#### BMCA/BC-503

2023

(5th Semester)

COMMERCE -

Paper No.: BC-503

# ( Business Mathematics and Computer Applications )

Full Marks: 70 Pass Marks: 45%

Time : 3 hours and bear to

( 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:

$$x - 3y + z = -1$$

$$2x+y-4z=-1$$

$$10 \quad 100 \quad 6x - 7y + 8z = 7 \quad 100 \quad 20$$

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(b) (i) Find the value of the following 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.

5

4

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

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

Or

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(b) Find the inverse of

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

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

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(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.

· · · Or

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

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(Continued)

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

9

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Or

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

(b) Write notes on the following:

5+4=9

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- (i) Importance of e-commerce
- (ii) Drawbacks of an Internet

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West Extensions

(c) The denvative of a constant function is zero.

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3 (5th Semester)

(d) The unit of a carpamental which performs believed is called control unit. BC-503. in Paper No.: BC-503.

(Business Mathematics and Computer Applications)

(e) CPU is co (PART: A—OBJECTIVE) on ai UTO (s) exercise (Marks: 25.)

The figures in the margin indicate full marks for the questions

2. Choose the correct answer and place its code in the brackets provided: ( 1: swam) combbe xinus 1 \$10 = 10

- 1. Indicate whether the following statements are True (T) or False (F) by putting a Tick (✓) mark: 1×5=5
  - (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  $A^2 = A$ .

I = (AT () F)

(T) / F)

(c) The derivative of a constant function is zero.

(7 / T) 2023 (5th Semester)

(d) The unit of a computing system which performs all numerical and logical operations is called control unit.

( T / F ) ( F )

(e) CPU is considered as the heart of the computer system.

(T/F)

The figures in the margin indicate full marks for the questions

- 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

(a). If two rows or two columns of a Oct. Alin Ont are identics, the value of determinant is unity.

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

A La La Citil (iii) in A 2 and a come of the come of t

$$(i\nu) \mid A \mid = I$$

(b) The cofactor of  $a_{32}$  of making the symmetry (h)

2 4 6 3 0 -1 4 -4 2

 $(i) -2x^{-1}$ 

is

10 131-0 and (mila)5-0 8-15- (m)

(i) -4

(ii) -20 Recal (ac A)E 0  $\varepsilon_{-\chi,\Sigma}$  (iii)

(iii) 20

(10)

(iv) 24

- (c) The wedl-xintage manageridite and as eighthe (c)
- (c) Matrix addition is

(i) (adjA)' = adjA'

(i) only commutative

(ii) only associative 1-A [hs = 1-(A (hs) (ii)

(iii) both commutative and associative

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

(iv) neither commutative nor associative

(iv) All of the above

## (d) The derivative of $x^{-2}$ with respect to x is $\frac{1}{2}$

(i) 
$$-2x^{-1}$$

$$\begin{vmatrix}
0 & 1 & 0 \\
1 & 0 & \varepsilon \\
0 & 1 & 0
\end{vmatrix}$$

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

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

(iv) 
$$2x$$

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

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

2) A a greate matrix A is called a matrix (i)

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

(c) Metrix addition is : believer gradulard

(iii) both commutative and associative (iii)

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

fiv) peither commutative nor associative in

(5) A system of linear equations AX = B is consistent and has a uni-(f) and has a unique solution if |A| = 0 any five of the following Distinguish between matrix and determinant |A| = 0 and  $(adj A)B \neq 0$ (iii) |A| = 0 and (adj A)B = 0Hexadecimal number system uses the base of (iv) (adj A)B = 08 (11) The binary equivalent of the decimal number (g)(11) 16 13 is 1101 (i) (i) The machine-independent program is High-level language 1011 (ii) (ii) low-level language (iii) 1110 (nii) assembly language

(iv) machine lauguage

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(iv) 111

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	(11)	2 bits			
	(10)	2 bits			
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	(ii)				
	(ii)	0			
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	(iv)	10			J
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(i) The machine-independent program is					7.7
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	(ii)	low-level	language		
	10.00			1110	(iii)
	(iii)	assembly	language		
	(iv) ]	machine l	language	Γ	
	(100)			IIIL	(m) I

SECTION II steve graturated (cf)

( Marks : 10 )

2×5=10

- 3. Answer/Write on any five of the following:
  - (a) Distinguish between matrix and determinant.

### (b) Operating System (OS)

A) 4 9 5

2 Answer/Write on any rive of the following OSEST (a) Distinguish between matrix and determinant.

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- (i) The machine-independent property to
  - Militaries language
  - low-level Marguege
  - Ad assembly and the
  - ic important large was

(9)

(c) Bus topology

(d) Compiler

(d) Compiler System (OE)

c) Rus topology

(11)

(e) Identity matrix

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

(g) E-commerce

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