

B.B.A. Semester - 2 (CBCS) Examination**March/April - 2023 (OLD COURSE)****ADVANCE TECHNIQUES OF BUSINESS MATHEMATICS (ELECTIVE)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1 A. Prove that : (07)

$$\begin{vmatrix} x+2 & x+5 & x+8 \\ 2003 & 2006 & 2009 \\ 100 & 103 & 106 \end{vmatrix} = 0$$

B. Solve : (07)

$$\begin{vmatrix} x & 3 & 3 \\ 3 & x & 3 \\ 3 & 3 & x \end{vmatrix} = 0$$

OR

Que.1 A. State the properties of determinant. (07)

B. Solve by Cramer's rule : (07)

$$x + 2y = 5, \quad 2y + z = 7, \quad x + y + z = 6$$

Que.2 A. Define the following : (07)

(1) Diagonal Matrix (2) Unit Matrix (3) Transpose of a Matrix
 (4) Column Matrix (5) Square Matrix (6) Symmetric Matrix
 (7) Zero Matrix

B. If $A = \begin{bmatrix} 5 & 2 \\ 2 & 7 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 5 \\ 0 & 8 \end{bmatrix}$, **and** $C = \begin{bmatrix} 4 & 7 \\ 9 & 5 \end{bmatrix}$ **Prove that** $A(BC) = (AB)C$. (07)

OR

Que.2 Solve following equations using matrix inverse method. (14)

$$x + 4y + 9z = 36, \quad x + 2y + 3z = 14, \quad x + y + z = 6.$$

Que.3 Find the following limits: (Any four) (14)

(1) $\lim_{x \rightarrow 3} \frac{x^5 - 243}{x^3 - 27}$ (2) $\lim_{x \rightarrow -3} \frac{2x^2 + 9x + 9}{2x^2 + 7x + 3}$ (3) $\lim_{x \rightarrow -2} \frac{9x^2 + 5x - 26}{5x^2 + 17x + 14}$

(4) $\lim_{x \rightarrow 0} \frac{1 - \sqrt{1-x}}{x}$ (5) $\lim_{x \rightarrow \infty} \frac{n^2 - n + 3}{2n^3 + 1}$ (6) $\lim_{x \rightarrow \infty} \frac{\sum n^2}{n^3}$

Que.4 Find $\frac{dy}{dx}$ (Any four) (14)

(1) $y = \frac{x^2 - 1}{x^2 + 1}$ (2) $y = \left(\frac{2x-1}{x^2+3x+2} \right) \left(\frac{2}{x+3} + x \right)$ (3) $y = \left(\frac{x+2}{x+3} \right)^4$

(4) $y = e^{(2x+1)^3}$ (5) $y = \frac{3^x}{x^3}$ (6) $y = \frac{y}{y-1}$

Que.5 A. Write short note on: Amount of Annuities. (07)

B. Rs. 6,000 is deposited at 10% compounded quarterly for one year. Find the effective annual rate of interest. (07)

OR

Que.5 A. Give difference between simple interest and compound interest. (07)

B. A principal P is to be invested to yield Rs. 50,000 in 6 years. Find the principal if the interest is (07)

(1) 8% per year compounded semiannually
 (2) 8% per year compounded quarterly.
