

## Term Evaluation (Odd) Semester Examination September 2025

Roll No.....

Name of the Course: B. Com (H)

Semester: I

Name of the Paper: Business Mathematics

Paper Code: BCH-106

Time: 1.5 Hours

Maximum Marks: 50

Note:

- Answer all the questions by choosing any one of the sub-questions.
- Each question carries 10 marks.

Q1.

(10 Marks)

a. Solve the system of linear equations:

(CO1)

$$2x - y + 3z = 9; x + y + z = 6 \text{ and } x - y + z = 2.$$

OR

b. Show that

(CO1)

$$\begin{vmatrix} -a^2 & ab & ac \\ ba & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 4a^2b^2c^2.$$

Q2.

(10 Marks)

a. Find the inverse of the following matrix:

(CO1)

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}.$$

OR

b. Show that  $A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{bmatrix}$  Satisfies the equation  $A^2 - 3A + 2I = 0$ .

(CO1)

Q3.

(10 Marks)

a. Show that,

$$(i) \begin{bmatrix} 5 & -1 \\ 6 & 7 \end{bmatrix} \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} \neq \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 5 & -1 \\ 6 & 7 \end{bmatrix},$$

$$(ii) \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix} \begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 2 & 3 & 4 \end{bmatrix} \neq \begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 2 & 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix}.$$



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OR

- b. Find the domain and range of a function: (CO2)

$$f(x) = \begin{cases} x^2 & x < 0 \\ x & 0 \leq x \leq 1 \\ 1/x & x > 1 \end{cases}$$

Also find  $f(0)$ ,  $f\left(\frac{1}{2}\right)$ ,  $f\left(\frac{3}{2}\right)$ ,  $f(5)$ .

Q4.

(10 Marks)

- a. Find the derivative of the following functions. (CO2)

(i)  $e^x + \sin x + x^2$ ,

(ii)  $x^{10} + 5x + 10$ ,

(iii)  $\tan x$ ,

(iv)  $\sin^2 x$ .

OR

- b. Find  $\frac{dy}{dx}$ .

(CO2)

(i)  $x = e^t$ ;  $y = \log t$ ,

(ii)  $x = a(t - \sin t)$ ;  $y = a(1 - \cos t)$ .

Q5.

(10 Marks)

- a. Show that the function  $x^5 - 5x^4 + 5x^3 - 1$  is Maximum at  $x = 1$  and Minimum at  $x = 3$  and neither Maximum nor Minimum at  $x = 0$ . (CO2)

OR

- b. Explain with Examples, (CO2)

(i) Unit Matrix,

(ii) Diagonal Matrix,

(iii) Scalar Matrix,

(iv) Symmetric Matrix.