Daffodil International University
Faculty of Business & Entrepreneurship
Department of Business Administration
Program: BBA

Semester: Spring-26 | Examination: Final
Time: 2 Hours | Full Marks: 40
Course Code: 0541-122 | Course Title: Business Mathematics
Section: 70(All), Retake _A | Teachers' Initial: SAS, AA, Jaher

Answer the following questions

		Alignment	Marks
1.	A small business owner takes a loan of Tk. 4,00,000 from a bank to expand their cafe. The bank charges an annual interest rate of 12% compounded quarterly. The loan is to be repaid through equal quarterly installments over a period of one and half year. a) Determine the amount of each installment. b) Prepare the amortization schedule for the loan repayment period.	CLO 2 Level-3	3 3
2. a)	Explain the concepts of Systems of linear equations.	CLO 1 Level-2	1.5
b)	A printing company produces two types of products: custom notebooks and printed calendars. Each notebook requires 30 minutes of printing time and 2 minutes of quality-check time. Each calendar requires 20 minutes of printing time and 1 minute of quality-check time. The company has a total of 5000 minutes of printing time available and 300 minutes of quality-check time available. Calculate the number of notebooks and calendars the company can produce within the given constraints.	CLO 2 Level-3	5.5
3.	A small company produces eco-friendly reusable water bottles. The company has a linear total cost function and has calculated their costs for two months with the production of 1000 units. It has a fixed cost of $90,000 for machinery, labor, and marketing. The variable cost is $80 per bottle produced. Each bottle is sold at a price of $130. a) Develop the equations for Revenue, Cost, and Profit using q for number of units. b) Compute the variable cost. c) Calculate the average cost. d) Identify the variable cost per unit. e) Solve for the profit if 500 units are made and sold. f) Estimate the quantity if they want to make profit of $450.	CLO 2 Level-3	7

	g) If the company is limited to producing only 1,200 bottles due to material shortages for the next two months, should it continue production? Analyze this situation.	CLO 3 Level-4	2
4. a)	Show this linear equation $5.5x + 11y = 22$ in slope-intercept form by identifying slope and y-intercept.	CLO 1 Level-2	1.5
b)	A manufacturing company produces electronic accessories and operates with a linear total cost structure. The management has observed that when sales are \$25,000, the total cost is \$36,500. When sales increase to \$40,000, the total cost rises to \$44,000. a) Build the Revenue, Cost, and Profit functions using s for sales volume. b) Determine the variable cost when sales are \$50,000. c) Identify the variable cost per dollar of sales. d) Estimate the total cost when sales are \$40,000. e) Calculate the sales level in the case of \$80,000 profit. f) Construct the break-even chart by clearly showing the cost line, revenue line, and break-even point.	CLO 2 Level-3	7.5
5. a)	Describe the objective function and constraints of a LP model.	CLO 1 Level-2	2
b)	A furniture manufacturing company produces two types of products: Tables (X) and Chairs (Y). Each unit of Product X and Product Y contributes to the company's overall profit according to the function: $Z = 3x + 5y - 2,$ Where x and y represent the number of units produced of Product X and Product Y respectively. To fulfill a bulk order, the combined production must satisfy: $x + 3y \leq 24$ To maintain supplier agreements, the production must also satisfy: $2x + y \geq 18$ Additionally, due to warehouse commitments, the total output must meet $3x + 4y \leq 52$ The number of tables and chairs produced cannot be negative, so $x, y \geq 0$ Using a graphical method, determine the number of units of Product X and Product Y the company should produce in order to maximize profit. Also, identify the maximum value of the profit.	CLO 2 Level-3	7