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Course Name & Code: Engineering Chemistry & CHY1701

Duration: 90 min

Class Number: 3368, 3383, 3384, 3390, 3391

Max. Marks: 50

Faculty Name: Dr. Asharani I V, Dr. Thirumanavelan G, Dr. Susanta Kumar Bhunia,

Dr. Karpagam S, Dr. Akhila Maheswari M

Slot: C2-TC2

S. No.	Answer All the Questions (10 x 5 = 50 Marks)	CO
1.	Describe the calgon and phosphate conditioning of water to overcome the boiler feed problem.	1
2.	Explain why the presence of O ₂ and CO ₂ should be avoided in boiler feed water? State the various methods for the removal of O ₂ and CO ₂ in water.	1
3.	Illustrate the zeolite process for the removal of hardness causing constituents in a water sample. Explain how an exhausted zeolite can be regenerated?	1
4.	Analysis of a sample water shows the following in mg/L, Ca(HCO ₃) ₂ = 4.86; Mg (HCO ₃) ₂ = 5.84; CaSO ₄ = 6.80; MgSO ₄ = 8.40. Calculate the alkaline and non-alkaline hardness of the water in terms of CaCO ₃ equivalence.	1
5.	Excess addition of soda during softening of water leads to boiler trouble. Justify the statement and also mention the methods to avoid it.	1
6.	A 20 mL of standard hard water (containing 1.5 g CaCO ₃ per litre) required 25 mL EDTA solution. 100 mL of water sample required 18 mL EDTA solution, while same water after boiling required 12 mL EDTA solution. Calculate the carbonate and non-carbonate hardness of water sample.	1
7.	What are the various steps involved in the treatment of water for municipal supply. How is it disinfected?	1
8.	What are ion-exchange resins? Draw its structure and how are spent resins regenerated?	1
9.	Explain electrodialysis method for the desalination of water?	1
10.	Explain the water softening process using lime, soda and coagulants through appropriate chemical reactions.	1

40 + 20