



SS – 351

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First Semester B.Sc. Examination, November/December 2018
(CBCS) (Fresh+Repeaters)
(2017-18 and Onwards)
STATISTICS – I
Basic Statistics – I

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Answer **ten** sub-divisions from Section – **A** and **five** questions from Section – **B**.
2) Scientific calculators are permitted.

SECTION – A



(20 Marks)

(10x2=20)

1. Answer **any ten** sub-questions from the following :
 - a) Distinguish between nominal and ordinal scale.
 - b) What are inclusive and exclusive class intervals ? Give examples.
 - c) Mention the uses of graphs in a statistical study.
 - d) Define geometric mean and harmonic mean.
 - e) Distinguish between absolute and relative measures of dispersion.
 - f) Explain positive and negative correlation with the help of scatter diagram.
 - g) Explain Legendre's principle of least squares.
 - h) State the properties of regression coefficients.
 - i) Define Rank correlation coefficient and write its limits.
 - j) Define "residual variance" and write its expression.
 - k) State axioms of probability.
 - l) Define :
 - i) Mutually exclusive event
 - ii) Equally likely events.

SECTION – B

(50 Marks)

Answer **any five** questions from the following :

(5x10=50)

2. a) Explain the various method of collecting primary data.
- b) Distinguish between questionnaire and schedule. What precautions to be taken while drafting a questionnaire ? (5+5)

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3. a) What are partition values ? How do you obtain them graphically ? Explain.
 b) Define weighted arithmetic mean and find the weighted arithmetic mean of first 'n' natural numbers, the weights being the corresponding numbers. (5+5)
4. a) Explain graphical method of locating mode.
 b) State the properties of arithmetic mean and prove one of them.
 c) Derive the expression for combined variance of two series A and B with n_1 and n_2 observations respectively. (4+3+3)
5. a) Obtain the relation between central moments in terms of raw moments.
 b) Show that $\beta_2 \geq \beta_1$, where β_1 and β_2 are moment co-efficient of skewness and Kurtosis respectively. (5+5)
6. a) Prove that Spearman's rank correlation coefficient is given by $1 - \frac{6 \sum_{i=1}^n di^2}{n^3 - n}$, where di denotes difference between ranks.
 b) Examine the effect of change of origin and scale on the correlation co-efficient (r). (5+5)
7. a) Obtain the equation to the plane of regression of X_1 on X_2 and X_3 .
 b) If $r_{12} = r_{23} = r_{13} = r$, then prove that $R_{1,23} = \frac{r\sqrt{2}}{\sqrt{1+r}}$. (7+3)
8. a) Define conditional probability. State and prove multiplication theorem of probability.
 b) If A, B and C are mutually independent events, show that A is independent of $(B \cup C)$.
 c) Define "pairwise" and "mutual independence" of events. (4+3+3)
9. a) Prove the following :
 i) $P(A \cap B') = P(A) - P(A \cap B)$
 ii) $P(A \cup B) = P(A \cap B') + P(A \cap B) + P(A' \cap B)$
 iii) If $B \subseteq A$, prove that $P(B) \leq P(A)$.
 b) State and prove Bayes' theorem. (6+4)