

H

Roll No.

BCH-106

B. COM. (HONS.)

(FIRST SEMESTER) END SEMESTER

EXAMINATION, Jan., 2023

BUSINESS MATHEMATICS

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Define the following with example : (CO1)

(i) Column matrix

(ii) Diagonal matrix

(iii) Null matrix

(iv) Symmetric matrix

(v) Identity matrix

P. T. O.

(2)

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(b). If $A = \begin{bmatrix} -1 & 2 & 3 \\ 5 & 7 & 9 \\ -2 & 1 & 1 \end{bmatrix}$ and $B =$

$\begin{bmatrix} -4 & 1 & -2 \\ 1 & 2 & 0 \\ 1 & 3 & 1 \end{bmatrix}$, then show that : (CO1)

(i) $(A+B)^T = A^T + B^T$

(ii) $(A-B)^T = A^T - B^T$

(c) Find the inverse of matrix defined by :

(CO1)

$$A = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{bmatrix}$$

2. (a) Draw the following curves : (CO2)

(i) $y = 4x + 2$

(ii) $y = x^2 + 2x$

(iii) $y = |x|$

(b) Define the following with examples :

(CO2)

(i) Mathematical function

(ii) Exponential function

(iii) Logarithmic function

(3)

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(c) Find the derivatives $\frac{dy}{dx}$ of the following

functions : (CO2)

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

(ii) $y = x^4 + e^x - 4 \log x + 5 \cos x$

3. (a) Find the first and second partial derivatives

of $z = x^3 + y^3 - 3xy + 2x - 5$. (CO3)

(b) For what value of x the function

$y = x^3 - 2x^2 + x + 6$ have a maxima or

minima. Find its maximum or minimum

value. (CO3)

(c) Verify Euler's theorem : (CO3)

(i) $z = \frac{x^3 + y^3}{x - y}$

(ii) $u = \log \left(\frac{x^2 + y^2}{x + y} \right)$

P. T. O.

(4)

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4. (a) Solve the following Linear Programming Problem graphically : (CO4)

Maximize :

$$z = 4x + y$$

Subject to the constraints :

$$x + y \leq 50$$

$$3x + y \leq 90$$

$$x \geq 0, y \geq 0.$$

- (b) Define the following : (CO4)

(i) Basic feasible solution

(ii) Unbounded solution

(iii) Linear Programming Problem

- (c) Solve the following LPP by Graphical method : (CO4)

Minimize :

$$z = 200x + 500y$$

Subject to the constraints :

$$z + 2y \geq 10$$

$$3x + 4y \leq 24$$

$$x \geq 0, y \geq 0.$$

(5)

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5. (a) Define the following with example :(CO5)

(i) Simple interest and Compound interest

(ii) Nominal and effective rate of interest

- (b) If the difference between simple and compound interest on a sum for 3 years at 5 percent interest per annum is ₹ 76.25, then find the sum. (CO5)

- (c) A moneylender charges 'interest' at the rate of 10 paise per rupee per month payable in advance. What effective rate of interest does he charge per annum ? (CO5)

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