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Your Roll No.....

Sr. No. of Question Paper : 12976
Unique Paper Code : 2374001002
Name of the Paper : Introduction to Statistics
Name of the Course : GE (NEP-UGCF)
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. Attempt **six** questions in all. Question No. **1** is compulsory.
3. Attempt **five** more questions, selecting at least **two** questions from each of section **A** and **B**.
4. Use of non-programmable calculator is allowed.

1. (a) (i) A frequency distribution is said to be _____ if it has two modes.
(ii) The _____ scale allows both differences and ratios to be meaningfully interpreted, and it has a true zero.
(iii) The coefficient of variation (CV) based on quartile deviation is given by _____ .
(iv) If $r_{xy} = 0$, then variables x and y are said to be _____ .
(v) For a perfectly symmetrical distribution, mean, median, and mode are _____ . (1×5)
- (b) The average (mean) of 8 numbers is 25. If one of the numbers is 15, then the mean of the remaining 7 numbers is _____ .

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- (c) For a distribution, if mean = 52 and median = 50, find the mode using the empirical relation.
- (d) For a certain data set, mean = 27, standard deviation = 6, find coefficient of variation.
- (e) Find the simple arithmetic mean of the first n natural numbers.
- (f) A car travels 40 km at 80 km/h and then returns the same distance at 40 km/h. Find its average speed for the entire journey. (2×5)

Section A

2. (a) Explain the types of statistical averages with appropriate examples showing when each is most suitable to use.
- (b) Calculate the mean, median, and mode from the following data :

Class Interval	0-9	10-19	20-29	30-39	40-49	50-59
Frequency	3	7	12	10	6	2

(7,8)

3. (a) A cyclist pedals from his house to his college at a speed of 10 km.p.h. and back from the college to his house at 15 km.p.h. Find the average speed.
- (b) Define percentiles and deciles. Ten dice were rolled together, and the number of sixes obtained was recorded. This experiment was repeated 300 times, and the frequencies corresponding to the number of sixes (x) were as follows :

x (Number of sixes)	0	1	2	3	4	5	6	7	8	9	10
Frequency (f)	3	10	30	60	75	55	35	20	8	3	1

Calculate the median, quartiles, 6th decile, and 35th percentile. (7,8)

4. (a) Explain the term 'Skewness' with the help of a suitable example. Discuss different measures of skewness and their importance in statistical analysis.
- (b) Calculate : (i) Quartile deviation and (ii) Mean deviation from mean for the following data :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	6	5	8	15	7	6	3

(7,8)

5. (a) Define variance and coefficient of variation. Prove that mean deviation is independent of change of origin but depends on the scale of measurement. Illustrate with a suitable numerical example.
- (b) Define raw moments (r^{th} non-central moments) and central moments (r^{th} moments about the mean). Calculate the first four moments about the mean and about an arbitrary value 50 from the following data:

Class Interval	30-40	40-50	50-60	60-70	70-80
Frequency	4	6	10	8	2

(7,8)

SECTION B

6. (a) Explain the term 'Kurtosis'. Discuss its importance in understanding the shape of a distribution. Compare leptokurtic, mesokurtic, and platykurtic distributions, giving examples for each.
- (b) Define the coefficient of range. In a mathematics test, the marks obtained (out of 100) by Student A and Student B in 8 tests are as follows. Determine who shows greater consistency in performance.

Student A	72	65	80	90	75	85	70	60
Student B	55	65	60	70	85	90	95	50

(7.8)

7. (a) Define consistency in a set of classes. Explain why it is important in the theory of attributes. Give an example to show how consistent data helps in studying the relationship between two attributes.
- (b) In a school 50% of the students are boys, 60% are Hindus, and 50% are 10 years of age or over. Twenty percent of the boys are not Hindus and 40% of boys are under 10. What conclusion can you draw in regard to percentage of Hindu students of 10 years or over? (7.8)
8. (a) Explain the concepts of independence and association of attributes in statistics. Discuss the importance of studying association between attributes and describe the different methods used to measure the association between two attributes.
- (b) Determine whether attributes A and B are independent, positively associated, or negatively associated in each of the following cases :
- (i) $N = 1200, A = 600, B = 750, AB = 450$
- (ii) $A = 520, AB = 312, \alpha = 680, \alpha B = 420$
- (iii) $AB = 200, \alpha B = 720, A\beta = 100, \alpha\beta = 480$ (7,8)