$n = 25$, $\Sigma X = 125$, $\Sigma Y = 100$, $\Sigma X^2 = 650$, $\Sigma Y^2 = 460$, $\Sigma XY = 508$. However, it was later discovered at the time of checking that it had copied down one pair as (X, Y) : (8, 6) while the correct value was (X, Y) : (6, 8), obtain the correct value of correlation coefficient.

7. (a) What is principle of least squares? Fit a straight-line $Y = a + bX$ to the following data

X	-4	-3	-2	-1	1	2	3	4
Y	-10	-7	-4	-1	5	8	11	14

(b) Define rank correlation coefficient. What are its limits? Under what condition these limits are attained?

8. (a) The line of regression of X on Y is $3Y - 2X - 10 = 0$ and Y on X is $2Y - X - 50 = 0$. Find two regression coefficients, correlation coefficients, $\bar{X}$, and $\bar{Y}$.

(b) Write the equations of two regression lines and find angle (θ) between them. Hence, find the value of r(X, Y), when

(i) $\theta = 0$,

(ii) $\theta = \frac{\pi}{2}$

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2429 **G**

Unique Paper Code : 2374001001

Name of the Paper : Basic Statistics

Name of the Course : **GE (NEP-UGCF) offered by Department of Statistics**

Semester : I

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **All** questions carry equal marks.
3. Attempt any **six** questions in all.
4. Use non-programmable calculator is allowed.

1. (a) Differentiate between :

(i) Quantitative and Qualitative variables,

(ii) Discrete and Continuous variables. Explain with suitable examples.

(b) Write short notes on :

(i) Cumulative frequency distribution,

(ii) Ogives.

Which average can be obtained from ogives and how? Also, write down the formula for computation of this average for a frequency distribution.

2. (a) What do you understand by measures of central tendency? What are its different measures? Explain how you will determine mathematically, mode and harmonic mean in case of frequency distribution.

(b) Find missing information from the following data :

	Group-I	Group-II	Group-III	Combined
Frequency	50	?	90	200
Mean	6	7	?	7.7
Standard deviation	113	?	115	116

3. (a) Define and discuss the following terms :

(i) Quartile deviation.

(ii) Mean deviation about mean, and

(iii) Standard Deviation.

Which one is best and why?

(b) In a frequency distribution, coefficient of skewness based upon the quartiles is 0.6. If the sum of first and third quartile is 100 and median is 38, find the value of the first and third quartiles.

4. (a) Define the term skewness. How is it measured? Explain graphically by showing the relative positions of mean, median and mode. What is the skewness if distribution is symmetrical?

(b) Define coefficient of variation. Discuss its advantage over standard deviation. Find coefficient of variation for the first 10 natural numbers.

5. (a) For a distribution, the first three moments about origin are 10, 116 and 1544 resp. Find first three moments about mean. Hence find mean, variance and measure of skewness.

(b) Define Karl Pearson's coefficient β_2 and γ_2. Discuss their utility in statistics. Explain with the help of graphs.

6. (a) Explain the concept of positive and negative correlation. Give an example of two dependent variables X and Y with correlation coefficient $r(X, Y) = 0$. Hence, interpret the case when $r(X, Y) = 0$.

(b) A computer while calculating correlation coefficient between two variables X and Y from 25 pairs of observations, obtained the following results :