First Year B.Sc. (Computer Science)
STATISTICS
CSST-121: METHODS OF APPLIED STATISTICS
(2019 Pattern) (Semester -II) (Paper-I)

[Max. Marks: 35]

[Time : 2 Hours]

Instructions to the candidates:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of calculator and statistical tables is allowed.
4) Symbols and abbreviations have their usual meaning.

Q1) Choose the most appropriate alternative for each of the following: **[1 each]**

i) Correlation measures the extent of ...... relation between two variables.

   a) Parabolic   b) Linear

   c) Logarithmic   d) Exponential

ii) In time series, the component having period of oscillation more than one year is...

   a) Trend   b) Cyclical variation

   c) Seasonal variation   d) Random Variation.

iii) Partial correlation coefficient $r_{23.1}$ is the simple correlation between

   a) X_2 and X_3

   b) X_1 and X_2 when linear effect of X_3 is eliminated from each of them.

   c) X_1 and X_3

   d) X_2 and X_3 when linear effect of X_1 is eliminated from each of them.

iv) The $Corr(X,Y)$ is lies between .....

   a) -1 to 1   b) 0 to 1

   c) -1 to 0   d) 0 to ∞

P.T.O.

Q2) Attempt any FIVE of the following; [2 each]

    a)   State the additive and multiplicative models of time series.

    b)   Define partial correlation coefficient for a trivariate data.

    c)   State any two properties of regression coefficient for bivariate data.

    d) $r_{12} = 0.6, r_{13} = -0.9, r_{23} = 0.8$. Are the given data consistent?

    e)   Explain the term correlation.

    f)   Define time series. State the components of Time series.

    g)   State the types correlation for the following:

        i) Weight and blood pressure of individuals.

        ii) Demand and price of product.

    h)   For a certain bivariate data the least square lines of regression are
        $3X - Y = 5$ and $4X - 3Y = 0$. Obtain means of X and Y.

Q3) Attempt any TWO of the following: [4 each]

    a)   For a trivariate data: $r_{12} = 0.6$, $r_{13} = 0.7$, $r_{23} = 0.65$. Compute $R_{1.23}$

    b)   Describe the stepwise procedure of fitting of regression of Y on X to the bivariate data using method of least squares.

    c)   Explain the concept of correlation. State the properties of correlation coefficient.

Q4) Attempt any Two of the following [4 each]

    a)   What is time series? Explain the components of time series.

    b)   Write short note on scatter diagram. State its merits as a measure of correlation.

    c)   Find correlation coefficient between X and Y given that:
$$n = 8, \sum (x - \bar{x})^2 = 36, \sum (y - \bar{y})^2 = 44, \sum (x - \bar{x})(y - \bar{y}) = 24$$

Q5) Attempt any ONE of the following:

[5 each]

a) Explain the concept of multiple partial correlation in case of trivariate data. Also state the expression for $r_{12.3}$.

b) Estimate trend by using 3 yearly moving averages for the following data:

Year	2015	2016	2017	2018	2019
Production (in lac tonnes)	12	20	28	32	50

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