

Roll No.

Total Pages : 5

9890/NJ

F-47/2110

BUSINESS MATHEMATICS

Paper-BL-307

Semester-III

Syllabus-(Dec-15)

Time allowed : 3 Hours] [Maximum Marks : 70

Note: The candidates are required to attempt two questions each from Section A and B. Section C contain 12 short questions, attempt any 10 short questions.

SECTION-A

1. Explain the properties of determinants with suitable examples. 10

2. If

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

verify that $A \cdot A^{-1} = A^{-1} \cdot A = I$ 10

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3. Write notes on : 5,5

(i) Types of Annuities.

(ii) Valuation of Simple Loans and Debenture

4. Divide Rs. 6305 into three parts such that their amount at 5% compound interest (Chargeable annually) in 2, 3 and 4 years respectively, may all equal. 10

SECTION-B

5. What is linear programming problem ? What are the assumptions in formulating linear programming problem ? What are the major limitations? 10

6. Solve the L.P.P. by simplex method : 10

$$\text{Maximize } Z = 4x_1 + 3x_2 + 6x_3$$

Subject to

$$2x_1 + 3x_2 + 2x_3 \leq 440$$

$$4x_1 + x_2 + 3x_3 \leq 470$$

$$2x_1 + 5x_2 + x_3 \leq 430$$

where $(x_1, x_2, x_3) \geq 0$

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SECTION-C

7. A company is faced with the problem of assigning six different machines to five different jobs. The costs are estimated and given below :

		Jobs				
		J ₁	J ₂	J ₃	J ₄	J ₅
Machines	M ₁	6	2	5	2	6
	M ₂	2	5	8	7	7
	M ₃	7	8	6	9	8
	M ₄	6	2	3	4	5
	M ₅	9	3	8	9	7
	M ₆	4	7	4	6	8

Find the assignment pattern that minimises costs.

8. Solve the transportation problem and tests its optimality.

		Centres				
		C ₁	C ₂	C ₃	C ₄	Supply
Factories	F ₁	10	8	7	12	500
	F ₂	12	13	6	10	500
	F ₃	6	10	12	14	900
Demand		700	550	450	300	1900 2000

9. Attempt any ten short questions : 10×3=30

- (i) Define orthogonal matrix.
- (ii) Define scalar matrix and diagonal matrix.
- (iii) What are the problems of sinking funds ?
- (iv) Distinguish between simple and compound interest.
- (v) Define Matrix.
- (vi) What is unbounded solution ?
- (vii) Define Primal and Dual.
- (viii) Write the steps of Hungarian method.
- (ix) What is Degeneracy in transportation problem ?
- (x) Define Redundant constraints.
- (xi) What is prohibited assignment problem ?
- (xii) If principle amount is double in 6 years. What is compound rate of interest ?