K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Nov-Dec 2025
B. Tech Program Scheme- III
Regular Examination: FY Semester: I
Course Code: BSC103 and Course Name: Engineering Chemistry
Date of Exam: 16/01/26 Duration: 02 Hours Max. Marks: 45

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.
Additional Data Atomic weights: C = 12, H =1, N =14, O = 16, Cl = 35.5, Na = 23, Mg =24 , Ca = 40
S = 32, Cl = 35.5

		Max. Marks	CO	BT level
Q 1	Solve **any five** questions out of six.	**15**		
i)	After treating 1500 liters of water by ion exchanger, the cationic resins required 200 liters of 0.2 N HCl and anionic resins required 200 liters of 0.2 N NaOH solutions. Calculate the hardness of water.	3	2	2
ii)	Calculate % atom economy of reactions with respect to product cinnamaldehyde $C_6H_5CHO + CH_3CHO \rightarrow C_6H_5CH=CHCHO + H_2O$	3	5	2
iii)	Write the difference between anodic and cathodic coatings.	3	1	2
iv)	What are the applications of solar cell?	3	4	1
v)	What are the applications of emission spectroscopy?	3	6	1
vi)	1.2 gm of coal sample was used for determination of nitrogen by Kjeldahl method. The NH_3 evolved was passed into 35ml of N/10 H_2SO_4.The excess acid required 13ml of N/10 NaOH for neutralization. Calculate % of nitrogen.	3	3	2
Q.2	Solve **any three** questions out of four.	**15**		
i)	What is corrosion? Explain inter granular corrosion with the	5	1	2

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	help of reactions and diagram.			
ii)	A sample of hard water on analysis was found to have following salts: $Ca(HCO_3)_2$ = 155 mg/L, $CaCl_2$= 162 mg/L, $MgSO_4$ = 145 mg/L, $Mg(HCO_3)_2$ = 190 mg/L, KNO_3 = 120 mg/L. Calculate temporary, permanent and total hardness of the given sample of hard water.	5	2	3
iii)	What are selection rules? Explain them in details with the help of diagram.	5	6	2
iv)	What is catalytic converter? Explain in detail.	5	3	2
Q.3	Solve **any three** questions out of four.	**15**		
i)	Explain conventional and green route of manufacturing indigo. Also justify why route is green?	5	4	3
ii)	50 ml of standard hard water (1ml CaCO3/ml) requires 25 ml of EDTA solution .50 ml of water sample required 17ml of EDTA solution .The same sample after boiling required 7 ml of EDTA solution .Calculate temporary hardness of water sample .	5	2	3
iii)	What is paint? Write any four constituents of paint with functions and examples.	5	1	2
iv)	A sample of coal contains C = 80%, H = 8%, O = 6%, S =4%, N = 2% Calculate Gross and Net Calorific value of the fuel.	5	3	3

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