2022

(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) *(i)* Find the value of determinant by Sarrus method of the following : 3

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

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(ii) Solve with the help of Cramer's rule of the following : 6

$$x - y = 1$$
$$3x + 5y = 11$$

Or

(b) (i) State the four properties of determinants. 4

(ii) It is given that consumption C and savings S are functions of income Y. Also $Y = C + S$. If an economy may be described as $C = 100 + 0{\cdot}4Y$ and $S = 50 + 0{\cdot}3Y$, find the equilibrium income, consumption and savings by using Cramer's rule. 5

2. (a) (i) Find the Adj A, if

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

(ii) If

$$A = \begin{bmatrix} 2 & 5 & 6 \\ 3 & 5 & 1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 5 \\ 6 & 7 \\ 8 & 1 \end{bmatrix}$$

show that $AB \neq BA$. 5

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Or

(b) The following matrix gives the number of units of 3 products P, Q and R that can be processed per hour on 3 machines A, B and C :

$$\begin{bmatrix} 10 & 12 & 15 \\ 13 & 11 & 20 \\ 16 & 18 & 14 \end{bmatrix}$$

Determine by using matrix algebra, how many units of each product can be produced if the hours on machines A, B and C are 54, 46 and 48 respectively. 9

3. *(a)* *(i)* Evaluate the limit

$$\lim_{x \to 2} \frac{x^3 - 3x + 2}{x^2 - x - 2}$$ 4

(ii) Find the total derivatives of first-order of the function $V = x^3 - 3y$, where $y = 3x - 1$ w.r.t. x 5

Or

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

$$2x^3 + 3x^2 - 12x + 60$$ 9

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4. *(a)* What is operating system? Discuss the various functions of operating system. 2+7=9

Or

(b) Discuss the various kinds of computer languages. 9

5. *(a)* Write notes on the following : 4+5=9

(i) Features of E-commerce

(ii) Uses of Internet

Or

(b) Discuss the various types of protocols used in Internet. 9

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2022

(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) The derivative of a constant function is unity.

(T / F)

(b) If two rows or two columns of a determinant are identical, the value of determinant is unity.

(T / F)

(c) Determinant has got no numerical value.

(T / F)

(d) Intranet is an international network of networks.

(T / F)

(e) The process of finding and correcting program error is called debugging.

(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 involutory, if

(i) $A^2 = A$

(ii) $A^2 = I$

(iii) $A'A = I$

(iv) $A' = A$ [ ]

(b) Which of the following statements is ***not*** correct?

(i) Matrix multiplication is not distributive with respect to addition of matrices.

(ii) Matrix multiplication is not always commutative.

(iii) Matrix multiplication is associative if conformability is assured.

(iv) Matrix addition is commutative and associative.

[ ]

(c) If $|A| \neq 0$, then the system of linear equations is

(i) consistent and has a unique solution

(ii) not consistent and has no solution

(iii) consistent and has infinitely many solutions

(iv) None of the above [ ]

(d) The derivative of a function of multiple variables when all but variable of interests are held fixed during the differentiation is

(i) chain rule

(ii) Euler's theorem

(iii) partial derivatives

(iv) differentiation of implicit function [ ]

(e) The cofactor of A_{32} in

$$\begin{vmatrix} 2 & 4 & 1 \\ 0 & 1 & 5 \\ 6 & 4 & 2 \end{vmatrix}$$

is

(i) −16

(ii) 16

(iii) 10

(iv) −10 [ ]

(f) The derivative of a^3 with respect to x is

(i) $3a^2$

(ii) $a^4/4$

(iii) $3a^4$

(iv) 0 [ ]

(g) The decimal equivalent of $(10011)_2$ is

(i) 19

(ii) 18

(iii) 9

(iv) 6 [ ]

(h) What do you call a computer on a network that requests from another computer?

(i) A client

(ii) A host

(iii) A router

(iv) A web server [ ]

(i) Which of the following is ***not*** an Internet Protocol?

(i) HTTP

(ii) FTP

(iii) STP

(iv) IP [ ]

(j) 'Heart' of the computer system is the

(i) input unit

(ii) memory unit

(iii) control unit

(iv) CPU [ ]

SECTION—II

(*Marks* : 10)

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

(a) Find the value of x, if

$$\begin{vmatrix} 2 & 4 \\ 5 & 6 \end{vmatrix} = \begin{vmatrix} 9x & 5 \\ 5x & 6 \end{vmatrix}$$

(b) Binary number system

(c) Bus topology

(d) UNIX

(e) Compiler

(f) Rational and irrational number systems

(g) Operation rules of matrices

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