

Statistics for Decision Making - I

Full Marks: 50

Time: 2 hrs 30 minutes

Answer 1 and 2 and any three from the rest

1. i) The following data shows the average monthly rainfall (in millimetres) across different regions of a fictional country. Give a proper diagrammatic representation to the data. (5)

Region	Average Rainfall (mm)
North Coast (Coastal)	145
Central Valley (Inland Plains)	65
East Highlands (Mountainous)	210
South Desert (Arid)	15
West Wetlands (Delta)	185

ii) Show, by proving necessary result(s) that, the correlation coefficient measures the strength of linearity of a given set of bivariate data. (5)

2. i) Prove or disprove: 'When there exists tied scores in a set of data, Spearman's approach of assigning ranks keeps the average rank the same, but impacts the variance of the ranks'. (6)

ii) The scores of students in a particular test are given below. Compute the mode of the data graphically: (4)

Score	90-99	80-89	70-79	60-69	50-59	40-49	30-39
Frequency	2	12	22	20	14	4	1

3. The time to failure in hours of a particular type of electronic components are shown below:

Class Interval Frequency

118–122	6
123–127	13
128–132	9
133–137	5
138–142	5
143–162	2
Total	40

- i) Draw the boxplot.
ii) Compute suitable measures of central tendency, dispersion and skewness. (3+7=10)

4. Prove that, mean deviation performs the best when taken about median. Can Root mean square deviation (RMSD) be considered as a better alternative? Justify with appropriate result (s). (6+4 = 10)

5. i) Analyse the following bivariate data on the heights of fathers and their sons, given in inch :

Father	60	58	55	61	65
Son	59	60	57	64	65

For a father with height 63 inch, what should be the expected height of his son? (7)

ii) Distinguish between primary data and secondary data. (3)

6. i) Define raw and central moments of r^{th} order. How moments can be used to define measures of central tendency, dispersion, skewness, kurtosis and correlation coefficient? (5)
- iii) Show that correlation coefficient lies between -1 and +1. (5)