Q.P. Code : 04957

[Time: Three Hours]   [Marks:100]

Please check whether you have got the right question paper.

N.B: 1.   All questions are compulsory.
        2.   Use of simple calculator is allowed

Q. 1 a) Correct the following if necessary, giving justification for each.   **(10)**
1) A coefficient of correlation computed is -0.95 means that relation between two variable is weak.   **(02)**
2) If r_{xy} = -0.84 then r_{yx} = 0.84   **(02)**
3) Sale of an Ice cream increases during summer season, it is an example of seasonal component in time **(02)**
series.
4) The Laspeyre's price index uses quantity of current year as base.   **(02)**
5) The linear curve is of the form YX = a+b   **(02)**

b) Answer in one sentence.   **(10)**
1 Define the term "coefficient of determination'.   **(02)**
2) State the expression of Spearman's rank correlation coefficient.   **(02)**
3) Define Marshall-Edgeworth's price index number.   **(02)**
4) If r=0.6, b_{yx}=1.2 then find value of bxy.   **(02)**
5) State the models of time series.   **(02)**

Q. 2   Attempt any TWO   **(20)**
1) I) Derive the normal equations for fitting a trend of the type y = a + bx for n pairs of values of (x,y). **(05)**
   II) How will you fit logarithmic curve?   **(05)**
2) I) Explain the concept of regression.   **(04)**
   II) State and prove any three properties of regression coefficient.   **(06)**
3) I) What is correlation? Explain when do you use rank correlation. How does the coefficient of rank **(04)**
   correlation between to variable differ from Karl Person's correlation coefficient.
   II) Derive the formula for Spearman's correlation coefficient using Karl Person's correlation coefficient. **(06)**
4) Find i) regression coefficient of y on x. ii) Estimate X when Y=18   **(10)**

X/Y	5-10	10-15	15-20	20-25
0-5	2	2	3	4
5-10	3	4	4	6
10-15	0	6	7	4
15-20	0	2	0	2

Q. 3   Attempt any TWO   **(20)**
1) Explain various components of time series giving suitable example for each.   **(10)**
2) I) Explain different models used in time series analysis.   **(06)**
   II) State applications of time series in business.   **(04)**
3) Discuss the following methods to estimate trend. Also state their merits and demerits.   **(10)**
   i) Moving average method ii) Semi average method.

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4) Describe the method of estimating seasonal variations by the ratio-to-trend method. State merits and **(10)** Demerits of ratio to trend method.

Q. 4   Attempt any TWO   **(20)**

1) Write short note on i) Cost of living index number   ii) deflating   iii) Splicing   **(10)**

2) Explain i) Time reversal test ii) Factor reversal test.   **(10)**
Further show that fisher's index number satisfies these tests.

3) I) What is an index number?   **(02)**
II) Explain i) Weighted aggregate method ii) Weighted average of price relative iii) Simple aggregate   **(08)**
method of calculating index number.

4) I)   Write note on cost of living index number.   **(04)**
II) Calculate the price index number for the year 2003 taking year 2000 as base using Arithmetic mean   **(06)**
of price relatives.

Items	Price in 2000	Price in 2003
A	20	25
B	12	18
C	40	48
D	50	56
E	36	44

Q. 5   Attempt any FOUR   **(20)**

1) Explain various steps involved in the construction of index numbers.   **(05)**

2) Describe fixed base and chain base index numbers.   **(05)**

3) Define following quantity index number by   **(05)**
i) Laspeyre's method ii) Paasche's method iii) Marshal-Edgeworth's method iv) Dobisch & Bowley's
methods v) fisher's method

4) Interpret the various values of r given below: -0.98, 0.27, 0.035, -0.02, -1   **(05)**

5) Mention utility of regression and correlation analysis.   **(05)**

6) Write a note on scatter diagram.   **(05)**

7) Prove that correlation coefficient is not affected by the shift of origin and change of scale.   **(05)**