Total No. of printed pages = 2

BBA 181104

Roll No. of candidate | | | | | | | | | | |

1937 2021

B.B.A. 1st Semester End-Term Examination

BUSINESS MATHEMATICS

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer all questions from Question 1 and any *four* question from the rest.

1. Fill in the gap : (10 × 1 = 10)

   (i) A matrix is said to be a ———— matrix when the diagonal element are similar and all off diagonal elements are zero.

   (ii) Matrix addition or subtraction is possible only when the two matrices are of ———— order. (same/different)

   (iii) If $A = (1, a, b, x, 2)$ and $B = (1, 2)$, then B is a ———— of A.

   (iv) If $y = a^x$, then dy/dx is ————.

   (v) If $y = C$ then dy/dx is ————.

   (vi) If $y = \log x$, then dy/dx is ————.

   (vii) If $y = 2x$, then dy/dx is ————.

   (viii) If a set contains no element than it is called ———— set.

   (ix) If $A = \{2, 4, 6, 8\}$ and $B = \{6, 8, 10\}$ then $A \cup B =$ ————.

   (x) ———— is a diagram that shows all possible logical relations between a finite collection of different sets.

2. Find out x_1, x_2, x_3 from the following set of equations using inverse of the matrix (10 + 5)

   (a) $11x - y - z = 31$
   $-x + 6y - 2z = 26$
   $-x - 2y + 7z = 24$

   (b) $5x_1 - 2x_2 = 16$
   $2x_1 + 3x_2 = 2$

[Turn over

3. (a) A firm's demand curve is given by $P = 200 - 2.5q$, where P is price and q is quantity demanded. Find the marginal revenue function and also find out the price at which marginal revenue is zero. What is AR? Find out. (7)

(b) Find out the AR and MR from the following functions : (4 + 4 = 8)

(i) $TR = 32q - q^2$

(ii) $P = q^2 + 0.5q + 3$

(Here, P is price and q is quantity)

4. Find derivatives of the following functions using the definition of derivatives : (5 × 3 = 15)

(a) $y = \dfrac{2x+5}{7x}$

(b) $y = \sqrt{x} + 2$

(c) $y = x^2 + \log x$

(d) $y = (x+1)(5x^2+7)$

(e) $y = e^x \cdot x^2$

5. (a) Suppose that the demand and total cost function facing a firm is $P = 12 - 5x$, $C = -x^3 + 3x^2$. Find out the equilibrium output (x) level where profit is maximized and maximum profit. (9)

(b) Define

(i) Null matrix

(ii) Scalar matrix

(iii) Identity matrix. (2 + 2 + 2 = 6)

6. (a) Define the following : (3 × 4 = 12)

(i) Complementary of a set

(ii) Universal set

(iii) Union and intersection of sets

(b) If $A = \{2\}$, $B = \{5, 8, 30\}$, $C = \{5, 100, 9\}$ then $A \cup (B \cup C) = ?$ $(A \cup B) \cup C = ?$ (3)