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Code No. : 12034 (C)

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD****B.E. (CBCS) II-Semester Main Examinations, January-2021****Applied Chemistry**

(Civil)

Time: 2 hours

Max. Marks: 60

*Note: Answer any NINE questions from Part-A and any THREE from Part-B***Part-A (9 × 2 = 18 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	Define specific conductance and equivalent conductance. Give their units.	2	1	1	1
2.	Compute the emf of the given cell at 25 <sup>0</sup> C, Zn/Zn <sup>+2</sup> (0.01M)//Cu <sup>+2</sup> (0.02M)/Cu. E <sup>0</sup> (Zn <sup>+2</sup> /Zn)= -0.76v, E <sup>0</sup> (Cu <sup>+2</sup> /Cu)= 0.34v.	2	4	1	2
3.	Differentiate between primary and secondary cells. Give one example for each.	2	4	2	1,12
4.	Give the reactions of Ag <sub>2</sub> O-Zn cell.	2	1	2	1
5.	Differentiate between plastic and resin.	2	4	3	1
6.	What do you understand by conducting polymer? Give an example.	2	1	3	1
7.	Outline the synthesis of TNT.	2	2	4	1
8.	How would you choose the best propellant? Give any two characteristics.	2	3	4	1
9.	What are the units of hardness? Give the relation between them.	2	2	5	1
10.	Define eutectic mixture and give its significance.	2	1	5	1
11.	Compare electrolytic and electrochemical cells.	2	4	1	1
12.	List out any two merits of fuel cells.	2	1	2	1,7,12
<b>Part-B (3 × 14 = 42 Marks)</b>					
13. a)	Explain the construction of quinhydrone electrode and discuss how it is used in the determination of pH of a solution.	8	2	1	1
b)	What are conductometric titrations? Discuss them with reference to strong acid Vs strong base, weak acid Vs strong base titrations.	6	2	1	1
14. a)	Discuss the differences between reversible and irreversible cells. How this concept of reversibility is helpful in the construction of batteries?	6	4	2	1,7,12
b)	Construct the lead-acid storage battery and write discharging and charging processes of this battery with suitable chemical reactions.	8	2	2	1

15. a)	Compare the characteristics of thermoplastics and thermosets.	7	4	3	1
b)	Distinguish between the addition and condensation polymerizations. Draw the structures of Kevlar and Bakelite.	7	4	3	1
16. a)	Estimate the volume of air required to burn 1 Kg of coal containing Carbon = 86%; Hydrogen = 5.2%; Oxygen = 3%; Nitrogen = 0.9%; Sulphur=1.2 and the rest is ash.	7	4	4	2
b)	What are proximate and ultimate analysis of coal? Discuss ultimate analysis in detail.	7	2	4	1
17. a)	A water sample on analysis has shown, having the following salts in mg/lit. $\text{Ca}(\text{HCO}_3)_2 = 104$ ; $\text{Mg}(\text{HCO}_3)_2 = 128$ ; $\text{CaSO}_4 = 77$ ; $\text{CaCl}_2 = 85$ ; $\text{MgSO}_4 = 29$ . Calculate the temporary, permanent and total hardness of the water sample.	7	4	5	2,12
b)	What are boiler troubles? Discuss the consequences caused by the scales.	7	2	5	1
18. a)	Discuss the working principle, advantages, limitations and applications of methanol-oxygen fuel cell.	7	2	2	1,7,12
b)	Derive the Nernst equation and give its significance.	7	2	1	1
19.	Answer any <i>two</i> of the following:				
a)	What is natural rubber? Discuss the phenomenon of vulcanization. Give the differences between natural rubber and vulcanized rubber.	7	2	3	1
b)	What are octane number and cetane numbers? Explain how the molecular structure of constituents of gasoline affects the octane number.	7	3	4	1
c)	How would you estimate the amount of hardness by complexometric titration?	7	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)	60
2	Knowledge on application and analysis (Level-3 & 4)	40
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	-

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