

Feb-March 2024
(B.Tech) Program: FE.
Supplementary Examination: FY Semester: I
Course Code: BSC103 Course Name: Engineering Chemistry
Duration: 02 Hours Max. Marks: 45

31

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.
Atomic weights ; C= 12, O=16, H=1, N=14, Ca=40, Na=23, Mg= 24, Cl=35.5, S=32, Fe=56, Al=27

		Max. Marks	CO	BT level
Q 1	Solve any five questions out of six	15		
i)	1.5g of coal was allowed to undergo complete combustion and gases produced were absorbed in aqueous KOH unit. The rise in weights was found to be 4.5 g. Calculate percentage of Carbon in the given sample of fuel.	3M	3	3
ii)	What is biodiesel? Why is it superior to petro diesel ?	3M	4	2
iii)	Calculate percentage atom economy for the following reaction with respect to benzophenone. $\text{C}_6\text{H}_6 + \text{CH}_3\text{COCl} \rightarrow \text{C}_6\text{H}_5\text{COCH}_3 + \text{HCl}$ benzophenone	3M	5	3
iv)	Differentiate between Galvanizing and Tinning	3M	1	1
v)	What do you mean by spectroscopy? What are the advantages of spectroscopic techniques?	3M	6	1
vi)	A chemical analysis showed the presence of following salts (mg/L) in the hard water sample: Ca (HCO ₃) ₂ = 140, Mg (HCO ₃) ₂ = 186, CaCl ₂ = 138, Mg (NO ₃) ₂ = 127, NaCl = 105. Calculate temporary, permanent and total hardness of the given sample of hard water.	3M	2	3

Q.2	Solve any three questions out of four.	15		
i)	Write the role played by different constituents of paints with functions and examples	5M	1	1
ii)	Explain the terms wavelength, wave number, frequency, energy and amplitude.	5M	6	1
iii)	Compare conventional and green route of manufacturing Adipic acid. Explain which principle of green chemistry does green route support?	5M	5	2
iv)	Draw a suitable diagram and explain differential aeration corrosion of the metallic objects.	5M	1	2
Q.3	Solve any three questions out of four.	15		
i)	50 ml of standard hard water (1200mg CaCO ₃ /L) requires 40 ml of EDTA solution. 100ml of water sample consumes 20ml of EDTA solution. 100ml of boiled and filtered water sample consumes 10 ml of EDTA solution. Calculate the hardness of water sample.	5M	2	3
ii)	A sample of coal contains CH ₄ = 35%, C ₂ H ₆ = 15%, O ₂ = 8%, C ₄ H ₁₀ = 22%, C ₃ H ₈ = 13%, N ₂ = 7% by volume. Calculate the volume of air needed for complete combustion of 1m ³ of this fuel.	5M	3	3
iii)	What are solar cells? Explain the working principle and uses of solar cells	5M	4	2
iv)	What is petrol knocking? What are anti-knocking agents?	5M	3	1
