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Daffodil International

Department of Nutrition and Food Engineering
Faculty of Health and Life Sciences
BSc. in Nutrition and Food Engineering
Midterm Examination Spring 2026

Course Code: 0721-3111 **Course Title:** Food Preservation and Storage Engineering
Level and Term: L-3, T-2 **Section:** 241 All **Course Teacher Initials:** MMM/MNR/MSI
Time: 1 hour 30 minutes **Total Marks:** 25

Maintaining the order of the questions is highly appreciated

1. a)	What do mean by food preservation?	[CLO1,PLO1,C1]	1
b)	Explain the concept of a moisture sorption isotherm and describe its significance in food preservation.	[CLO1,PLO1,C2]	2
c)	Convert the following moisture content, i) 78% wet basis to dry basis & ii) 30% dry basis to wet basis.	[CLO1,PLO1,C2]	2
2. a)	Construct a drying curve and assess how each drying stage affects the efficiency of a drying process.	[CLO1,PLO1,C5]	2
b)	Apple juice is being concentrated in a natural-circulation single-effect evaporator. At steady-state conditions, dilute juice is the feed introduced at a rate of 0.67 kg/s. The concentration of the dilute juice is 11% total solids. The juice is concentrated to 75% total solids. Calculate the rate of production of juice concentrate and how much water should evaporate?	[CLO1,PLO1,C5]	3
3. a)	Construct a freezing diagram for water and a food material.	[CLO1,PLO1,C3]	2
b)	A spherical food product is being frozen in an air-blast freezer. The initial product temperature is 15° C and the cold air -35° C. The product has a 5 cm diameter with *density of* 1000 kg/m^3 the initial freezing temperature is -2.15° C the thermal conductivity of the frozen product is 1.2W/mK and the latent heat of fusion is 250 kJ/kg. If the convective heat transfer coefficient is 45W /m^{2}K, estimate the freezing time.	[CLO1,PLO1,C3]	3

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4. a)	Define water activity with an equation.	[CLO1,PLO1,C2]	1
b)	Onions with 85% moisture content on wet basis is dried to a final moisture content of 10%. If we dry 200kg of onions, what is the final weight of the product and how much water is removed?	[CLO1,PLO1,C4]	2
c)	List the advantages of supercritical fluid (SCF) extraction.	[CLO1,PLO1,C1]	2
5. a)	Draw a typical figure of single screw extruder.	[CLO2,PLO1,C1]	2
b)	Analyze the effect of extrusion on the physicochemical properties of food products.	[CLO2,PLO1,C4]	3