Ref. No.: Ex/Che/PC/B/T/313/2023(S)

B.E. CHEMICAL ENGINEERING THIRD YEAR FIRST SEMESTER SUPPLEMENTARY EXAMINATION 2023

CHEMICAL TECHNOLOGY-I

Time -3 hrs **(50 Marks for each Part)** **Full Marks : 100**

PART I (50 Marks) **Use Separate Answer scripts for each Part**

CO-1 (answer any 7)	1. Both chlorine and ozone can be used as biocide for cooling tower water treatment. What are their relative advantages and disadvantages? 2. Both surface water and underground water are available. Which one is preferred for industrial use? Why? 3. Boiler feed water must have a neutral pH. If not possible it may be permitted to have a pH higher than 7 but never less than 7. Why? 4. Water is used as a fire extinguishing fluid — why? But it is never used in oil-fire — why? Again, water is used in refinery fire — why? 5. Problems are associated with biological fouling of cooling tower water but this problem is not there in boiler feed water. Comment. 6. Lime-soda ash treatment for water is not a demineralization process and it has serious after-effects. Comment. 7. Strong acid (ion-exchange) resins (in the acid form) are used in boiler feed-water treatment — why? 8. Aeration of water has various advantages and disadvantages — what are they? 9. De-aeration is a mandatory step in boiler feed-water treatment — why?	35
CO-4 (answer any 3)	1. Ammonia can be liquefied at temperatures below –33°C at atmospheric pressure or at 20°C at a pressure of 7.5 bar — under which thermodynamic conditions ammonia is stored in fertilizer plants and why? 2. Superphosphate is granulated, ammonium sulphate is crystallised and urea is prilled — why? 3. In the naphtha based ammonia plant, what are the functions of desulphurization unit, secondary reformer, shift reactor, methanation reactor and water removal unit? 4. In paint formulation, the vehicle can act as a binder. Comment.	15

[Turn over

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CHEMICAL TECHNOLOGY-I

Time -3 hrs **(50 Marks for each Part)** **Full Marks : 100**

PART II (50 Marks) **Use Separate Answer scripts for each Part**

CO-2	a. Describe the production method of hydrochloric acid by Mannheim process with PFD.	15
	b. Discuss the steps of Brine treatment in membrane process.	7
	c. What are the engineering aspects involved during soda ash manufacturing in Solvay process.	8
CO-3	a. Write down the steps of paper making (show PFD)	10
	b. Describe the process and reactions involved in the burning zone during cement manufacturing.	10