JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2025

B.Tech-III Semester (CE)

COURSE CODE (CREDITS):25BIICE314 MAX. MARKS: 35

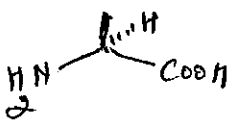
COURSE NAME: CHEMISTRY

COURSE INSTRUCTORS: Dr. Gopal Singh Bisht MAX. TIME: 2 Hour

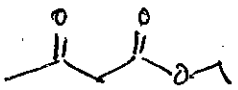
Note: *(a) All questions are compulsory.*

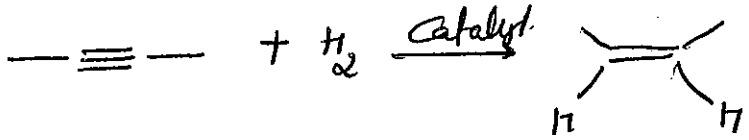
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	a) Evaluate metallic bonding is considered more adaptable for industrial applications compared to ionic or covalent bonding.	[COVI]	[2x5=10]
	b) What happens to temporary hardness when hard water is boiled? Provide chemical reactions.	[COIII]	
	c) Explain polymerization of 1,3-Butadiene and Acylonitrile. Provide the common name of rubber formed.	[COVI]	
	d) Explain chemical reaction of Vulcanization of raw rubber with sulphur as vulcanizing agent	[COV]	
	e) Compare and contrast between conformation and configuration with suitable example.	[COII]	
Q2	a) How polymers are classified? Explain the Mechanism of addition polymerization.	[COVI]	[3]
	b) If the polymer sample has population as: 10 molecules of molecular mass each is 6000, 20 molecules of molecular mass each is 7500, 10 molecules of molecular mass each is 15000, 20 molecules of molecular mass each is 20000, 10 molecules of molecular mass each is 25000, 5 molecules of molecular mass each is 26000. Calculate its number average and weight average molecular mass of polymer and then PDI.		[4]
Q3	a) Given the cell: Al / Al^{3+}(0.1M) // Fe^{2+}(0.2 M) / Fe: $E^0_{Al3+/Al}$ =- -1.66 V and $E^0_{Al3+/Al}$ = -0.44 V Calculate the maximum work that can be obtained by the cell.	[COIV]	[3]
	b) Compare the variation in conductance behavior of weak and strong electrolytes	[COIV]	[2]
	c) Write IUPAC name of the followings.	[COII]	[2]



b)



	d) Consider the following reaction. Predict the fate of the reaction at very high and low temperature. 	[COIV]	[3]
Q4.	Cement and lime industries rely on decomposition of calcium carbonate $CaCO_3 \rightleftharpoons CaO + CO_2$ This reaction is endothermic. At high temperatures, equilibrium shifts toward CaO and CO_2, producing lime. However, excess CO_2 in the kiln atmosphere can shift equilibrium backward, reducing efficiency. Engineers design kilns with controlled airflow to remove CO_2, maintaining forward reaction. Analyze why removal of CO_2 gas is essential in lime kilns and the effect of lowering kiln temperature on lime yield. Evaluate the economic implications of equilibrium control in cement industries.	[COV]	[4]
Q5.	Design a protocol for sampling and laboratory analysis of drinking water from multiple locations in an industrial area. Include sampling methods, preservation, labeling, transport, and key parameters to be tested.	[COV]	[4]