

B.A.(Honours) Examination, 2017
Semester-II
Integrated Mathematics & Statistics
Paper: S-1.2.5.P.2 (Subsidiary)
(Statistics-II)

Time: 3 Hours

Full Marks: 40

Questions are of value as indicated in the margin.

Answer **any four** from the following.

1. (a) Prove that the Correlation Coefficient does not depend on the origin or scale of the observations.
 (b) Given $\sum x = 56, \sum y = 40, \sum x^2 = 524, \sum y^2 = 256, \sum xy = 364$ and $n=8$, find the correlation coefficient. 6+4=10
2. (a) Deduce Spearman's formula of rank correlation coefficient.
 (b) If two variables x and y satisfy the relationship $y=-5+6x$, find the correlation coefficient between x and y . 8+2=10
3. Out of two regression lines given by $x+2y=5$ and $2x+3y=8$ which one is the regression line of x on y ? Find also the values of $\bar{x}, \bar{y}, r$ and σ_y given $\sigma_x = 12$. 10
4. Ten handwritings were ranked by two judges in a competition. The rankings are given below. Calculate Spearman's and Kendal's rank correlation coefficient to measure the closeness of the two rankings

A	B	C	D	E	F	G	H	I	J	
Judge-I	3	8	5	4	7	10	1	2	6	9
Judge-II	6	4	7	5	10	3	2	1	9	8

5+5=10
5. (a) Discuss the different steps that have to be taken in the construction of a Price Index Number.
 (b) Calculate the price index number by (i) Paasche's Method (ii) Laspeyer's Method

	1979		1980	
Commodities	Price (Rs)	Quantity (Kgs)	Price (Rs)	Quantity (Kgs)
A	20	8	40	6
B	50	10	60	5
C	40	15	50	10
D	20	20	20	15

6+4=10

P.T.O.

(2)

6. (a) Show that Fisher's Index satisfy both factor and Time reversal tests.
- (b) The percentage increase in price in 1971 over 1960 in the following groups for middle class people in Bolpur and the percentage of total expenditure spent on those groups are shown below. Calculate the cost of living index number for 1971 with 1960 as base

Group	% increase in price	% of total expenditure	
Food	125	45	
Clothing	66	6	
Fuel and Light	112	5	
House rent and Tax	90	10	
Miscellaneous	105	34	5+5=10

7. Describe briefly the different components of a Time Series. With which component of the Time Series would you associate each of the following? Why?
- (i) The rainfall that occurred in Calcutta for four days in February, 1981.
- (ii) A decline in Ice Cream Sales during November to March.
- (iii) An era of prosperity.
- (iv) Increase in garment sales in October. 5+5=10

8. Fit a straight line trend to the following series of production data

Year	1960	1961	1962	1963	1964	1965	1966
Y	37	38	37	40	41	45	50

"Y" values being the average production in thousand tons. Find the monthly trend values from the fitted equation for March, 1961. 8+2=10
