



DCB-16080001020602 Seat No. _____

B. Com. (Sem. II) (CBCS) (W.E.F. 2016) Examination

July - 2022

Business Mathematics - 2

(Old Course)

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Instruction : All the questions are compulsory.

- 1 (a) Write Rules of Determinants. **10**
 (b) State the difference between Matrix and Determinants. **5**
 (c) Solve by using Crammer's method : **5**
 $4x + 3y - 12 = 0$
 $4x - 9y - 108 = 0$

OR

- 1 (a) Find value of x **5**

$$\begin{vmatrix} 4 & 5 & -7 \\ -2 & x & 6 \\ 1 & x & 1 \end{vmatrix} = 43$$

- (b) Prove that **10**

$$\begin{vmatrix} x+a & b & c \\ c & x+b & a \\ a & b & x+c \end{vmatrix} = x^2(x+a+b+c)$$

- (c) Prove that **5**

$$\begin{vmatrix} a & a & a \\ a & b & b \\ a & b & c \end{vmatrix} = a(a-b)(b-c)$$

- 2 (a) Find Matrix A and B if, $2A - B = \begin{bmatrix} 8 & 11 \\ 8 & 7 \end{bmatrix}$ and **5**

$$3A - B = \begin{bmatrix} 17 & 19 \\ 12 & 8 \end{bmatrix}.$$

- (b) Prove that **10**

$$(1) (AB)^T = B^T A^T$$

$$(2) Adj(AB) = (Adj(B))(Adj(A)) \quad \text{for, } A = \begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix} \quad \text{and}$$

$$B = \begin{bmatrix} -1 & 2 \\ 3 & 5 \end{bmatrix}.$$

- (c) If $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -1 \\ -1 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$ find $(A + B + C)$. 5

OR

- 2 (a) Solve by using Matrix 15

$$3x + 5y + 6z = 4$$

$$x + 2y + 3z = 2$$

$$2x + 4y + 5z = 3$$

- (b) Find x 5

$$\begin{bmatrix} x & 4 & -1 \end{bmatrix} \begin{bmatrix} 2 & 1 & 0 \\ 1 & 0 & 2 \\ 0 & 2 & 4 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ -4 \end{bmatrix} = 0$$

- 3 Find the value : (any **three**) 15

(1) $\lim_{x \rightarrow 0} \frac{(\sqrt{1+x} - 1)}{x}$ (2) $\lim_{x \rightarrow 4} \frac{(x^2 - 3x - 4)}{x^2 - 2x - 8}$

(3) $\lim_{x \rightarrow -\frac{1}{3}} \frac{(3x^2 + 7x + 2)}{9x^2 - 1}$ (4) $\lim_{x \rightarrow 0} \frac{1}{x} \left[\frac{2x+9}{x+3} - \frac{3}{1} \right]$

(5) $\lim_{x \rightarrow 0} \frac{3^{2x} + 2^{3x} - 2}{x}$ (6) $\lim_{x \rightarrow \infty} \frac{2x^2 + 7x + 5}{4x^2 + 3x - 1}$

- 4 (a) Prove that by using Mathematical induction 8

$$2 + 5 + 8 + \dots + (3n - 1) = \frac{n(3n + 1)}{2}$$

- (b) Find sum of 7

$$3 \cdot 8 + 5 \cdot 11 + 7 \cdot 14 + \dots n \text{ terms.}$$

OR

- 4 (a) Find sum of 7

$$T_n = 3n^2 + 2n$$

- (b) Find sum of 8

(1) $7^2 + 8^2 + 9^2 + \dots + 20^2$

(2) $11^3 + 12^3 + \dots + 20^3$.