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

Subject Code: **BSC103**   Subject Name: **Engineering Chemistry**   Date: 07/03/2024

February - 2024
(B.Tech) Program: FE
Supplementary Examination: FY Semester: I Scheme II
Course Code: **BSC103**   Course Name: **Engineering Chemistry**

Duration: 02 Hours   Max. Marks: 45

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.
B.Tech._FY_I_2UBSC103_QP A

		Max. Marks	CO	BT level
Q 1	Solve **any five** questions out of six	**15**		
i)	Write the difference between anodic and cathodic coatings?	3M	1	2
ii)	Calculate the gross and net calorific value of a coal sample having the following composition C = 84 %, H = 8%, O =3.5%, N = 1%, S = 0.2%, remaining ash.	3M	3	3
iii)	A 25ml sample of waste water was refluxed with 15 ml of potassium dichromate solution and after refluxing the excess unreacted dichromate required 9 ml of 0.1N FAS solution. In separate flask, 15 ml of the same dichromate solution was refluxed with 25 ml of distilled water under the same condition. This sample required 31 ml of 0.1N FAS solution. Calculate of COD of waste water.	3M	2	3
iv)	What is bio diesel and what are the advantages of it?	3M	4	1
v)	Calculate % atom economy of reactions with respect to product benzanilide $C_6H_5NH_2 + C_6H_5COCl \rightarrow C_6H_5CHNHCOC_6H_5 + HCl$	3M	5	3
vi)	How "area of anode and cathode" and pH affect the rate of	3M	1	1

	corrosion?				
Q.2	Solve <u>any three</u> questions out of four.	**15**			
i)	Write conventional and green route of manufacturing adipic acid. Explain which principle of green chemistry does green route support?	5M	5	2	
ii)	A gaseous fuel containing H_2=12%, CH_4=30%, C_2H_2=15%, C_3H_8=22%, O_2=5% and remaining is N_2. Find the volume and weight of air supplied for combustion of one m^3 of this fuel.	5M	3	3	
iii)	With suitable diagram explain galvanic corrosion.	5M	1	2	
iv)	Write a note on reverse osmosis process.	5M	2	2	
Q.3	Solve <u>any three</u> questions out of four.	**15**			
i)	0.1 gm of $CaCO_3$ was dissolved in dilute HCl and diluted to 100ml. 50 ml of this solution required 42ml EDTA for titration. 50ml of hard water sample required 29 ml of EDTA solution. 50ml of water sample on boiling, filtering required 20 ml of EDTA. Calculate hardness of water sample.	5M	2	3	
ii)	What is cathodic protection? Explain sacrificial anodic method of corrosion control with the help of diagram.	5M	1	1	
iii)	What are the advantages and applications of hydrogen as a fuel?	5M	4	2	
iv)	What are anti knocking agents of petrol engine?	5M	3	2	

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