

Code No.: CH202BS

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H.T.No.

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CMR ENGINEERING COLLEGE: : HYDERABAD

UGC AUTONOMOUS

I-B.TECH-I-Semester End Examinations (Regular) - JULY- 2021

ENGINEERING CHEMISTRY

(Common to CSM, ME and ECE)

[Time: 3 Hours]

[Max. Marks: 70]

1. Answer Any **FIVE** Questions. Each Question Carries 14 Marks
2. Illustrate your answers with NEAT sketches wherever necessary.

5 x 14M=70M

1. a. Discuss
 - i. Caustic embrittlement
 - ii. Calgon and Phosphate conditioning
- b. A sample of water on analysis has been found to contain the following $\text{Ca}(\text{HCO}_3)_2 = 10.5$ ppm; $\text{Mg}(\text{HCO}_3)_2 = 12.5$ ppm; $\text{CaSO}_4 = 7.5$ ppm; $\text{CaCl}_2 = 8.2$ ppm; $\text{MgSO}_4 = 2.6$ ppm. Determine temporary and permanent hardness in degree Clarke
2. a. Explain desalination of brackish water by reverse osmosis method.
- b. Discuss softening of water by Ion exchange process
3. a. Explain LCAO method. Draw molecular orbital energy level diagram of N_2 molecule and comment on its magnetic behavior and bond order
- b. Explain the splitting of 'd' orbitals in octahedral complexes with a neat diagram.
4. a. Explain π molecular orbitals of Benzene and how do they account for aromaticity.
- b. Discuss p-type and n-type semiconductors.
5. a. Explain construction and functioning of calomel electrode.
- b. What are secondary batteries. Discuss in detail about Li-ion battery and give its applications.
6. a. Explain construction and working principle of $\text{H}_2\text{-O}_2$ fuel cell. Give advantages and applications of fuel cells.
- b. Discuss electrochemical series and give its important applications.
7. a. What is cracking. Explain fixed bed catalytic cracking with a neat sketch
- b. Explain proximate analysis of coal and give its significance.
- c. Define HCV and LCV
8. a. Explain preparation, properties and engineering applications of Teflon, Bakelite and Dacron.
- b. What is cathodic protection. How metals are protected by sacrificial anodic and impressed current cathodic method

