647510 **BBA2AtbA102x** **Seat No :_____**

B.B.A. Semester - 2 (*CBCS*) Examination
March/April – 2023 (New Course)
Advanced Techniques of Business Mathematics (ALLIED)

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)**

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

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

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

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

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 (1) 8% per year compounded semiannually **(07)**
(2) 8% per year compounded quarterly.

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