

B.E. CHEMICAL ENGINEERING THIRD YEAR FIRST SEMESTER EXAM 2025

CHEMICAL TECHNOLOGY-I

Time – 3 hrs

FM-100

To the point answer is encouraged

CO-1	1. (i) Differentiate Tray type and spray type deaerating heater. (ii) What are the methods of regeneration during water softening via ion exchange. (iii) Why excess lime is used in lime soda process? Write short note on decarbonation. (iv) How calcium carbonate scale can be controlled using solubilizing chemicals? (v) what are the adverse effect of bacterial growth in cooling tower and how they can be controlled? 2. Fill in the blanks: (i) A-----to properly disperse coagulant and promote particle collisions is needed to achieve good coagulation. (ii)----- is used as oxygen scavenger to control corrosion. (iii) Dealkalization by ion exchange removes----- and -----. (iv) The drift eliminators efficiently remove ----- from the air. (v) To precipitate calcium carbonate we need to raise the pH to----- via addition of -----.	5*5+5=30
CO-2	1. (i) How tail gas emissions during nitric acid production are controlled via extended absorption and catalytic reduction? (ii) What are the pre-treatment of SO₂ adopted before catalytic conversion during sulphuric acid production. (iii) How Chlorine is being handled in membrane cell process and discuss the process of cooling of the same. (iv) Discuss the cell reactions involved in mercury process (sketch preferred). (v) How ammonia is recovered from Solvay process. 2. Fill in the blanks: (i) ----- is an essential step in metal surface treatment, removes rust or iron oxide scale from iron or steel. (ii) A.----- is introduced into the column to re-oxidize the NO.	5*5+5=30

[Turn over

	(iii) Ammonia oxidation is favored at ----- and absorption of the same is favored at -----. (iv) Arsenic occurs in pyrites as -----. (v) In this final step of the contact process, dilution of ----- is done by reacting it with water.	
CO-3	Write down reactions involved different steps of cement manufacturing. Why pre heating is important and how it has been executed? Why gypsum is added during final grinding step?	10
CO-4	(i) How CO, CO₂ and water are removed during ammonia synthesis? Write down the relevant reactions (ii) Sketch the block diagram of carbon dioxide stripping of Urea synthesis. (iii) Show the simplified block diagram of phosphoric acid production and write down the side reactions involved. (iv) How SiF₄, HF fumes and silica impurity are taken care off during superphosphate production?	6+6+12+6=30