

BACHELOR OF ARTS EXAMINATION, 2019

(1st Year, 1st Semester , Old)

ECONOMICS**STATISTICS I**

Time : Two hours

Full Marks : 30

Answer *Question No. 1* and any *two* questions from the rest1. Answer briefly four questions from the following:

- (a) Find the harmonic mean of 9 observations of the form $(1/x)$, where $x = 1$ to 9.
- (b) Show $\Sigma(x_i + 1)^2 f_i = \Sigma x_i^2 f_i + 2\Sigma x_i f_i + N$, where $N = \Sigma n_i$
- (c) What is the relationship between the r^{th} order standardized moments about the origin and non-standardized moments about the origin for the population. When is such standardized moment unity?
- (d) Can the Laspeyres' and Paasche's formula lead to same price index? Justify.
- (e) What does a linear regression line of y on x imply? Illustrate with the help of a diagram.
- (f) What is Spearman Rank Correlation coefficient when two variables are in perfect disagreement with each other? Justify. 2.5x4

2. Calculate mean, median and mode of heights of students in a class from the following Table 1. Draw the histogram in the graph paper provided and what can you comment on the distribution of height in the class.

Table 1: Height of students in a class

| Height (in inches) | Frequency | Cumulative Frequency (< type) |
|--------------------|-----------|-------------------------------|
| 60-62 | 5 | 5 |
| 63-65 | 16 | 21 |
| 66-68 | 37 | 58 |
| 69-71 | 25 | 83 |
| 72-74 | 12 | 95 |
| 75-77 | 4 | 99 |
| 78-80 | 1 | 100 |

2+2+2+4

3. (a) Show $Ns^2 = n_1s_1^2 + n_2s_2^2 + (n_1n_2/N).(x_1 - x_2)^2$, where $N = n_1 + n_2$, and s_i and x_i are respectively the standard deviation and mean for the i th group.

(b) Prove that the variance of the first N positive integers is $(N^2 - 1)/12$.

(c) If two values , x_1 and x_2 , are obtained for the variate x , and if $\bar{x} = (x_1+x_2)/2$, show that

$$(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 = (x_1 - x_2)^2/2$$

$$\text{and } s_x = x_1 - x_2/2$$

$$3+4+1+2$$

4. Fit a straight line trend to the given data on production of steel ('000 metric tons) in India using the method of least squares and comment on the estimated coefficients and goodness of fit.

| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---------------------|------|------|------|------|------|------|------|------|------|------|
| Production of steel | 683 | 687 | 674 | 665 | 656 | 689 | 691 | 698 | 705 | 721 |

$$6 + 4$$