First Semester B.Sc. Examination, November/December 2017
(CBCS) (Fresh) (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)

1. Answer **any ten** sub-divisions from the following in first **3** pages only.   (10×2=20)

   a) Distinguish between primary data and secondary data.

   b) Explain exclusive and inclusive type of class intervals. Give examples.

   c) Mention the uses of graphs in a statistical study.

   d) Define median and mode.

   e) Define mean-deviation and standard-deviation.

   f) Define Karl-Pearson's co-efficient of correlation and mention its limits.

   g) What is scatter diagram ? Explain the case of perfect correlation with the help of scatter diagram.

   h) What is regression ? Write the regression equation of X on Y interms of means, standard deviations and correlation co-efficients.

   i) Define rank correlation co-efficient and give the formula for rank correlation co-efficient for tied ranks.

   j) Define "residual variance" and write its expression.

   k) State classical definition of probability and mention its limitations.

   l) Define :
      i) Conditional probability
      ii) Independent events.

P.T.O.

SECTION – B   (50 Marks)

Answer **any five** questions from the following :   (5×10=50)

2. a) Mention the methods of collecting primary data and discuss one of them.

   b) Distinguish between :

      i) Classification and tabulation

      ii) Simple and complex tables.

   c) Explain the construction of ogive and mention its utility.   (4+3+3)

3. a) State the properties of arithmetic mean and prove one of them.

   b) Obtain an expression for combined geometric mean.

   c) Distinguish between simple arithmetic mean and weighted arithmetic mean. Obtain weighted mean for the first 'n' natural numbers whose weights are equal to the corresponding numbers.   (3+3+4)

4. a) What are partition values ? How do you obtain them graphically ? Explain.

   b) Distinguish between absolute and relative measures of dispersion. List them.

   c) Find variance of first 'n' natural numbers.   (4+3+3)

5. a) Define moments of a frequency distribution and explain how the first four moments are used to describe the characteristics of a frequency distribution.

   b) Explain 'Kurtosis' of a distribution and show that moment co-efficient of Kurtosis β_2 is more than unity.   (5+5)

6. a) What is correlation ? Show that Karl-Pearson's co-efficient of correlation is independent of change of origin and scale.

   b) Obtain the expression for an acute angle θ between two regression lines and interpret the case when $r = 0$, $r = +1$, $r = -1$.   (4+6)

7. a) Obtain the equation to the plane of regression of X_1 on X_2 and X_3.

   b) If $r_{12} = r_{\alpha 3} = r_{13} = r$, then prove that $R_{1.23} = \dfrac{r\sqrt{2}}{\sqrt{1+r}}$.   (7+3)

8. a) Define :

   i) Sample space

   ii) Mutually exclusive events

   iii) Exhaustive events.

   b) State the axioms of probability and prove the following :

   i) $P(A' \cap B) = P(B) - P(A \cap B)$

   ii) $P(A/B') = \dfrac{P(A) - P(A \cap B)}{1 - P(B)}$.   (3+7)

9. a) Define 'Pairwise' and 'Mutual Independent' events.

   If A, B, C are pair-wise independent events and A is independent of $(B \cup C)$, then prove that A, B and C are mutually independent events.

   b) State and prove Bayes' theorem.   (5+5)

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