Reg.No. : ☐☐☐☐☐☐

I.Answer all the questions.

II.Use blue pen only.

III.Question number 15 is compulsory.

Time : 01:30:00 Hrs

Total Marks : 95

Part-A

5 x 1 = 5

1) If X and Y are two variates, there can be atmost

(a) one regression line　(b) two regression lines　(c) three regression lines　(d) none of these

2) In a regression line of Y on X ,the variable X is known as

(a) independent variable　(b) dependent variable　(c) both (a) and (b)　(d) none of these

3) scatter diagram of the variate values (X,Y) give the idea about

(a) functional relationship　(b) regression model　(c) distribution of errors　(d) none of these

4) The lines of regression intersect at the point

(a) (X,Y)　(b) $(\bar{X}, \bar{Y})$　(c) (0,0)　(d) none of these

5) The term regression was introduced by

(a) R.A.Fisher　(b) Sir Francis Galton　(c) Karl pearson　(d) none of these

Part-B

5 x 6 = 30

6) From the data given below, construct a cost of living index number by family budget method for 1986 with 1976 as the base year.

Commodity	P	Q	R	S	T	U
Quantity in 1976 Base year	50	25	10	20	30	40
Price per unit in 1976 (Rs.)	10	5	8	7	9	6
Price per unit in 1986 (Rs)	6	4	3	8	10	12

7) A furniture manufacturing company plans to make two products, chairs and tables from its available resources, which consists of 400 board feet of mahogany timber and 450 man-hours of labour. It knows that to make a chair requires 5 board feet and 10 man-hours and yields a profit of Rs.45, while each table uses 20 board feet and 15 man - hours and has a profit of Rs.80. How many chairs and tables should the company make to get the maximum profit under the above resource constraints? Formulate the above as an LPP.

8) Calculate the correlation co-efficient from the following data N=25, $\Sigma X = 125, \Sigma Y = 100, \Sigma X^2 = 650, \Sigma Y^2 = 436, \Sigma XY = 520$

9) Find trend values to the following data by the method of semi-averages.

Year	1980	1981	1982	1983	1984	1985	1986
Sales	102	105	114	110	108	116	112

10) The sales in tonnes of a commodity varied from 1994 to 2001 as given below:

Year	1994	1995	1996	1997	1998	1999	2000	2001
Sales	270	240	230	230	220	200	210	200

Find the trend values by the method of semi-average.Estimate the sales in 2005.

Part-C

6 x 10 = 60

11) Solve graphically: Minimize $Z = 20X_1 + 40X_2$ Subject to $36X_1 + 6X_2 > 108$ 　 $3X_1 + 12X_2 > 36$ 　 $20X_1 + 10X_2 > 100$ 　 $X_1, \quad X_2 > 0$

12) Obtain the two regression lines from the following

X:	6	2	10	4	8
Y:	9	11	5	8	7

13) A firm manufactures headache pills in two sizes A and B. Size A contains 2 mgs. of aspirin. 5 mgs. of bicarbonate and 1 mg. of codeine. Size B contains 1 mg. of aspirin, 8 mgs. of bicarbonate and 6 mgs. of codeine. It is found by users that it requires atleast 12 mgs. of aspirin, 74 mgs. of bicarbonate and 24 mgs. of codeine for providing immediate relief. It is required to determine the least number of pills a patient should take to get immediate relief. Formulate the problem as a standard LPP.

14) A company manufactures two products P1 and P2. The company has two types of machines A and B for processing the above products. Product P1 takes 2 hours on machine A and 4 hours on machine B, whereas product P2 takes 5 hours on machine A and 2 hours on machine B. The profit realized on sale of one unit of product P1 is Rs.3 and that of product P2 is Rs. 4. If machine A and B can operate 24 and16 hours per day respectively, determine the weekly output for each product in order to maximize the profit, through graphical method.

15) a)　Maximize z = $x_1 + x_2$ subject to $x_1 + x_2 \leq 1$

$$4x_1 + 3x_2 \geq 12$$

$$x_1, x_2 \geq 0$$

(OR)

b)　Calculate the correlation co-efficient for the following heights (in inches) of fathers(X) and their sons(Y).

X :	65	66	67	67	68	69	70	72
Y :	67	68	65	68	72	72	69	71

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