

2017

STATISTICS

[Honours]

(CBCS)

[First Semester]

PAPER – C1T

Full Marks : 40

Time : 2 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP – A

1. Answer five questions out of eight questions : 2×5

(a) Distinguish between Histogram and Bar Diagram. 2

- (b) A variable x takes only two values x_1 and x_2 .
Find the mean deviation about mean. 2
- (c) What are the errors in the construction of
index number ? 2
- (d) Distinguish between population and sample. 2
- (e) Distinguish between variance and coefficient
of variation. 2
- (f) Define Gini coefficient. 2
- (g) Define skewness and distinguish between
positively skewed and negatively skewed
distribution. 2
- (h) Define Spearman's Rank correlation. 2

GROUP – B

Answer **four** questions out of six questions : 4×5

2. If there are two groups of x_1 and x_2 observation
with harmonic means H_1 and H_2 respectively,
then find harmonic mean of the composite group

of $(x_1 + x_2)$ observations. Also, proved that composite harmonic means lies between two group harmonic means. 3 + 2

3. Prove that

$$\frac{R^2}{2n} \leq s^2 \leq \frac{R^2}{4}$$

where R is the range of a set of n observations and s is the standard deviation of that set. 5

4. If θ be the angle between the two lines of regression, show that

$$\tan\theta = \pm \frac{1-r^2}{r} \frac{s_x s_y}{s_x^2 + s_y^2}$$

and interpret the casts when $r = 0$ and $r = \pm 1$. 3 + 2

5. Using Cauchy Schwartz inequality prove that $b_2 \geq b_1 + 1$ with usual notation. 5

6. Define time reversal and factor reversal tests of Index Number. Examine whether Fisher's Ideal Index number satisfies these two tests. 5

7. What is Sheppard's correction for moments? Give the conditions for which these conditions are valid. 5

GROUP – C

Answer **one** question out of two questions : 10×1

8. Let x be a variable assuming the values $i = 1, 2, \dots, k$ with frequency f_i and greater than cumulative frequencies F_i' while F_i'' are the cumulative total of the greater than type of these cumulative frequencies. If n be the total frequency and

$$T_1 = \frac{1}{n} \sum_{i=1}^k F_i', T_2 = \frac{1}{n} \sum_{i=1}^k F_i''$$

show that $s^2 = sT_2 - T_1 - T_1^2$. 10

9. (a) Estimate coefficients of linear regression by ordinary least square method.
- (b) Show that correlation coefficient lies between -1 and $+1$. 10