H Roll No. .....

BCH–106

B. COM. (H) (FIRST SEMESTER)

MID SEMESTER EXAMINATION, 2021-22

BUSINESS MATHEMATICS

Time : 1 : 30 Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each question carries 10 marks.

1. (a) Show that $A=\begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 2 \\ 2 & 1 & 1 \end{bmatrix}$ satisfies the relation $A^2-4A-5I=O$, where O denotes the null matrix. Hence find the inverse of A. (CO1)

P. T. O.

OR

(b) Evaluate :

$$\begin{vmatrix} 1 & x & x^2 - yz \\ 1 & y & y^2 - zx \\ 1 & z & z^2 - xy \end{vmatrix}$$

without direct expansion. (CO1)

2. (a) Show that :

$$\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = xyz\left(1+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right).$$

(CO1)

OR

(b) Determine the inverse of :

$$A = \begin{bmatrix} 2 & 4 & -6 \\ 4 & 2 & 2 \\ 3 & -3 & 1 \end{bmatrix}$$

by row operations. (CO1)

3. (a) Solve the following system of linear equations by determining the inverse of a matrix : (CO2)

$$3x + 3y + 4z = 20$$
$$-2x + 4y - 2z = -6$$
$$4x - 2y + 3z = 16.$$

OR

(b) Solve the above system of equations by using Cramer's rule. (CO2)

4. (a) Differentiate x^3 from the first principle of differentiation. (CO3)

OR

(b) Let $f(x) = \frac{e^x + 1}{e^x - 1}$, then find $f'(x)$. (CO3)

5. (a) Differentiate the following :

(i) $(x^2 + 1)\log(x^2 + 1)$

(ii) $\log(ax^2 + bx + c)$

where a, b and c are constants.

(CO3)

OR

(b) If : (CO3)

$$y = \frac{\sqrt{x^2+1} + \sqrt{x^2-1}}{\sqrt{x^2+1} - \sqrt{x^2-1}}$$

prove that :

$$\frac{dy}{dx} = 2x + 2x^3/\sqrt{x^4 - 1}.$$