

B.E. CHEMICAL ENGINEERING THIRD YEAR FIRST SEMESTER SUPPLEMENTARY EXAM 2018

CHEMICAL TECHNOLOGY- I

Use a separate Answer-Script for each part

Time: Three Hours

Full Marks: 100

**Part-I
(50 Marks)**

Answer all questions

1. (a) How does aeration work?
(b) Why steam is used as a purge gas in the pressure deaeration for preparation of boiler feed water?
(c) Briefly discuss the coke tray aerator with diagram. **2+3+5=10**

2. a) Classify the Soda-Ash production processes.
(b) Briefly explain the ammonia recovery and recycle in Soda-Ash production by Solvay process.
(b) Draw the flow-sheet diagram of Soda-Ash production by Solvay process. **1+3+6=10**

3. (a) Explain the uses and economics of hydrochloric acid.
(b) Discuss the reactions and energy requirements for hydrochloric acid production.
(c) Draw the flow-sheet diagram of chlorine combustion furnace. **2+3+5=10**

4. (a) What are the different methods used for production of nitric acid?
(b) Briefly explain the nitric acid production by ammonia oxidation process with flow sheet diagram. **2+8=10**

5. (a) What are the different types of portland cement?
(b) Write the different constituents of portland and high alumina cement.
(c) Briefly explain the portland cement production with flow-sheet diagram. **1+2+7=10**

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BACHELOR OF CHEMICAL ENGINEERING EXAMINATION, 2018

(THIRD YEAR FIRST SEMESTER SUPPLEMENTARY)

CHEMICAL TECHNOLOGY - I

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Full Marks: 100
(50 marks for each part)

Use a separate Answer-script for each part

Part II

Answer *any TEN* questions

10×5

1. Discuss how water is used in thermal power stations and in rock-cutting.
2. For big industries drawing water from rivers, bank-side reservoirs are often used for storage. Why?
3. Can process water be used as boiler-feed water and vice-versa? Give reasons.
4. In industry, cooling tower is often termed as a white elephant considering its high operational and maintenance cost. An engineer suggests to adopt the 'use and throw policy' for cooling water. Make your comments.
5. In the case of underground water supply that is rich in acid gases but devoid of oxygen, aeration simply exchanges one corrosive gas for another. Comment.
6. In sulphuric acid production process from elemental sulphur four important steps are taken before SO₂ enters the converter. They are: a) Purification of sulphur by melting & decantation b) Burning of sulphur to form sulphur dioxide c) Cooling of SO₂ & generation of steam and d) Filtration of gases for dust removal. Justify each of the steps.
7. In ammonia oxidation process in a nitric acid plant, why air is fed in large excess than needed?
8. There are two calciners operating at different temperatures in a Solvay soda-ash plant. What do these calciners calcine and at what temperatures?
9. Weak brine from the anolyte chamber (membrane cell of a chlor-alkali plant) needs some treatment before rock-salt can be dissolved in it to make it saturated. What are the treatments and why are they necessary?
10. Wet grinding consumes less energy than dry grinding but wet process of cement manufacture has become obsolete. Why?
11. The superphosphate before entering into the granulator, is treated with ammonia, why?