

**2 0 1 8**

( 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) Use Cramer's rule to solve for the equilibrium level of price  $P$  and quantity  $Q$ , given

$$\text{Supply : } 6P - 3Q = 36$$

$$\text{Demand : } 8P + 2Q = 192$$

4

- (ii) Find the equation of line joining  $A(4, 2)$  and  $B(10, 4)$  by using determinant. 5

Or

- (b) (i) Show that  $(a+b, c)$ ,  $(b+c, a)$  and  $(c+a, b)$  are collinear (using determinant). 5
- (ii) Prove that  $x = 2$  and  $x = 3$  are roots of the equation

$$\begin{vmatrix} x-5 & 2 \\ -3 & x \end{vmatrix} = 0 \quad 4$$

2. (a) (i) If

$$A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

show that

$$(aA + bB)(aA - bB) = (a^2 + b^2)A \quad 4$$

- (ii) A trust fund has ₹ 80,000 that is to be invested in two different types of bonds. The first bond pays 4% interest per year and second bond pays 5% interest per year. Determine how to divide ₹ 80,000 between two types of bonds so as to the trust obtain an annual interest of ₹ 3,500 by using matrix multiplication. 5

Or

- (b) (i) If  $A = \begin{pmatrix} 4 & 1 \\ 7 & 2 \end{pmatrix}$ , find the matrix  $B$  such that  $AB$  equals  $\begin{pmatrix} -2 & 0 \\ 0 & -2 \end{pmatrix}$ . 4

- (ii) Examine the consistency of the system of equations : 5

$$4x + 5y = 12 \text{ and } 12x + 15y = 20$$

3. (a) Find  $\frac{dy}{dx}$  of the following : 4+5=9

(i)  $y = x^x$

(ii)  $y = \sqrt{ax^2 + bx + c}$

Or

- (b) (i) Verify Euler's theorem for  $u(x, y) = x^3 - x^2y + 2xy^2 - y^3$  4

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

4. (a) Discuss the functions of operating system. 9

*Or*

- (b) Define binary number system. Why have computers been designed to use binary number system?

5. (a) Write the objectives and importance of E-commerce. 9

*Or*

- (b) Define network topologies. Explain some of the important network topologies.

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2018

( 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. Fill in the blanks : 1×5=5(a) A square matrix  $A$  is called non-singular, if

.....

(b) The value of a determinant

..... change when rows and columns are interchanged.

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

(d) Control unit in a computer system is considered as the ..... of the computer.

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

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

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

( T / F )

(b) If  $|A| \neq 0$ , then  $|A^{-1}| = \frac{1}{|A|}$ .

( T / F )

(c) A function may have several maxima and minima values.

( T / F )

(d) DTP refers to the use of computer for publishing books and other finished products.

( T / F )

(e) Hexadecimal number system is used with base 2.

( T / F )

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

(a) The cofactor of  $A_{12}$  in  $\begin{vmatrix} 2 & -4 \\ 5 & 6 \end{vmatrix}$  is

(i) 4 ( )

(ii) -4 ( )

(iii) 2 ( )

(iv) -2 ( )

(b) A square matrix  $A$  is called symmetric matrix, if

(i)  $A' = A$  ( )

(ii)  $A' = -A$  ( )

(iii)  $A'A = A$  ( )

(iv)  $A^2 = A$  ( )

(c) The derivative of  $\frac{1}{x}$  with respect to  $x$  is

(i)  $\frac{1}{x^2}$  ( )

(ii)  $-\frac{1}{x^2}$  ( )

(iii)  $x^2$  ( )

(iv)  $2x$  ( )

(d) The decimal equivalent of the binary number 101 is

(i) 1 ( )

(ii) 2 ( )

(iii) 4 ( )

(iv) 5 ( )

(e) 1 terabyte is equal to

(i) 1024 bytes ( )

(ii) 1024 KB ( )

(iii) 1024 MB ( )

(iv) 1024 GB ( )



SECTION—II

( Marks : 10 )

4. Answer the following questions :

2×5=10

(a) Distinguish between LAN and WAN.

(b) Write on the shortcomings of online shopping.

(c) Evaluate the limit of

$$\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3}$$

(d) If  $f(x) = \frac{ax+b}{bx+a}$ , prove that  $f(x)f\left(\frac{1}{x}\right) = 1$ .

(e) Find  $AB$ , if  $A = (2 \ 4)$  and  $B = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ .

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