

BACHELOR OF ARTS EXAMINATION, 2022

(1std Year, 2nd Semester)

ECONOMICS**STATISTICAL METHODS FOR ECONOMICS**

Time : Two hours

Full Marks : 30

*Answer Question no.1 and any two from the rest***[Note:** All notations carry their usual meaning]1. Answer **any four** from the following

- (a) Show that if two variables and are linearly related in the form, then their medians are related by the same relation.
- (b) The mean, median and the coefficient of variation of a distribution are respectively 45, 42 and 40%. Find the coefficient of skewness.
- (c) Show that quartile deviation is independent of change of origin but depends on change of scale.
- (d) The mean monthly salary paid to all employees in a certain factory is Rs 5000. The mean monthly salary paid to male and female employees are Rs 5200 and Rs 4200 respectively. Obtain the percentage of male and female employees in the factory.
- (e) Examine whether Fisher's ideal index satisfies the 'time reversal' test.
- (f) Calculate 5-yearly moving averages of the number of students studying in a college from the following data:

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------|------|------|------|------|------|------|------|------|------|------|
| No. of Students | 332 | 317 | 357 | 392 | 402 | 405 | 410 | 427 | 405 | 431 |

- (g) If and are two positive values of a variable, prove that their geometric mean is equal to the geometric mean of their arithmetic and harmonic means.

$$2.5 \times 4 = 10$$

2. (a) If a variable takes the values with as the corresponding more-than type cumulative frequencies, then prove that , where is the total frequency.
- (b) Suppose a variable assumes the values and and other values all equal to. Find the standard deviation.
- (c) Show that standard deviation cannot be smaller than mean deviation about mean.

$$3+3+4=10$$

3. (a) The first four moments of a distribution about the value 4 of a variable are 1, 4, 10 and 45 respectively. Calculate and. Comment on the nature of the distribution.

[Turn over

(b) Show that correlation coefficient lies between -1 and +1.

(4+2)+4=10

4. (a) Two positively correlated variables and have standard deviations and respectively. Determine the value of the constant such that and are uncorrelated.

(b) Find the regression equation of on for the following data:

| | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|
| | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| | 5.3 | 5.7 | 6.3 | 7.2 | 8.2 | 8.7 | 8.4 |

(c) From the following data calculate price index number for the year 2000 with 1990 as base year by Fisher's formula.

| Commodity | 1990 | | 2000 | |
|-----------|-------|----------|-------|----------|
| | Price | Quantity | Price | Quantity |
| A | 65 | 40 | 81 | 46 |
| B | 72 | 35 | 90 | 54 |
| C | 57 | 92 | 77 | 72 |

3+4+3=10
