

CHRIST UNIVERSITY, BANGALORE-560029

End Semester Examination October - 2013

CMS/EMS-I SEMESTER

Code : STA131-13

Max. Marks : 100

Sub : DESCRIPTIVE STATISTICS AND PROBABILITY THEORY

Duration : 3Hrs

General Instructions : Question numbers and notations must be clearly written. Scientific calculators allowed

SECTION A

Answer any TEN questions

10 X 2 = 20

- 1 List any two types of primary data collection.
- 2 Define bifold classification and give an example.
- 3 Write the formula for calculating 28th percentile and 7th decile in continuous frequency distribution.
- 4 The standard deviation of 10 observations is 2. Find the changed standard deviation if (i)each observation is increased by 4(ii)each observation is multiplied by 5?
- 5 Write the formula for calculating 28th percentile, explaining each term.
- 6 Define coefficient of determination.
- 7 State the two properties of regression coefficients.
- 8 State any two properties of residuals.
- 9 In a trivariate distribution, $\sigma_1=2$, $\sigma_2=\sigma_3=3$, $r_{12}=0.7$, $r_{23}=r_{31}=0.5$, find $R^2_{1.23}$.
- 10 Define independent event and give an example.
- 11 Define $P(A/B)$ stating all notations correctly. A and B are any two events.
- 12 Find $P(A \cap B)$ if $P(A)=1/2$, $P(B)=3/4$ and A and B are mutually exclusive events.

SECTION B

Answer any FOUR questions**4 X 6 = 24**

- 13 Explain various types of classification giving suitable examples.
- 14 Define geometric mean. When do we use it? Obtain the expression for combined geometric mean of 2 sets of observations.
- 15 Write short notes on skewness. Also obtain the limits for Bowley's coefficient of skewness.
- 16 Derive the line of regression of X on Y.
- 17 Show that (i) $1 - R_{12}^2 = (1 - r_{12}^2)(1 - r_{13}^2)$ (ii) If $R_{12} = 0$, X_1 is uncorrelated with any of the other variable.
- 18 A box contains 4 red and 3 green marbles. Another has 1 red and 2 green marbles. Two marbles are drawn at random from one of the boxes. What is the probability that
- (i) both are of the same colour?
- (ii) both are of different colour?
- b) What concept was used in the above question? Explain it briefly.

SECTION C**Answer any FOUR questions****4 X 14 = 56**

- 19 a. Explain the procedure of framing a schedule.
- b. Explain how the graphical representation of data can be used to locate averages
- 20 a) Show that the standard deviation is independent of change of origin but not of scale.
- b) Let r be the range and s be the standard deviation of a set of n observations. Then prove that $s \leq r$.

- 21 a) Define Spearman's rank correlation and derive the formula for computing the same.
- b) Show that rank correlation coefficient lies between -1 and +1.
- 22 State and prove the properties of multiple correlation coefficients, after defining the same with examples.
- 23 a) If A, B and C are mutually independent, prove that AUB and C are also independent.
- b) If A, B, C are pair wise independent and A is independent of BUC, then A, B and C are mutually independent.
- c) If A and B are independent, prove that A^c and B are independent
- 24 a) State and prove Bayes theorem. What is it used for?
- b) A machine manufactures 2% defectives. Another manufactures 1.5% defectives. An article is chosen from the manufactured common lot and is found to be defective. What is the probability that it came from machine 1?