

END SEMESTER EXAMINATION, MAY - 2026**B. Com. (Hons.) Semester - II****Paper Code: 551109****Subject Name: Business Mathematics****Subject Code: BCM203****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully**

Q.1		VERY SHORT ANSWER QUESTIONS – Attempt All.	(10x2 = 20 Marks)
a.	What is range of a function		CO1
b.	What is null set		CO1
c.	For $y = 4x^3 + 3x^2$, determine the second derivative		CO1
d.	What is turning points		CO1
e.	For $C = 4Q^2 + 3Q$, what is integral of the 'C' w.r.t 'Q'		CO1
f.	Write a Transpose matrix of $B = \begin{bmatrix} 5 & 2 \\ 4 & 2 \end{bmatrix}$		CO1
g.	Subtract Matrix A from matrix B $A = \begin{bmatrix} 2 & 0 & 4 \\ 0 & 5 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 & 0 \\ 1 & 0 & 3 \end{bmatrix}$		CO1
h.	Why is Venn diagram is used		CO1
i.	What are the steps for determining inverse of matrix		CO1
j.	Write the Roster form of any set.		CO1
Q.2		SHORT ANSWER QUESTIONS – Attempt any Five.	(5x4 = 20 Marks)
a.	For set $A = \{a, b, c, d\}$ and $B = \{4, 5, 6\}$ which of the following represents relation of A to B (i.e. $A \times B$) If representation is wrong provide explanation. i. $\{(b,5), (6,6), (4,d)\}$ ii. $\{(b,5), (a,d), (4,d)\}$ iii. $\{(a,5), (a,6), (a,4)\}$ iv. $\{(a,5), (a,6), (a,6)\}$ v. $\{(b,5), (a,6), (d,4)\}$		CO2
b.	What are various ways the set can represented. Explain with example.		CO3
c.	Using Pascal diagram write the expansion of $(2x - 5y^2)^5$		CO2
d.	Determine the determinant of following matrix: $A = \begin{bmatrix} 9 & 9 & 12 \\ 1 & 3 & -4 \\ 1 & 9 & 12 \end{bmatrix}$		CO3
e.	The $MR = 45Q^2 + 5Q + 3$, determine the revenue function considering revenue is zero when quantity sold is zero.		CO3
f.	For the function, $y = 2x^2 - 2$, discuss about its domain and range values.		CO2
g.	For the series 104,100, 96, Determine the sum of first 10 elements.		CO2

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Q.3	STRUCTURED QUESTIONS – Attempt any Three.	(3x10 = 30 Marks)
	a. Define function. What are various types of function and which test is applied for determining the function? (explain with examples)	CO3
	b. The manager is planning to increase the production of its popular product. Since the demand for future is not determined, manager is planning increase the production gradually. In May 2024 the production capacity was 1500 and manager is planning to increase the production by 4% of previous month capacity. What will be the production capacity of July 2024 and October 2024 month? What will the total production at the end of May 2025?	CO3
	c. For the given sets: the universal set consists of first 18 natural numbers. The subset A consists elements {1,4,8,11,15,16} and subset B consists of elements {2,5,8,10,11,18}. Determine: (i) $A \cup B$ (ii) $A \cap B$ (iii) A' (iv) $(A \cup B)'$ (v) only A	CO4
	d. The Sportz club provides Swimming classes at the weekends to boost club funds. The club has fixed costs of Rs. 4000 daily (renting and insurance cost) when offering these classes. The variable cost is Rs. 100 for each lesson given and fees per lesson for candidate is Rs. 400 per lesson. i. Develop total cost function (in standard form) and plot its graph for $Q = 0$ to 60. ii. Write the Revenue function iii. Derive profit function iv. Determine the break-even point quantity (number of lessons).	CO4
Q.4	Case Analysis/ Situation Based QUESTIONS – Attempt any Two.	(2x15 = 30 Marks)
	a Monopolist faces a revenue function $R = 152.5Q - 4Q^2$ and has costs given as: $TVC = (1/3)Q^3 - 16Q^2 + 175Q$, and $TFC = 400$ i. Write down the expression of Profit. ii. (b) Find the output, Q, at which profit is minimized and maximized.	CO5
	b According to a survey of 200 students regarding their favourite subject choices, 80 preferred Mathematics, 110 preferred English, and 70 preferred Economics. Moreover, 50 preferred both mathematics and English, 20 preferred both English and Economics, and 30 preferred Mathematics and Economics. 10 preferred English and Economics but not Mathematics. Develop Venn diagram for the given problem and label the parts of Venn diagram appropriately (6M). Determine: i. Number of students preferred all three subjects. ii. Number of students preferred either of the three subjects. iii. How many students are there, not preferring either of three subjects?	CO5
	c For following system of linear equations determine the values of unknown by determinant method : $2x + 2y + 2z = 9$ $4x + y - z = 8$ $2x - y + z = 9$	CO5
