**SAINTGITS COLLEGE OF APPLIED SCIENCES**

**First Internal Assessment Examination, February 2019**

**B.Com Fourth Semester (Computer Applications & Taxation)**

**QUANTITATIVE TECHNIQUES FOR BUSINESS II**

**Section A**

1. What is PE?

The **Probable Error of Correlation Coefficient** helps in determining the accuracy and reliability of the value of the coefficient that in so far depends on the random sampling.n other words, the probable error (P.E.) is the value which is added or subtracted from the coefficient of correlation **(r)** to get the upper limit and the lower limit respectively, within which the value of the correlation expectedly lies.

The probable error of correlation coefficient can be obtained by applying the following formula: 

1. What do you mean by spurious correlation?

In statistics, a *spurious correlation*, or spuriousness, refers to a connection between two variables that appears causal but is not. ... This *spurious correlation* is often caused by a third factor that is not apparent at the time of examination, sometimes called a confounding factor.

1. What is coefficient of alienation?

The **coefficient of alienation** (a.k.a., **coefficient** of non-determination) represents the proportion of variance in the dependent variable that is not accounted for by the independent variable(s). It is the **coefficient** of determination's counterpart. It is estimated by 1 - r2.

1. What is regression line of X on Y?

The line of regression of Y on X is given by Y = a + bX where a and b are unknown constants known as intercept and slope of the equation. ... On the other hand, the line of regression of X on Y is given by X = c + dY which is used to predict the unknown value of variable X using the known value of variable Y.

1. Explain Simple and Multiple Regressions?

It is also called a simple linear regression. It establishes the relationship between two variables using a straight line. ... If two or more explanatory variables have a linear relationship with the dependent variable, the regression is called a multiple linear regression.

1. What are the characteristics of regression analysis?

In regression analysis, one variable is dependent and other is independent. Also, it measures the degree of dependence of one variable on the other(s). The regression coefficient was first used to measure the relationship between the heights of fathers and their sons.

 **(5 X 2 = 10 marks)**

 **Section B**

*Answer any 5 questions. Each question carries 5 marks.*

1. Explain the merits and demerits of scatter diagram method.

Demerits of Scatter Diagram: (i) A scatter diagram does not measure the precise extent of correlation. (ii) It gives only an approximate idea of the relationship. (iii) It is only an qualitative expression of the quantitative change.

The following are a few advantages of a scatter diagram: It shows the relationship between two variables. It is the best method to show you a non-linear pattern. The range of data flow, i.e. maximum and minimum value, can be easily determined.

1. Distinguish between correlation and regression.

Correlation is a statistical measure which determines co-relationship or association of two variables. Regression describes how an independent variable is numerically related to the dependent variable. ... Regression indicates the impact of a unit change in the known variable (x) on the estimated variable (y).

Correlation is used to represent the linear relationship between two variables. On the contrary, regression is used to fit the best line and estimate one variable on the basis of another variable. ... As opposed to, regression reflects the impact of the unit change in the independent variable on the dependent variable.

1. What are the characteristics of Karl Pearson’s Coefficient of Correlation?

Properties of Coefficient of Correlation

The value of the coefficient of correlation (r) always lies between ±1. Such as:

r=+1, perfect positive correlation

r=-1, perfect negative correlation

r=0, no correlation

The coefficient of correlation is independent of the origin and scale. By origin, it means subtracting any non-zero constant from the given value of X and Y the vale of “r” remains unchanged. By scale it means, there is no effect on the value of “r” if the value of X and Y is divided or multiplied by any constant.

The coefficient of correlation is a geometric mean of two regression coefficient. Symbolically it is represented as:

Karl Pearson-3

The coefficient of correlation is “ zero” when the variables X and Y are independent. But, however, the converse is not true.

1. Find out the coefficient of rank correlation  from the following:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks by judge A | 80 | 78 | 75 | 75 | 68 | 67 | 60 | 59 |
| Marks by judge B | 72 | 78 | 84 | 84 | 84 | 96 | 90 | 98 |

Ans) R = -0.928

1. In order to find the correlation coefficient between two variables X and Y from 12 pairs of observations, the following data were obtained:

 ΣX2 = 670 ΣY2= 285 ΣXY = 344   ΣX= 30   ΣY= 5

Later on it was discovered that the pair (X =11, Y=4) was copied wrongly and the correct values are (X= 10, Y= 14). Find the correct regression coefficients, regression equations and correlation coefficient.

Ans) Regression Equation of X on Y : X= 0.905Y +1.286

Regression Coefficient; bxy=0.905

 Regression Equation of Y on X : Y= 0.697X - 0.435

Regression Coefficient; byx = 0.697

Correlation coefficient, r = 0.794

1. You are given the following data about advertising expenditure and sales

|  |  |  |
| --- | --- | --- |
|  | Advertising (Rs. in lakhs) | Sales(Rs in lakhs) |
| Arithmetic mean | 10 | 90 |
| Standard Deviation | 3 | 12 |

The correlation coefficient is 0.8

Calculate the two regression coefficients and two regression equations.

Ans) Regression Equation of X on Y : X= 0.2Y -8

Regression Coefficient; bxy = 0.2

 Regression Equation of Y on X : Y = 3.2X+58

Regression Coefficient; byx = 3.2

 **(5 X 5 = 25 marks)**

**Section C**

*Answer any 1 question. It carries 15marks.*

1. Calculate spearman’s rank coefficient of correlation from the following

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 60 | 56 | 70 | 80 | 45 | 50 | 48 | 85 | 90 | 88 |
| Y | 65 | 42 | 67 | 82 | 38 | 52 | 40 | 87 | 92 | 85 |

Ans) R= 0.976

1. The following data shows the maximum and minimum temperature on a certain day at 10 cities located at different parts of India:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Max. Temp | 29 | 23 | 25 | 15 | 27 | 29 | 24 | 31 | 32 | 35 |
| Min. Temp | 8 | 3 | 7 | 5 | 8 | 19 | 10 | 7 | 5 | 8 |

1. Fit a regression line of X on Y and Y on X.

Ans) Regression Equation of X on Y : X= 0.324Y + 24.408

Regression Equation of Y on X : Y= 0.192X + 2.816

1. Estimate the Maximum Temperature when the Minimum Temperature is 12.

Ans) Maximum Temperature (X) = 28.3 degree celsius

1. Estimate the Minimum Temperature when the Maximum Temperature is 40.

Ans) Minimum Temperature (Y) = 10.5 degree celsius

1. Also calculate Karl Pearson’s Coefficient of Correlation.

Ans) r= 0.25

 **(1 X 15 = 15 marks)**

 ***Scan QR code for the answer scheme***