Total No. of Questions : 5]

P356

SEAT No. :

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F.Y.B.Sc.

STATISTICS

Descriptive Statistics

(2013 Pattern) (Paper - I)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

1) All questions are compulsory.

2) Figures to the right indicates full marks.

3) Use of statistical tables and calculators is allowed.

4) Symbols have their usual meanings.

Q1) Attempt each of the following:

a) i) Define the term Attribute. [1]

ii) State any two merits of arithmetic mean. [1]

iii) Define the term class-boundaries. [1]

iv) Define the term sample. [1]

b) Choose the correct alternative for each of the following: [1 each]

i) Which of the following is a measure of central tendency.

A) Arithmetic mean   B) Variance

C) Range   D) S.D.

ii) If the smallest value in a set of observations is 82 and it's range is 22, the largest value of the set is

A) 60   B) 104

C) 22   D) 82

P.T.O.

iii) The value of excess of kurtosis (γ_2) for a platykurtic distribution is,

    A) O   B) Positive

    C) Negative   D) 3

iv) If the equation of line of regression of Y on X is $2x - 3y = 9$, the regression coefficient of Y on X is :

    A) $\frac{2}{3}$ B) $\frac{3}{2}$

    C) 3   D) $\frac{-2}{3}$

c) i) Explain the term population.   [2]

  ii) State the formula of mode for grouped frequency distribution. [2]

  iii) Define correlation coefficient.   [2]

  iv) The first 2 raw moments of a frequency distribution are 2 and 20 respectively. Find standard deviation of the distribution.   [2]

Q2) Attempt any <u>four</u> of the following: [4 × 4 = 16]

a) Explain two - stage random sampling with one illustration.

b) State any two merits & demerits of median.

c) Distinguish between primary and secondary data.

d) Explain different methods of classification.

e) A distribution has mean 30, coefficient of variation 20% and coefficient of skewness is 0.3. Find its mode.

f) If n = 10, $\sum (X - 120) = 20$, $\sum (X - 120)^2 = 200$, find the mean and standard deviation.

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Q3) Attempt any <u>four</u> of the following: [4 × 4 = 16]

   a) What is correlation? Explain its different types with illustrations.

   b) Explain how to obtain quartiles in case of frequency distribution.

   c) Define central moments. State the relationship between 4th central moment and raw moments.

   d) Make a critical comparison between Laspeyre's and Paasche's index numbers.

   e) For a bivariate data we have:

$$\overline{X} = 53, \overline{Y} = 28, byx = -1.5, bxy = -0.2.$$

     Find   i)   Correlation coefficient between X and Y.

             ii) estimate Y for X = 60.

   f) In an examination 60% passed in Mathematics, 52% passed in statistics while 32% failed in both the subjects. Find the percentage of students passed in both the subject.

Q4) Attempt any <u>two</u> of the following: [2 × 8 = 16]

   a) i) Show that correlation coefficient is independent of change of origin and scale numerically.

       ii) Is the following information consistent:

           N = 100, (A) = 30, (B) = 40, (AB) = 35.

   b) i) Explain the advantages of sampling over census.

       ii) If X and Y are uncorrelated variables then show that, $Var(X + Y) = Var(X - Y)$.

   c) i) Discuss the effect of change of origin and scale on arithmetic mean.

       ii) Spearman's rank correlation coefficient between the marks in Accountancy and statistics for a group of students is 0.5. If the sum of squares of differences between the ranks is 42 find the number of students in the group assume that no rank is repeated.

   d) i) State and prove minimal property of mean squared deviation.

       ii) If the first three raw moments of a distribution are 1, 4 and 10 respectively, compute coefficient of skewness (γ_1) and comment on the type of skewness.

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Q5) Attempt any <u>one</u> of the following: [1 × 16 = 16]

   a)   i)   Derive an expression for line of regression of Y on X, for a set of n observations on a bivariate random variable (X, Y). [8]

        ii)   Explain the term Kurtosis. Give a measure of Kurtosis. [4]

        iii)   Given that; $r = 0.4$, $\sum \left(X - \overline{X} \right)\left(Y - \overline{Y} \right) = 108$, $Var(Y) = 9$, $\sum \left(X - \overline{X} \right)^2 = 900$. Find number of pairs of observations (*n*). [4]

   b)   i)   Define following terms: [8]

           I)   Bowley's coefficient of skewness.

           II)   Independence of two attributes.

           III)   Coefficient of determination.

           IV)   Coefficient of association.

        ii)   Calculate Fisher's price index number for the following data: [4]

Commodities	2011		2012	
	Price (₹)	Quantity (Kg.)	Price (₹)	Quantity (Kg.)
A	20	8	40	6
B	50	10	60	5
C	40	15	50	10

        iii)   Discuss any one problem involved in construction of an index number. [4]

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