[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 12975

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Unique Paper Code : 2374001001 (NEP-UGCF)

Name of the Paper : Basic Statistics

Name of the Course : **GE – I (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. **Section A** is Compulsory.
3. Attempt any **five** questions from **Section B**.
4. Use of non-programmable scientific calculator is allowed.

Section – A

1. Answer the following :

   (i) The point of intersection of less than ogive and more than ogive corresponds to _____ .

   (ii) The algebraic sum of deviations about mean is _____ .

   (iii) The system of grades in the military service is an example of a _____ scale.

   (iv) Extreme values have no effect on _____ .

   (v) Two attributes A and B are independent when _____ .

   (vi) If both the regression lines are perpendicular to each other, then we say that there is _____ correlation between X and Y.

P.T.O.

(vii) If both the regression coefficients are negative, the correlation coefficient would be _____ .

(viii) The mean age of group of 100 persons was found to be 32.02. Later it was detected that age 57 was misread as 27. Find the correct mean.

(ix) The marks of 60 students in section A is 40 and mean marks of 40 students in section B is 45. Find the combined mean of the 100 students in both sections.

(x) Examine the consistency of the following data:

N = 400, (A) = 300, (B) = 20 and (AB) = 70, the symbols having their usual meaning.

(xi) The coefficient of correlation between two variates X and Y is 0.8 and their covariance is 20. If variance of X series is 16, find the standard deviation of Y series. (1×7,2×4)

Section – B

2. (a) Define arithmetic mean with its merits and demerits. Show that sum of deviations about their arithmetic mean is least.

(b) Find the Median, 3rd Quartile and 9th Decile of the data given below:

Marks	0-10	10-20	20-30	30-40	40-50
No. of Students	4	6	10	7	3

(7,8)

3. (a) What is skewness and kurtosis? Explain how kurtosis can be measured.

(b) The following is the record of goals scored by team A is a football session:

No. of goals scored	0	1	2	3	4
No. of matches	1	9	7	5	3

For Team B, the average number of goals scored per match was 2.5 with a standard deviation of 1.25 goals. Find which team may be considered more consistent. (7,8)

4. (a) 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 correct mean and standard deviation corresponding to the correct figures.

(b) Using moments, calculate coefficient of skewness and kurtosis for the following distribution and comment on the result obtained :

Daily wages (`)	***Number of workers***
350 but below 400	8
400 but below 450	11
450 but below 500	18
500 but below 550	9
550 but below 600	4

(7,8)

5. (a) Explain the principle of least squares. Describe the method of fitting a curve of the type $Y = a + bx$ to a set of points (x_i, y_i); $i = 1,2, \ldots\ldots, n$.

(b) From the following data calculate Spearman's rank correlation where X and Y are the marks in English and Hindi respectively of a student :

X	48	33	40	16	16	65	24	16	9
Y	13	13	24	15	4	20	9	13	6

(7,8)

6. (a) Define the coefficient of correlation. What is it intended to measure? How would you interpret the sign and magnitude of calculated 'r'? Consider in particular the values $r = 0$ and -1.

(b) A computer while calculating the correlation coefficient between two variables X and Y obtained the results:

$N = 30$, $\Sigma X = 120$, $\Sigma X^2 = 600$, $\Sigma Y = 90$, $\Sigma Y^2 = 250$, $\Sigma XY = 356$.

It was how, later discovered that it has copied 2 pairs of observations as (8, 10) and (12, 7) while the correct values were (8, 12) and (10, 7). Obtain the correct values of correlation coefficient. (7,8)

7. (a) Can vaccination be regarded as preventive measure for small-pox from the data given below?

Of 1482 persons in a locality exposed to small-pox, 368 in all were attacked.'

'Of 1482 persons, 343 had been vaccinated and of these only 35 were attacked.'

(b) The following results are obtained for the data contained two variables X and Y :

Variance of X = 9 and

Regression equations, $8X-10Y = -66$, and $10X - 4.5\ Y = 53.5$

Find (i) the coefficient of correlation between X and Y.

(ii) the standard deviation of Y, and

(iii) Estimate value of Y when X = 15 (7,8)

8. (a) Explain the following (i) Order of a class, (ii) Ultimate class frequencies and. Find the total number of class frequencies of all orders, for n attributes.

(b) What do you understand by independence of attributes? Find if A and B are independent, positively associated or negatively associated, in each of the following cases :

(i) N = 1000, (A) = 470, (B) = 620 and (AB) = 320.

(ii) (A) = 490, (AB) = 294, (α) = 570 and (αB) = 380. (7,8)