2015

(5th Semester)

COMMERCE

Paper No. : BC–503

(Business Mathematics and Computer Application)

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)* *(i)* If

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

show that $A^3 - 3A^2 - A + 9I = 0$. 6

(ii) Find BA, if

$$A = \begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix} \text{ and } B = [5 \quad 3 \quad 1]$$

3

Or

(b) (i) If

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

find adj A. 6

(ii) Solve the following using determinants : 3

$$2x - y = 5$$
$$3x + 2y = -3$$

2. (a) (i) Find the inverse of the matrix

$$\begin{bmatrix} 3 & 10 \\ 2 & 7 \end{bmatrix}$$

4

(ii) Evaluate (without expanding) the following : 5

$$\begin{vmatrix} 12 & 16 & 20 \\ 5 & -6 & 3 \\ 3 & 4 & 5 \end{vmatrix}$$

Or

(b) Three fruit sellers X, Y and Z went to a wholesale market to buy the following articles :

X buys 8 dozens of mangoes, 10 dozens of apples and 5 dozens of bananas; Y buys 9 dozens of mangoes, 9 dozens of apples and 7 dozens of bananas; and Z buys 12 dozens of mangoes, 5 dozens of apples and 5 dozens of bananas. A mango costs ₹ 5, an apple costs ₹ 6 and a dozen of banana costs ₹ 50.

Calculate each individual's bill by using matrix applications. 9

3. *(a)* *(i)* Evaluate the following : 3

$$\lim_{x \to 2} \frac{x^2 - 3x + 2}{x^2 - x - 2}$$

(ii) Find the maximum and minimum values of the function

$$\frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$$ 6

Or

(b) *(i)* Find $\frac{dy}{dx}$ of $y = \sqrt{(3x^2 - 7)}$ 3

(ii) Calculate the first-order partial derivatives of $3x^3 + 5xy + 2y^2$. 6

4. *(a)* Explain various generations of computer. 9

Or

(b) Discuss various kinds of computer language.

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

Or

(b) Write short notes on the following : 4½+4½=9

(i) Application of Internet in business

(ii) Shortcomings of online shopping

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COMMERCE

Paper No. : BC-503

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(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

1. Fill in the blanks : 1×5=5

(a) ..... method is applicable only in case of determinant of order 3.

(b) The matrix obtained by interchanging the rows and columns is called ..... .

(c) The method of obtaining the derivative of a composite function is known as

.....

(d) UNIX operating system which is a fixed part and not accessible to a user is called

.....

(e) ..... is a device used to connect digital signal to analog signal and vice versa.

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

(a) Gopher is a protocol that allows Internet user to move around the globe looking for information in various information centres.

(*T* / *F*)

(b) Loading DOS into memory is known as debugging the system.

(*T* / *F*)

(c) Logarithmic differentiation cannot be applied to a function which is the product or quotient of two or more functions.

(T / F)

(d) Matrix multiplication is always commutative.

(T / F)

(e) Cramer's rule does not apply, if $\Delta = 0$.

(T / F)

3. Tick (✓) the correct answer in the brackets provided : 1×5=5

(a) The output at which there is no profit and no loss is the

(i) marginal cost ( )

(ii) break-even point ( )

(iii) average cost ( )

(iv) revenue ( )

(b) The unit of memory is measured by

(i) megabyte ( )

(ii) kilobyte ( )

(iii) gigabyte ( )

(iv) terabyte ( )

(c) A computer which is linked to a computer network is referred to as

(i) host computer ( )

(ii) channel ( )

(iii) protocol ( )

(iv) workstation ( )

(d) A square matrix is called idempotent, if

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

(ii) $A^3 = 0$ ( )

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

(iv) $A'A = I$ ( )

(e) A determinant can be expanded by any row or by any column and the result is

(i) the same ( )

(ii) parallel ( )

(iii) zero ( )

(iv) opposite ( )

SECTION—II

(*Marks* : 10)

4. Write short notes on/Answer the following : 2×5=10

(a) Sarrus method

(b) Find the adjoint of $\begin{bmatrix} 2 & 5 \\ 6 & 7 \end{bmatrix}$.

(c) A function has been defined by

$$f(x) = \begin{cases} 2 - x & \text{when } 1 \leq x \leq 2 \\ x - \frac{1}{2}x^2 & \text{when } x > 2 \end{cases}$$

Find $f(1 \cdot 5)$ and $f(2)$.

(d) Binary number system

(e) Smart card

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