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(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) It is given that consumption (C) and savings (S) are functions of income (Y). Here, $C = 800 + 0.2Y$. If an economy may be defined as

$$C = 800 + 0.2Y$$

$$S = 700 + 0.05Y$$

Find the equilibrium income, consumption and savings (use Cramer's Rule). 9

Or

- (b) (i) Find the value by Sarrus diagram

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

5

- (ii) Find the value of

$$\begin{vmatrix} 3 & 5 & 9 \\ 0 & 3 & 1 \\ 2 & 5 & 0 \end{vmatrix}$$

4

2. (a) (i) Prove that the matrix A given by $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ satisfies the relation

$$A^2 - A(a+d) + (ad-bc)I = 0$$

where I is a unit matrix of order 2. 5

- (ii) If

$$A = \begin{pmatrix} 2 & 3 \\ 5 & 6 \\ 7 & 2 \end{pmatrix} \text{ and } B = \begin{pmatrix} 3 & 1 \\ 5 & 2 \\ 9 & 3 \end{pmatrix}$$

find a matrix Z such that $3A - 5B + 2Z = 0$. 4

Or

- (b) (i) A firm has in stock 50 dozen of handkerchiefs, 40 dozen socks, 30 dozen gowns. The selling prices are ₹60, ₹480 and ₹2,400 respectively. Find the total amount the firm will receive from selling all the items (by using matrix multiplication). 5

(3)

(ii) Let $A = \begin{pmatrix} 5 & 3 \\ 12 & 7 \end{pmatrix}$. If $A^2 - 12A - I_2 = 0$,
obtain A^{-1} . 4

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

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

(ii) If $f(x) = x \frac{x-m}{n-m} + x \frac{x-n}{m-n}$, where
 $m < n$, prove that
 $f(m) = f(n) = f\left(\frac{m+n}{2}\right)$. 5

Or

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

(ii) Find for which value of x , the
function $f(x) = 2x^3 + 3x^2 + 12x + 60$
is maximum. 5

4. (a) Discuss the various kinds of computer
languages. 9

Or

(b) Discuss the functions of operating
system. 9

(4)

5. (a) Explain the various types of computer
networking topologies. 9

Or

(b) (i) Write a note on the importance of
E-commerce. 4

(ii) Elaborate the shortcomings of
online shopping. 5
