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 : 9

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

Or

(b) *(i)* Find the value of the following determinant by Sarrus method : 5

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

(ii) State the four properties of determinants. 4

2. *(a)* If

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

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

Or

(b) Find the inverse of

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

3. *(a)* *(i)* Evaluate $\lim\limits_{x \to \infty} \dfrac{x - 5x^2 - 10x^3}{3 - x - 4x^2}$. 4

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

Or

(b) Find the maximum and minimum values of $y = 2x^3 - 3x^2 + x - 20$. 9

4. *(a)* State and discuss the various areas where the computer applications are used. 9

Or

(b) Discuss the various types of protocols used in Internet.

5. *(a)* Discuss the various types of computer networking. 9

Or

(b) Write notes on the following : 5+4=9

(i) Importance of e-commerce

(ii) Drawbacks of an Internet

★ ★ ★

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)

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 $A^2 = A$.

(T / F)

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

(T / F)

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

(T / F)

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

(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

$$\begin{vmatrix} 2 & 4 & 6 \\ 3 & 0 & -1 \\ 4 & -4 & 2 \end{vmatrix}$$

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

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

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

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

(iv) $2x$ [ ]

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

(i) $(\text{adj}\, A)' = \text{adj}\, A'$

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

(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 $(\text{adj}\, A)B \neq 0$

(iii) $|A| = 0$ and $(\text{adj}\, A)B = 0$

(iv) $(\text{adj}\, A)B = 0$ [ ]

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

(i) 1101

(ii) 1011

(iii) 1110

(iv) 111 [ ]

(h) A byte is a group of

(i) 4 bits

(ii) 6 bits

(iii) 8 bits

(iv) 2 bits [ ]

(i) Hexadecimal 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 [ ]

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

★★★