

Seat No.

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F.Y.B.Com.

**124A: BUSINESS MATHEMATICS & STATISTICS-II**  
(CBCS 2019 Pattern)(Semester-II)

[Time: 2½ Hours]

[Max. Marks: 70]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of simple calculator is allowed.

Q.1) A) Fill in the blanks: (any five)

[5]

- a) A matrix whose all elements are zero is called as \_\_\_\_  
(Row matrix, zero matrix, column matrix)
- a) A matrix in which determinant is zero is called as \_\_\_\_  
(Singular matrix, non-singular matrix, symmetric matrix)
- b) Use of graphical method of LPP is to solve \_\_\_\_  
(Final solution, Linear Equation, Initial Solution)
- c) Karl Pearson's coefficient of correlation lies between \_\_\_\_  
(-3 to +3, -1 to +1, 0 to 1)
- d)  $\text{Corr}(X, X) =$  \_\_\_\_  
(1, -1, 0)
- f) \_\_\_\_ is known as the 'Ideal Formula' for constructing index numbers.  
(Fisher's Index, Paasche's Index, Laspeyre's Index)

B) State the following statements are 'True' or 'False': (any five) [5]

- a) Index number is an economic barometer.
- b) The extent of linear relationship between the two variables is called as correlation.
- c) A scalar matrix in which all diagonal elements are one is called as diagonal matrix.
- d) Determinant and matrix are of the same meaning.
- e) An index number is used to measure changes in a variable over time.
- f) In simple linear regression, the numbers of unknown constants are two.

P.T.O.

Q2) Solve any three from the following.

[15]

- a) If  $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix}$ . Find  $2A+3B$ ,  $A-B$ .
- b) A and B are two types of fertilizers available at Rs.30 per kg and Rs.50 per kg respectively. Fertilizer A contains 20 units of potash, 10 units of nitrogen and 40 units of phosphorous. Fertilizer B contains 15 units of potash, 20 units of nitrogen and 10 units of phosphorous. The requirement of potash, nitrogen & phosphorous is at least 1800, 1700, 1600 units. Formulate the LPP in order to minimize the total purchasing cost.
- c) Calculate cost of living index numbers for the following data:

Group	Index Number	Weight
Food	350	50
Fuel & Lighting	200	10
Clothing	240	10
House rent	160	10
Miscellaneous	250	20

- d) Explain any five types of Matrices with example.
- e) Define Correlation and types of correlation.

Q3) Solve any three from the following.

[15]

- a) Show that the matrix  $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$  satisfies the equation  $A^2 - 4A + I = 0$ .
- b) Solve graphically given LPP:  
Maximize  $Z = 3x + 5y$   
Subject to:  $2x + 3y \leq 12$   
 $3x + 2y \leq 18$   
 $x, y \geq 0$
- c) Calculate the Index number using Fishers method for the following data.

Commodities	Year 2018		Year 2019	
	Price	Quantity	Price	Quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	10
D	20	20	20	15

P.T.O

- d) State index numbers and its uses.  
 e) Find correlation coefficient between X & Y, given that,  
 $n=25, \sum X=75, \sum Y=100, \sum X^2=250, \sum Y^2=500, \sum XY=325$ .

**Q4) Solve any three from the following.**

[15]

a) Find the inverse of following Matrix:  $A = \begin{bmatrix} 2 & -3 \\ 1 & -2 \end{bmatrix}$

b) Draw the graphs of linear equation.

$$5x+3y=15$$

$$2x+5y=10$$

c) Obtain the rank correlation coefficient for the ranks given by two judges in a contest:

Rank by judge A	3	6	2	4	5	1
Rank by judge B	4	5	2	3	6	1

d) Explain the term 'Linear programming' also explain Decision variable, constraints & objective function.

e) Explain types of index numbers.

**Q5) a) Following are the value of import of raw Material and export of finished product in suitable units.**

[10]

Export	10	11	14	14	20	22	16	12	15	13
Import	12	14	15	16	21	26	21	15	16	14

Calculate the coefficient of correlation between the Import and Export values.

b) If  $A = \begin{bmatrix} 2 & 3 \\ -3 & 2 \end{bmatrix}$  &  $B = \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix}$ , Find AB & BA.

[5]

OR

b) A study of wheat prices at Mumbai and Kanpur yield the following data:

	Mumbai	Kanpur
Arithmetic mean	Rs.35	Rs.36
Standard deviation	Rs.0.326	Rs.0.207

Correlation coefficient between the prices at Mumbai and Kanpur is 0.774. Estimate the price at Kanpur if the price at Mumbai Rs.40 using above data.

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