



**Final Assessment Test (FAT) – January/February 2023**

Programme	B.Tech.	Semester	Fall Semester 2022-23
Course Title	ENGINEERING CHEMISTRY	Course Code	BCHY101L
Faculty Name	Prof. Dr.G Ramachandran	Slot	F1+TF1
		Class Nbr	CH2022231700654
Time	3 Hours	Max. Marks	100
Answer any <b>TEN</b> questions.			

**SECTION A (10 X 10 Marks)**

**Answer any 10 questions**

1. Explain in brief about the principle involved in carnot cycle with a neat diagram and mention its applications in detail. [10]
2. (a) Ligands generally influence the colour of the complexes. Explain the statement with suitable examples. (5 Marks) [10]  
(b) Calculate the crystal field splitting energy for a metal with five 'd' electrons under (i) high spin and (ii) low spin conditions. (5 Marks)
3. Describe in brief the stability aspects of carbocation and carbanion with relevant examples. [10]
4. You are provided with a natural dye derived from agro based source material as one of the component. Construct a solar cell by incorporating the above components and describing its working principle with a neat diagram. [10]
5. How polymers are made conductive? Explain the classification and mechanism of conducting polymers with relevant examples. [10]
6. Explain the working principle of UV-Visible spectroscopy and SEM. [10]
7. Describe the method which is used to provide residual hardness of water less than 2ppm. Draw diagram and write equations for the same. [10]
8. (a) Write short notes on enzyme catalysis and the mechanism involved in it. (5 Marks) [10]  
(b) Explain the structure, properties and applications of ferrocenes? (5 Marks)
9. (a) Describe the preparation method of an azo dye. (5 Marks) [10]  
(b) Explain the components, construction and working principle of SOFC in detail with a neat diagram. (5 Marks)
10. (a) Write short notes on the working principle of OLED. (5 Marks) [10]  
(b) Find out the crystallite size of the given nanomaterial using p-XRD data: Peak position  $2\theta = 21.81^\circ$ , FWHM of sample  $= 2.81^\circ$ ,  $k = 0.9$  and  $\lambda = 1.5406 \text{ \AA}$  (degree to radian = Degree  $\times \pi/180$ ). (5 Marks)
11. (a) Explain in brief about the preparation of nanoparticles by sol-gel method with an illustration. (5 Marks) [10]  
(b) Write short notes on corrosion control and protection methods. (5 Marks)
12. (a) Explain pseudo first order reaction with an example. (5 Marks) [10]  
(b) Describe the working principle involved in Reverse Osmosis. (5 Marks)

