

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:**

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

Q1.

a. Solve the system of linear equations:

(10 Marks)

(CO1)

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

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.

a. Find the inverse of the following matrix:

(10 Marks)

(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.