

B.E. CHEMICAL ENGINEERING THIRD YEAR FIRST SEMESTER EXAM 2024

CHEMICAL TECHNOLOGY-I

Time – 3 hrs

FM-100

To the point answer is encouraged

CO-1 (answer any five)	<p>(i) How alkalinity, temperature and dissolved/suspended solids affect the rate of corrosion in boiler feed water?</p> <p>(ii) What inhibitors are commonly used for dissolved CO₂ removal and discuss how they work.</p> <p>(iii) Discuss the chloride dealkalization process of water softening and write down reactions involved.</p> <p>(iv) Why excess lime is used in lime soda process? Write short note on decarbonation.</p> <p>(v) Discuss the working principle of open circulating cooling water systems. (sketch preferred)</p> <p>(vi) What are the adverse effects of microbial organism growth in cooling water and how it can be controlled?</p> <p>(vii) Discuss any three methods of controlling calcium carbonate scale.</p>	6*5=30
CO-2 (answer any five)	<p>(i) Discuss the roles of the following during production of nitric acid: Air Compressor and Air Heater, Waste heat boiler, product acid cooler.</p> <p>(ii) How NO_x emission increases from acid absorption tower? Discuss the most effective technique of NO_x emission.</p> <p>(iii) What are the pre-treatment of SO₂ adopted before catalytic conversion during sulphuric acid production.</p> <p>(iv) Write short note on pyrohydrolysis of hydrochloric acid.</p> <p>(v) Discuss Brine preparation and treatment processes in chlor-alkali plant.</p> <p>(vi) Write down the cell reactions in mercury cell and differentiate it from membrane cell.</p> <p>(vii) Show the simplified PFD of Solvay process.</p>	6*5=30
CO-3	Write down different steps of cement manufacturing and the reactions involved. Why pre heating is important and how it has been executed? Why gypsum is added during final grinding step?	10

<p>CO-4 (answer Q.No.(v) and any three from the rest</p>	<p>(i) Why ZnO is been added for hydrogen production during ammonia synthesis? How carbon dioxide is removed?</p> <p>(ii) Sketch the block diagram of ammonia stripping Urea process.</p> <p>(iii) Discuss the granulation of CAN production with relevant reactions.</p> <p>(iv) Write down the side reactions in absorption tower during phosphoric acid production. "The reaction between phosphate rock and sulphuric acid is self-limiting". How this problem can be encountered?</p> <p>(v) Discuss the process description superphosphate and triple superphosphate production via suitable PFD.</p>	<p>(6*3+12) =30</p>
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