



Roll no.....

End Semester Examination, December 2024
BBA/B.COM – I Semester
Business Mathematics (MCBA107)

Time: 2.5 hrs.

Max Marks: **50**

Note: **All Questions are compulsory.** Marks are indicated against each question.

PART-A

Q.1 *Attempt any five questions:*

- (a) Define Arithmetic Progression with example. [CO-1] [L-1] **2**
- (b) Differentiate the logarithmic function $f(x) = \log(x^2 + 1)$. [CO-1] [L-1] **2**
- (c) Define a matrix with example. [CO-1] [L-1] **2**
- (d) Find the 9th term of the G.P. 3, 6, 12, 24, ... [CO-1] [L-1] **2**
- (e) What is a point of inflexion in a function's curve? [CO-1] [L-1] **2**
- (f) State Principle of Counting. [CO-1] [L-1] **2**
- (g) Find n, if $nP_4 = 2(5P_2)$ [CO-1] [L-1] **2**

2x5

PART-B

- Q.2 Examine the differentiation the following with respect to x [CO-2] [L-3] **10**
- a) $x^9 + 9\sin(x) + 100$
 - b) $\sin^2 x$
 - c) $x^2 \cos x$
 - d) $\frac{e^x}{x}$

OR

- Solve the derivative of the following function w.r.t. x [CO-2] [L-3] **10**
- a) $\frac{2x+3}{x-4}$
 - b) $x^{100} + 10x^{10} + 5x + 1$
 - c) $\frac{e^{2x}}{x^2}$
 - d) $x^2 \sin x$

- Q.3 Evaluate the order and degree, is defined, of each of the following differential equations: [CO-3] [L-5] **10**
- a) $\frac{dy}{dx} - \cos(x) = 0$
 - b) $y''' + y^2 + e^{y'} = 0$
 - c) $xy \frac{d^2 y}{dx^2} + x \left(\frac{dy}{dx} \right)^2 - y \frac{dy}{dx} = 0$
 - d) $\frac{d^2 y}{dx^2} + y = 0$

OR

- Explain the point of minimum value of a function f . Find local maximum and local minimum values of the function f given by [CO-3] [L-2] **10**

$$f(x) = 3x^4 + 4x^3 - 12x^2 + 12.$$

- Q.4 a) Solve the adjoint of the following matrix [CO-4] [L-3] **10**

$$\begin{pmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{pmatrix}$$

- b) Determine the rank of the following matrix

$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 3 & 0 & 5 \end{pmatrix}$$

OR

- a) Solve the equation for x, y, z and t , if

[CO- 4] [L-3] **10**

$$2\begin{pmatrix} x & z \\ y & t \end{pmatrix} + 3\begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix} = 3\begin{pmatrix} 3 & 5 \\ 4 & 6 \end{pmatrix}$$

- b) Determine the inverse of the following matrix

$$\begin{pmatrix} 2 & -3 & 3 \\ 2 & 2 & 3 \\ 3 & -2 & 2 \end{pmatrix}$$

Q.5 Write the definition of harmonic progression (HP) and geometric progression (GP) with example. In geometric progression, the first term is 10 and the common ratio is 5. Calculate the 10th term of the progression and the sum of the first 10 terms.

[CO-1] [L-6] **10**

OR

- i. How many ways can you select 5 balls from a box containing 7 red and 8 green balls if you must choose at least 3 red balls?
- ii. In how many ways can the letters of the word "EXAMINATION" be arranged so that all vowels appear together?

[CO-1] [L-4] **10**