Total Number of printed pages: 02 Programme (Diploma)/6th Semester/DFET 601

2025

Food Engineering Operations-II

Full Marks: 100

Time: Three hours

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

Answer **any five** questions

<table>
<tr><td>1</td><td>a)</td><td>What do you mean by drying? List out different types of dryers?</td><td>5</td></tr>
<tr><td></td><td>b)</td><td>A food processing plant uses an evaporator to concentrate a fruit juice solution. The initial volume of the solution is 1000 liters with a solute concentration of 10%. After evaporation, the final volume is reduced to 200 liters. Calculate the final concentration of the solute in the concentrated solution.</td><td>5</td></tr>
<tr><td></td><td>c)</td><td>Draw a clean clear and well-labelled diagram of a dryer and write the main objectives of drying methods.</td><td>5+5=10</td></tr>
<tr><td>2</td><td>a)</td><td>Define the word crystallization. Mention its principles and different uses of it?</td><td>5</td></tr>
<tr><td></td><td>b)</td><td>What is extraction? Mention the different types of extraction techniques and show them with a schematic diagram.</td><td>10</td></tr>
<tr><td></td><td>c)</td><td>Complete the given table
<table>
<tr><th>Parameter</th><th>Humidification</th><th>Dehumidification</th></tr>
<tr><td>Definition</td><td>Adding moisture to air</td><td></td></tr>
<tr><td>Purpose</td><td></td><td>Prevents microbial growth</td></tr>
<tr><td>Common Methods</td><td>Evaporation, Steam Injection</td><td></td></tr>
<tr><td>Applications</td><td></td><td>Food Drying, Storage</td></tr>
</table></td><td>5</td></tr>
<tr><td>3</td><td>a)</td><td>Define microwave heating. Describe its working principle, types of equipment used, applications in food processing, and limitations</td><td>10</td></tr>
</table>

	b)	What is extrusion cooking? What are the differences between single-screw and twin-screw extruders? Highlight their advantages and applications.	10
4	a)	Mention Different types of Evaporators? List the factors Affecting Evaporation process? Draw a diagram of Evaporator that mostly used in food industry	10
	b)	What do you mean by Freeze Concentration? Mention its Advantage's and Describe the principle and steps involved in the freeze concentration process.	10
5	a)	What is the importance of drying in food engineering? Explain its main advantages, disadvantages, and uses in the food industry.	10
	b)	Florina and Lakhya used three drying methods—direct, indirect, and mixed-mode—to dry mushrooms. Which method is the most effective, and why? Mention five advantages of the selected method. OR Bandita and Jahina used direct, indirect, and mixed-mode drying methods to prepare lemon powder. Which drying method is the most effective for this purpose, and why? List five advantages of the chosen method."	10
6	a)	Differentiate between direct, indirect and mix-mode drying methods.	10
	b)	With a neat, labeled diagram, explain the working principle of a single-effect evaporator. Also, mention its main advantages and disadvantages.	10
7	a)	With neat labelled diagram discuss rotary dryer and its application in food industry.	10
	b)	Define Humidification. Discuss the mechanism of humidification.	10