2410N751   Candidate's Seat No :_____

B.Sc Sem.-3 Examination
CC-202
Statistics

Time : 2-30 Hours]   October-2024   [Max. Marks : 70

Q1 Write the following: (14)

    (i)   Explain the method of least square for fitting a straight line.

    (ii)   Obtain the normal equations for fitting of the curve $y = ae^{bx}$.

OR

    (i)   Write a short note on scatter diagram.

    (ii)   Derive the least square equations for fitting the curve $y = ax + b/x$ to a set of n pairs of x and y.

Q2 Write the following: (14)

    (i)   Obtain the equation for line of regression for Y on X by the method of least square. Why there are two lines of regression? Explain.

    (ii)   With usual notation prove that $-1 \leq r \leq 1$. Where r is the karl pearson's correlation coefficient

OR

    (i)   Prove that the correlation coefficient 'r' is unaffected by change of origin and scale. What is the value of correlation coefficient if two lines are perpendicular to each other? And what is the angle between two lines of regression.

    (ii)   State and prove three properties of regression coefficients.

Q3 Write the following: (14)

    (i)   Define multiple regression. Also derive the equation of plane of regression of X1 on X2 and X3.

    (ii)   In usual notation prove that $r_{1.23} = \dfrac{r_{12} - r_{13} r_{23}}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}}$.

OR

    (i)   In usual notation prove that $R_{1.23}^2 = 1 - \dfrac{\sigma_{1.23}^2}{\sigma_1^2}$.

    (ii)   If r_{12} and r_{13} are given. Show that r_{23} must lie in the range : $r_{12} r_{13} \pm (1 - r_{12}^2 - r_{13}^2 + r_{12}^2 r_{13}^2)^{1/2}$. If $r_{12} = k$ and $r_{13} = -k$, show that r_{23} will lie between -1 and $1 - 2k^2$.

Q4 Write the following: (14)

    (i)   Explain the independence of two attributes.

    (ii)   What are the various methods of studying association? Explain any two.

OR

    (i)   With the usual notation prove that $Q = \dfrac{2Y}{1+Y^2}$.

    (ii)   Define the terms:

P T O

1) Association of attributes.
2) Complete association
3) Complete disassociation

Q 5 Answer the following questions in one or two lines: (Any 7)   (14)

(i)   Explain the term association.
(ii)   What is an attribute?
(iii)   Define positive association of two attributes.
(iv)   State the normal equations for fitting an exponential curve.
(v)   What is a bivariate data?
(vi)   State the principle of least squares in curve fitting.
(vii)   State the normal equations for fitting the curve y= a+bx+cx^2.
(viii) Explain the term correlation.
(ix)   If two variables are independent, then they are uncorrelated? True or False.
(x)   Show that $b_{xy} = r\frac{S_x}{S_y}$.
(xi)   State the equation for plane of regression if X2 on X1 and X3.
(xii)   State any one property of residuals.