Exam. Code: 5003
Sub. Code: 10818

2125

Bachelor of Arts (FYUP) Third Semester

Statistics

Descriptive Statistics -II

(Common with B.Sc. 3rd Semester, NEP)

Time allowed: 3 Hours

Max. Marks: 60

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting one question from each Unit.*

x-x-x

Q.1. Attempt the following:-

(a) Write down the properties of regression coefficients.

(b) Define residuals in regression analysis.

(c) Write down the expression for Spearman's Rank Correlation Coefficient.

(d) Give two examples where regression analysis can be used.

(e) Show Scatter diagram showing positive correlation. (3,3,2,2,2)

UNIT - I

Q. 2 (a) Write a detailed note on Karl Pearson's Correlation Coefficient, clearly mentioning its formula and its important properties.

(b) Distinguish between correlation and causation. Give an example where correlation exists but causation does not. (6, 6)

Q.3 (a) What is Spearman's rank correlation? When should this test be used? How does Spearman's differ from Pearson's correlation?

(b) Define Correlation. Give detailed note on various type of correlation with examples. Also define scatter plot. Describe in detail how it is used to study relationship between two variables. (6, 6)

UNIT - II

Q4. (a) Derive the normal equation for fitting a straight line of the form $y = a + bx$ using the method of least square.

(b) Explain the procedure for fitting an exponential curve of the form $y = ae^{bx}$. Why the curve is first transformed into a linear form? (6, 6)

P.T.O.

Q.5 (a) Discuss the applications of power curves and exponential curves in real life situations.

(b) Explain in detail the conditions under which a second degree parabola provides a better fit than a straight fit. (6, 6)

UNIT - III

Q.6 (a) What do you understand by the term 'Regression'? Define the regression equation of Y on X and its usefulness.

(b) Derive the standard error of estimate of Y obtained from the linear regression equation of Y on X. What does this standard error measure? (6, 6)

Q.7 (a) Show that the coefficient of correlation between the observed and estimated values of Y obtained from the line of regression of Y on X is same as that between X and Y.

(b) In a laboratory experiment on correlation research study the equation of the two regression lines were found to be $2X - Y + 1 = 0$ and $3X - 2Y + 7 = 0$. Find the means of X and Y. Also work out the values of the regression coefficient and correlation between the two variables X and Y. (6, 6)

UNIT - IV

Q.8 (a) Explain the properties of residuals in regression model. Why must the sum of residuals be zero?

(b) Define and explain the use of partial and multiple correlation coefficients. (6, 6)

Q.9 (a) Define the coefficient of partial correlation. State and prove its properties.

(b) What do you understand by variance of residuals? Discuss how it is related to total variance. (6, 6)

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