

BMCA/BC-503

2018

(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

L9/134a

(Turn Over)

(2)

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

Or

- (b) (i) Show that $(a+b, c)$, $(b+c, a)$ and $(c+a, b)$ are collinear (using determinant).

- (ii) Prove that $x = 2$ and $x = 3$ are roots of the equation

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

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

(3)

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)

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.
