K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22

(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

Second half Nov – Dec 2021 (Conducted in March 2022)

(B.Tech) Program: ALL

Examination: **FY** Semester: **I**

Course Code: **1UBSC103** and Course Name: **Engineering Chemistry**

Duration: 02 Hours

Max. Marks: 45

Instructions:

(1) All questions are compulsory.

(2) Draw neat diagrams wherever applicable. Write balanced reactions where required.

(3) Assume suitable data, if necessary.

(4) Atomic weights: H =1, C =12, N =14, O =16, Na = 23, Mg = 24, S =32, Cl =35.5, K =39, Ca =40

		Marks	CO	BT
Q 1	**Solve any 5 questions out of six.**	**15**		
i)	What is temporary hardness of water? Write reaction of hard water with soap.	3M	2	U
ii)	Explain the term BOD. What is the significance of BOD?	3M	2	U
iii)	What are the characteristics of a good paint?	3M	1	U
iv)	What is power alcohol? State advantages of power alcohol?	3M	3	U
v)	How is nature of oxide film influence the rate of corrosion?	3M	1	U

vi)	Calculate % atom economy of reactions with respect to product methyl iso-cynate $CH_3NH_2 + COCl_2 \rightarrow CH_3\text{-}N\text{=}C\text{=}O + 2HCl$	3M	4	Ap
Q.2	**Solve any three questions out of four.**	**15**		
i)	A sample of coal was found to contain the following constituents C=75%, O=9%, S=2%, H=8%, N=1%, ash=1% and remaining is water vapours. Calculate the minimum weight and volume of oxygen required for the complete combustion of two kg of coal.	5M	3	Ap
ii)	With a suitable diagram and electrode reactions, explain electrochemical mechanism of rusting of iron in neutral and aqueous medium.	5M	1	U
iii)	Write conventional and green route to synthesize, 'Adipic acid'. Which principle of Green Chemistry is supported by the Green Route?	5M	4	U
iv)	50 ml of standard hard water (1600mg $CaCO_3$ /lit) requires 40 ml of EDTA solution. 100ml of water sample consumes 25 ml of EDTA solution .100ml of boiled and filtered water sample consumes 11 ml of EDTA solution .Calculate the hardness of water sample .	5M	2	Ap
Q.3	**Solve any three questions out of four.**	**15**		
i)	How the iron sheet is protected from corrosion by Galvanizing? Describe with the help of flow sheet diagram.	5M	1	U
ii)	Explain briefly the process of Reverse Osmosis for purification of water with applications.	5M	2	U
iii)	How bio gas is produced from biological waste? Write advantages of bio gas.	5M	3	U
iv)	What is the principle of demineralization? 2500 litres of hard water was softened by ion exchanger resin. For regeneration of exhausted resin 150 litres of 0.1 N HCl and 0.1 N NaOH solutions were consumed. Calculate hardness of the water sample.	5M	2	Ap