

1849

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(b) Given the following data

$N = 23,713$ ,  $(A) = 1,618$ ,  $(B) = 2,015$ ,  $(C) = 770$ ,  
 $(AB) = 587$ ,  $(AC) = 428$ ,  $(BC) = 335$ ,  $(ABC) = 156$ ,

find the remaining class frequencies. (6,6)

(200)

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1849

C

Unique Paper Code : 32375101

Name of the Paper : Statistical Methods

Name of the Course : **Statistics: G.E. for Honours**

Semester : I

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
  2. Attempt **six** questions in all. Question No. **1** is compulsory.
  3. Attempt **five** more questions, selecting at least **two** questions from each of sections **A** and **B**.
  4. Use of a simple calculator is allowed.
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1. (a) (i) A set of data is said to be \_\_\_\_\_ if the values belonging to it can be ranked.

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- (ii) The values of a set of data are called \_\_\_\_\_ scale when the distance between any two adjacent units of measurement is the same but the zero point is arbitrary.
- (iii) The measure of Kurtosis  $\beta_2 =$  \_\_\_\_\_ .
- (iv) If either  $(AB) = 0$  or  $(\alpha\beta) = 0$  then  $Q =$  \_\_\_\_\_ .
- (v) Name the type of correlation coefficient which can never be negative.
- (b) The mean of ten numbers is 58. If one of the numbers is 40, then the mean of the other 9 numbers is \_\_\_\_\_ .
- (c) If the mean, mode, and standard deviation of a frequency distribution are 41, 45, and 8 respectively, then its Pearson's coefficient of skewness is \_\_\_\_\_ .
- (d) State the relation between  $\beta_1$  and  $\beta_2$ .
- (e) For a certain frequency distribution if mean = 40.5 and median = 36, find mode.

## SECTION B

6. (a) Define geometric mean and harmonic mean. Give two merits of each. Where are these used?
- (b) Explain the terms skewness and kurtosis. Also, explain the methods for measuring skewness and kurtosis of a frequency distribution. (6,6)
7. (a) Define Spearman's rank correlation coefficient. Prove that :

$$r = 1 - \frac{6 \sum_i d_i^2}{n(n^2 - 1)}$$

where  $d_i$  is the difference between the ranks of the  $i^{\text{th}}$  item. State the limits of rank correlation.

- (b) Define regression coefficients  $b_{yx}$  and  $b_{xy}$ . State and prove any three properties of the regression coefficients. (6,6)
8. (a) Define multiple correlation coefficient. With usual notations, show that :

$$1 - R_{1.23}^2 = (1 - r_{12}^2)(1 - r_{13.2}^2)$$

- (f) Given the variables  $U = \frac{X-2}{100}$ ,  $V = \frac{Y-100}{2}$  and  $r(U, V) = 0.75$ , find  $r(X, Y)$ . (1×5, 2×5)

### SECTION A

2. (a) Compare ordinal and interval scales of measurement. Give suitable examples.

- (b) Eight coins were tossed together and the number of heads resulting was noted. The operation was repeated 256 times and the frequencies (f) that were obtained for different values of X, the number of heads, are shown in the following table. Calculate median, quartiles, 4<sup>th</sup> decile and 27<sup>th</sup> percentile.

x:	0	1	2	3	4	5	6	7	8
f:	1	2	26	59	72	52	29	7	1

(6,6)

3. (a) The first four moments of a distribution about the value 4, of a variable, are  $-1.5$ ,  $17$ ,  $-30$ , and  $108$ . Find the moments about the mean,  $\beta_1$ ,  $\beta_2$ , and the moments about the origin.

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- (b) Define central moments of a frequency distribution. Obtain the relation between the central moments ( $\mu_r$ ) of order  $r$  in terms of moments  $\mu_r$  about any point  $A$ . Express  $\mu_2$ ,  $\mu_3$  and  $\mu_4$  in terms of moments about the point  $A$ . (6,6)
4. (a) Explain the term "dispersion". Discuss different measures of dispersion.
- (b) You can take a trip which entails travelling 900 km by train at an average speed of 60 km/hour, 3,000 km by boat at an average speed of 25 km/hour, 400 km by plane at 350 km/hour and finally 15km by taxi at 25 km/hour. What is your average speed for the entire distance? (6,6)
5. (a) Define the coefficient of dispersion based on different measures of dispersion. Also, define the coefficient of variation. How can it be used to compare the variability of two series?
- (b) For a group of 200 candidates, the mean and standard deviation of scores were found to be 40 and 15 respectively. Later on, it was discovered that the scores 43 and 35 were misread as 34 and 53 respectively. Find the corrected mean and standard deviation corresponding to the corrected scores. (6,6)