistry of lead acid storage cell. Give its merits and limitations.	5	2	1	1
b)	Outline the synthesis of silicone rubber from dichlorosilane and give its applications.	3	1	2	1
17.	Answer any *two* of the following:				
a)	500 ml of standard hard water containing 0.5 mg of pure $CaCO_3$ per ml, consumed 50 ml of EDTA. 50 ml of a hard water sample consumed 25 ml of the same EDTA solution. After boiling, 50 ml of the same hard water sample consumed 10 ml of EDTA solution. Calculate the alkaline, non alkaline and total hardness of the water sample.	4	3	3	1
b)	Classify the composite materials and explain a method for their preparation.	4	2	4	1
c)	Draw the block diagram of flame photometer and write the principle involved in it.	4	2	5	1

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

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	68
2	Knowledge on application and analysis (Level-3 & 4)	32
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	

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