Time: Two Hours   Full marks: 30

Questions are of equal value or as indicated in the margin

Answer any three questions

1. State the difference between correlation and regression. State how to obtain the correlation coefficients if you are given the regression coefficients b_{yx} and b_{xy}. **(10)**

2. Explain the assumptions required to build a regression model. **(10)**

3. Write the model and its normal equations for
   Linear equation, Quadratic equation, Power equation and Compound equation. **(10)**

4. (a) Discuss about stepwise selection of variables in the context of multiple linear regression.

   (b) Define the terms autocorrelation, outlier and dummy variable. **(10)**

5. Write short notes on **any two** of the following: **(2 × 5 = 10)**
   (a) Rank correlation coefficient
   (b) Scatter diagram
   (c) Multicollinearity

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Palli Siksha Bhavana (Institute of Agriculture)
Department of Agricultural Statistics
M. Sc. (Ag.) Semester: II Examination, 2024
Course: STAT 502
(Statistical Methods for Applied Sciences)

Time: Two Hours

Full marks: 30

Questions are of equal value or as indicated in the margin

Answer any three questions

1. (a) What do you mean by a probability distribution? Obtain the probability distribution of the random variable X, the number of tails obtained in tosses of a fair coin thrice.

    (b) Prove that normal distribution is a symmetric and mesokurtic distribution. (10)

2. (a) Write down the characteristics of binomial distribution with parameters n and p.

    (b) Determine the mode of a binomial distribution that has a mean 4 and a variance 3. (10)

3. (a) A random variable X follows a Poisson distribution with parameter $\lambda = 4$. Find the mean, variance and coefficient of skewness of X.

    (b) A sample analysis of board examination results of 200 students was made. It was found that 46 students had failed, 68 secured a third division, 62 secured a second division and the rest were placed first division. Test at 5% level of significance whether these figures commensurate with the general examination result which is in the ratio of 4: 3: 2: 1 for the various categories respectively. (10)

4. (a) If the fitted regression equation is

    Final score = -39.538 + 0.573*Pre-test score

    (i) What are the values of 'a' and 'b'?

    (ii) If $R^2 = 0.75$, then what will be your interpretation on R^2?

    (b) Write the formula for partial correlation coefficient. (10)

5. (a) Where do we use scatter diagram, Karl Pearson and rank correlation?

    (b) How to test the significance of correlation coefficient? (10)