

2023

Food Process Equipment Design

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

Answer any five questions.

1. a) Discuss about the properties of materials which must be considered during the selection of material for the designing of food equipment. 10
b) Write about the properties of plastics. 5
c) Explain about any two stresses which must be considered during the fabrication of food equipment. 5
2. a) Write about the structural characteristics (any five) that must be considered in the selection of food processing equipment 10
b) Write short notes on the following heat exchangers. 4+6=10
(i). Spiral heat exchangers
(ii). Graphite heat exchangers
3. a) Give the schematic diagram of any one of the shell and tube heat exchangers. 5
b) Briefly explain about the design aspects of following components of a shell and tube heat exchangers. 4+6+5=15
(i). Shell
(ii). Tubes
(iii). Shell side and tube side passes
4. a) How heat exchangers are classified based on the fluid flow arrangement? 4
b) Explain the working mechanism of plate type heat exchangers (PHE) with proper diagram. Mention the advantages, and disadvantages of PHE also. 10
c) Give the schematic diagrams of the following conveyors: 6
(i). Screw conveyors
(ii). Roll conveyors
(iii). Skate wheel conveyors

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| 5. | a) | Explain the working mechanism of pneumatic conveyors with suitable diagram. | 10 |
| | b) | Describe the working principle of belt conveyors with proper diagram. | 10 |
| 6. | a) | Give short notes on the working mechanism of chain conveyors with suitable diagram. | 10 |
| | b) | Explain the working mechanism of single effect evaporators with suitable diagram. | 10 |
| 7. | a) | Write about the different types of feeding arrangements in multiple effect evaporators with suitable diagrams | 10 |
| | b) | Briefly describe the working principle of batch crystallizer with proper diagram. | 7 |
| | c) | Write the applications of crystallization in food processing. | 3 |

