



Daffodil International University

Faculty of Science & Information Technology

Department of Information Technology & Management (ITM)

Final Examination, Fall 2024

Course Code: MATH101, Course Title: Business Mathematics

Section: A & Teacher: Prof. Dr. Bimal Chandra Das

Time: 02:00 Hrs

Marks: 40

• Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a)	The supply function for a product is $p_s(q) = 10 - 0.25q$ where q is in million of tons and $P_s(q)$ is in dollars per ton. Market equilibrium occurs at a demand to 50 million tons. Compute the producer's surplus.	5	CLO4 (3,5)
	b)	Evaluate $\int_1^2 \left(\frac{5}{(5x^2 + 1)^{1/2}} + 2e^{-3x} - 3 \right) dx$	5	
2.	a)	For an examination, a candidate has to select 7 subjects from 3 different groups A, B, and C. The group contain 4, 5, 6 subjects respectively. In how many different ways can a candidate make his selection if he has to select at least 2 subjects from each group?	5	CLO3 (6)
	b)	Solve the system of linear equations using Gauss-Elimination method $\begin{aligned} 2x + y + 2z &= 3 \\ 3x - y + 2z &= 2 \\ 2x + 3y + 2z &= 5 \end{aligned}$	5	
3.	a)	Find $\frac{dy}{dx}$ if (i) $y = x^{\sin x} + e^{x^3} \frac{2}{x^{-2/3}}$ (ii) $y = \frac{\log e^{2x}}{\cos(\sin x)} + \tan x \cos x^2 + a$	2+3=5	CLO4 (5)
	b)	The profit realized when x gallons of distilled water are produced and sold is $P(x) = 20x - 0.005x^2$. (i) Find the number of gallons that should be made to maximize profit. (ii) What is the maximum point and compute the maximum profit?	5	
4.	a)	What is the condition for multiplication of two matrices? Define symmetric matrix. If $A = \begin{pmatrix} 1 & -2 & 1 \\ 2 & 3 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 1 & 1 \\ 1 & 1 & 2 \\ 0 & 2 & 3 \end{pmatrix}$; Is $AB = BA$ true? Verify your comments.	1+1+3=5	CLO4 (1,5)
	b)	Find the derivative of $f(x) = \sin ax$ using first principal rule.	5	