Bus. maths (New)

CODE : NEODYMIUM

Time : 2 Hrs. **Marks : 60**

Note : 1] Section I is compulsory .

2] Attempt any three qeustions out of four questions from section II.

3] Simple calculators are allowed.

Section - I

Q.1 Attempt any Three of the following. 15

a) If $A = \begin{bmatrix} 4 & 2 \\ -3 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 1 \\ 3 & -1 \end{bmatrix}$

Prove $(AB)^I = B^I A^I$

b) If $A = \begin{bmatrix} 2 & 3 \\ 7 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -1 \\ -3 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 3 & -3 & 8 \\ 4 & -2 & 7 \end{bmatrix}$

Prove that A(BC) = (AB) C.

c) Find $\frac{dy}{dx}$ if (i) $y = (x^3 - \sqrt{x} + \log x)\ (3e^x + 5^x)$

(ii) $y = (5x^3 + 6x^2 + 2)\ (2^x - \log x)$

d) The sequence of 3 numbers a, b, c is an A.P. whose sum is 18. If a & b are each increased by 4 & C is increased by 36, the new numbers form a G.P. find a, b, c.

Q.2 Attempt any Three of the following 15

a) Given the following transaction matrix, find the input - output coefficient matrix & also write the balance equation.

	Purchasing Sector		
Producing	Agriculture	Industry	Final Demand
Agriculture	300	600	100
Industry	400	1200	400

b) Given below the transaction table, find the input - output coefficient matrix & also write the balance equation.

Purchasing Sector → / Producing sector ↓	Industry	Agriculture	Current Dedmand	Total Output
Industry	30	40	60	130
Agriculture	20	10	40	70

c) i) Define the Profit Function

ii) The demand function P = 1400 - 6x & the cost function C = 1500 + 80x, where x is the output. Find x for which the profit is increasing.

d) Examine the following function for maximum & minimum. Also find maximum & minimum values $f(x) = x^3 - 24x^2 + 189x + 10$.

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Section - II

Q.3 a) (i) Determine the principal that will earn Rs. 4000 as simple interest in 8 years at 5% p.a. 02

(ii) Find the compound interest of Rs.8,000 at the rate of 6% for 1.5 years, if the interest is calculated half yearly. 03

Q.3 b) (i) Define EMI. 02

(ii) A person borrows Rs.1,00,000 from a bank for a period of 4 years at 9% flat rate of interest. Compute EMI 03

Q.4 a) Define : (i) Total Revenue function 06

(ii) The Profit function

(iii) Total cost function.

b) Evaluate : (i) $\int \frac{(1-x)^3}{x}\,dx$ 04

(ii) $\int \frac{(x+1)\quad(x-4)}{\sqrt{x}}\,dx$ 04

Q.5 a) (i) What is the present value of an annuity of Rs. 3000 paid at the end of each year for 4 years at 10% p.a.? 06

(ii) How many four digit number can be formed using six digits 1, 3, 5, 7, 8 & 9 if (1) No digit is repeated in the same number.

(2) repetition of digits is allowed.

b) Evaluate : $\int_1^2 \frac{(1+x^2)}{x}\,dx$ 04

Q.6 a) If $A = \begin{bmatrix} 2 & -3 \\ 4 & -1 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix}$ 04

Find the matrix X s.t AX = B.

b) (1) Define Producer Surplus & Consumer Surplus. 06

(2) Find the Producer surplus for supply function

$P^2 - x = 9$ when $x_0 = 7$.

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