

B.A. (Honours) Examination, 2015

Semester – II

Integrated Mathematics & Statistics

Paper : S.1.2 (Subsidiary)

(Statistics-II)

Time: 3 Hours

Full Marks: 40

Questions are of value as indicated in the margin.

Answer **any four** questions from the following.

1. (a) Prove that the correlation coefficient does not depend on the origin or scale of observation.
(b) While calculating the coefficient of correlation between two variables X and Y, the following results were obtained : $n = 25$, $\Sigma x = 125$, $\Sigma Y = 100$, $\Sigma x^2 = 650$, $\Sigma Y^2 = 460$, $\Sigma XY = 508$. It was however later discovered that two pairs of observations (X,Y) were copied as (6,14) and (8,6) while the correct values were (8,12) and (6,8) respectively. Determine the correct value of co-efficient of correlation. 4+6=10
2. (a) The correlation coefficient between two variates x and y is $r = 0.60$. If $\sigma_x = 1.5$, $\sigma_y = 2$, $\bar{x} = 10$, $\bar{y} = 20$, find the equation of the regression lines of (i) y on x (ii) x on y .
(b) If two variables x and y satisfy the relationship $y = -5+6x$, find the correlation coefficient between x and y . 6+4=10
3. (a) If X and Y are two correlated variables with same variance and the correlation coefficient is r find the regression co-efficient of X on (X+Y) and that of (X+Y) on X. Hence find the correlation coefficient between X and (X+Y).
(b) Do we consider these two lines $2x+3y=7$ and $3y-7x+2=0$ as the regression lines? Give reasons. 6+4
4. (a) Deduce Spearman's formulae' for rank correlation coefficient (without tie).
(b) In a contest two judges ranked seven candidates in order of their preference as in the following table:

Candidates	A	B	C	D	E	F	G
Ranks by Judge-I	2	1	4	5	3	7	6
Ranks by Judge-II	3	4	2	5	1	6	7

Calculate Spearman's Rank correlation coefficient.

5+5=10

P.T.O.

(2)

5. (a) What do you mean by a Time Series? Explain the different components of such a series.

- (b) The net profits of a company for eleven successive years are given below. Find the three yearly moving averages.

Year	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Profit (in Lacs)	2.7	2.9	3.4	5.2	5.8	6.4	9.3	9.2	9.8	10.2	11.0

5+5

6. Fit a straight line trend equation by the method of least squares from the following data and then estimate the trend value for the year 1985.

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Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Value	65	80	84	75	77	71	76	74	70	68

7. (a) Examine whether Fisher's Ideal Index formula satisfies the "Time reversal and Factor reversal Test".

- (b) Define Circular Test.

8+2

8. (a) Using Fisher's Ideal Formula calculate the quantity index no. from the following data:

Commodity	Base Year Price	Base Year Quantity	Current Year Price	Current Year quantity
A	5	50	10	56
B	3	100	4	120
C	4	60	6	60
D	11	30	14	24
E	7	40	10	36

- (b) Show that Walsh's index satisfies Time Reversal Test.

8+2=10