

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1279 **D**

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.



P.T.O.

1. (a) Define the terms population and sample. Give examples of
  - (i) Finite population and its sample, and
  - (ii) Infinite population and its sample.
- (b) A variable takes the values 0, 1, 2, 3, 4, 5 with frequencies 1, 5, 10, 10, 5, 1 respectively. Find:
  - (i) Arithmetic Mean
  - (ii) Variance
  - (iii) Coefficient of Skewness ( $\beta_1$ ).

Also, comment on skewness of the data.

2. (a) Write a short note on 'histogram'. Which average can be obtained from it? Explain the method of finding out this average from a histogram. Also, write down the formula for the computation of this average for frequency distribution.

- (b) Find mean deviation from mean and standard deviation of the series: 2, 6, 10, 14, 18, 22, 26, 30, and verify that the latter is greater than the former.
3. (a) Define kurtosis. How is it measured? Represent the different values of kurtosis graphically.
- (b) What are the different measures of central tendency? A train runs 25 kilometers (km) at a speed of 30 km/hr., 50 km at a speed of 40 km/hr., and finally covers the remaining distance of 125 km at a speed of 20km/hr. What is the average speed for the entire distance?
4. (a) Explain the term "dispersion". Describe different measures of dispersion. Which is the best measure of dispersion and why?
- (b) Define Bowley's coefficient of skewness. What are its limits? What is the value of Bowley's coefficient of skewness:

- (i) If the distribution is symmetrical, and
- (ii) If 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quartiles are 30, 38, and 70 respectively?
5. (a) Define  $r^{\text{th}}$  moment about mean ( $\mu_r$ ) and  $r^{\text{th}}$  moment about origin ( $\mu'_r$ ). Express the first four moments about mean in terms of the moments about origin. Express mean and variance in terms of moments.
- (b) In two sets of variables X and Y with 50 observations each, the following data were observed:

$$\bar{X} = 10, \sigma_X = 3, \quad \bar{Y} = 6, \sigma_Y = 2 \text{ and } r(X, Y) = 0.3.$$

But on subsequent verification it was found that one value of X i. e. 10 and the corresponding value of Y i. e. 6 were inaccurate and hence weeded out. For the remaining 49 pairs of values, find the new value of  $r(X, Y)$ .

6. (a) Define Karl Pearson's correlation coefficient. How can you use scatter diagram to obtain an idea of the extent and nature of the correlation coefficient?
- (b) What is the effect of change of origin and scale on the correlation coefficient  $r(X, Y)$ ? If  $r(X, Y) = 0.2$ , find  $r(U, V)$ , where
- (i)  $U=2X-5$ ,  $V=-3Y+4$ , and
- (ii)  $U=-3X+2$ ,  $V=-4Y + 3$ .
7. (a) Define 'line of regression'. Why are there two such lines? Write their equations. What is the point of intersection of these two lines?
- (b) What is curve fitting? Find the line of best fit  $Y = a + bX$  to the given set of data:

X	12	10	14	18	16
Y	9	10	8	9	7

8. (a) The marks obtained by 5 students in Mathematics (X) and Statistics (Y) are (75, 85), (30, 45), (60, 64), (80, 91) and (53, 58). Find the rank correlation coefficient between X and Y and interpret your result.
- (b) State the properties of regression coefficients.

Can  $Y = 10 + 1.2 X$  and  $X = -2 - 0.7 Y$  be regression lines of Y on X and X on Y, respectively? Explain your answer with suitable arguments.