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Department of Nutrition and Food Engineering
Faculty of Health and Life Sciences
B.Sc. in Nutrition and Food Engineering
Final Examination Spring 2026

Course Code: 0732-3101 **Course Title:** Food Plant and Machine Design
Level and Term: L-3, T-1 **Section:** 241 All **Course Teacher Initials:** DSAM/MNR
Time: 2 hours **Total Marks:** 40

Maintaining the order of the question is highly appreciated

			Marks
1	(a) Explain why all types of cleaning and sanitizing agents cannot be used interchangeably in a CIP system.	[CLO3,PLO7,C2]	2
	(b) Distinguish between single-use and multiple-use CIP infrastructure.	[CLO3,PLO7,C4]	2
	(c) Interpret the details of the devices used in a CIP system design.	[CLO3,PLO7,C3]	4
2	(a) Define turbidity and pressure. Apply these concepts to explain their role in monitoring CIP system performance.	[CLO3,PLO7,C3]	2
	(b) Describe the primary, secondary, and tertiary stages of an industrial wastewater treatment process and explain how each stage removes specific contaminants.	[CLO3,PLO7,C2]	3
	(c) Design a basic waste handling system for food processing unit by applying the stages of solid waste management.	[CLO3,PLO7,C3]	3
3	(a) Analyze the roles of preliminary and primary treatment in wastewater treatment and compare their effectiveness in removing different types of pollutants.	[CLO3,PLO7,C4]	3
	(b) A food industry has to pump a liquid (milk) 425 m^3/s available at 25°C and atmospheric pressure from a storage tank. The tank is 21m below the pump position. Assume the mechanical efficiency of the pump to be 85% and the motor efficiency to be 90%. If head loss due to friction is 4.7m and delivery head 14m. Identify the shaft power and motor power requirement in horse power.	[CLO3,PLO7,C3]	3
	(c) List and briefly describe the four R's concept for the management of solid waste.	[CLO3,PLO7,C4]	2
4	(a) Define BEP and critically analyze the break-even chart with explanation.	[CLO4,PLO11,C4]	3
	(b) A food company manufactures cake. The fixed costs of production are 29450/- per year. The variable cost per cake includes 2.4/- for materials, 4.7/- for labor, and 0.8/- for overhead. Each cake is sold for 13.15/-. Determine the number of cakes company must sell in a year to break even.	[CLO4,PLO11,C5]	3
	(c) What are the common cost and risk factors in industrial operations.	[CLO4,PLO11,C1]	2
5	(a) Show the relationship between productivity, profit and cost with explanation.	[CLO4,PLO11,C1]	3
	(b) Write the mathematical expressions for productivity and profit. Evaluate and justify the conditions under which film should accept zero profit or continue at a loss, using these expressions as the basis.	[CLO4,PLO11,C5]	3
	(c) Compare between accounting profit and social profit.	[CLO4,PLO11,C3]	2