



2023

5th Semester)

#### COMMERCE

Paper No.: BC-503

### ( Business Mathematics and Computer Applications )

Full Marks: 70 Pass Marks: 45%

Time: 3 hours

( PART : B—DESCRIPTIVE )

( Marks: 45)

The figures in the margin indicate full marks for the questions

1. (a) Solve the following system by linear equations:

$$x-3y+z=-1$$
$$2x+y-4z=-1$$
$$6x-7y+8z=7$$

Or

(i) Find the value of the following (b) determinant by Sarrus method:

$$A = \begin{vmatrix} 2 & 4 & 6 \\ 5 & 3 & 1 \\ 3 & -1 & 5 \end{vmatrix}$$

(ii) State the four properties of determinants.

9

5

2. (a) If

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

show that  $A^3 - 3A^2 - A + 9I = 0$ .

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Or

(b) Find the inverse of

$$A = \begin{bmatrix} 2 & 3 & -5 \\ 4 & 1 & 7 \\ 6 & 2 & 0 \end{bmatrix}$$

3. (a) (i) Evaluate  $\lim_{x\to\infty} \frac{x-5x^2-10x^3}{3-x-4x^2}$ .

(ii) A steel plant produces x tons of steel per week at a total cost of  $\left(\frac{1}{3}x^3 - 5x^2 + 99x + 35\right)$ . Find the output at which marginal cost attains its minimum.

5

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Or

(b) Find the maximum and minimum values of  $y = 2x^3 - 3x^2 + x - 20$ .

24L/145a

(Continued)

4. (a) State and discuss the various areas where the computer applications are used.

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Or

- (b) Discuss the various types of protocols used in Internet.
- 5. (a) Discuss the various types of computer networking.

Or

- (b) Write notes on the following: 5+4=9
  - (i) Importance of e-commerce
    - (ii) Drawbacks of an Internet

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#### 2023

(5th Semester)

#### COMMERCE

Paper No.: BC-503

# (Business Mathematics and Computer Applications)

( PART : A—OBJECTIVE )

( Marks: 25.)

The figures in the margin indicate full marks for the questions

SECTION—I

( Marks: 15)

- Indicate whether the following statements are True (T) or False (F) by putting a Tick (✓) mark:
  - (a) If two rows or two columns of a determinant are identical, the value of determinant is unity.

(T / F)

(b) A square matrix A is called an orthogonal matrix if  $A^2 = A$ .

(T / F)

(c)	The	derivative	of	a	constant	function	is	zero
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(T / F)

(T / F)

(T / F)

# 2. Choose the correct answer and place its code in the brackets provided: 1×10=10

(a) A square matrix A is called a singular matrix if

(i) 
$$|A| = 0$$

(ii) 
$$A^2 = A$$

(iii) 
$$A^2 = I$$

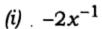
(iv) 
$$|A| = I$$

(b) The cofactor of  $a_{32}$  of

is

- (i) -4
- (ii) -20
- (iii) 20
- (iv) 24
- (c) Matrix addition is
  - (i) only commutative
  - (ii) only associative
  - (iii) both commutative and associative
  - (iv) neither commutative nor associative

(d) The derivative of  $x^{-2}$  with respect to x is



(ii) 
$$-2x^{-2}$$

(iii) 
$$-2x^{-3}$$

(iv) 2x

[ ]

(e) If A is an invertible square matrix, then

(i) 
$$(adj A)' = adj A'$$

(ii) 
$$(adj A)^{-1} = adj A^{-1}$$

(iii) 
$$AA^{-1} = A^{-1}A = I$$

(iv) All of the above

(f)	A system of linear equations $AX = B$ is consistent
	and has a unique solution if

(i) 
$$|A| \neq 0$$

(ii) 
$$|A| = 0$$
 and  $(adj A)B \neq 0$ 

(iii) 
$$|A| = 0$$
 and  $(adj A)B = 0$ 

(iv) 
$$(adj A)B = 0$$

(g) The binary equivalent of the decimal number 13 is

- (i) 1101
- (ii) 1011
- (iii) 1110
- (iv) 111

(h)	A by	yte is a group of		
	(i)	4 bits		
	(ii)	6 bits		
	(iii)	8 bits		
	(iv)	2 bits	[	]
(i)	Hex	adecimal number system uses the	base of	
	(i)	2		
	(ii)	8		
	(iii)	10		
	(iv)	16	[	]
(j)	The	machine-independent program is		
	(i)	high-level language		
	(ii)	low-level language		
	(iii)	assembly language		
	(iv)	machine language	[	1

## SECTION—II

( Marks: 10)

3. Answer/Write on any five of the following: 2×5=10

(a) Distinguish between matrix and determinant.

(b) Operating System (OS)

(c) Bus topology

(d) Compiler

(e) Identity matrix

(f) Evaluate  $\lim_{x\to 5} \frac{\sqrt{x}-\sqrt{5}}{x-5}$ .

(g) E-commerce

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