

B. Sc. (Honours) Agriculture Semester-V Examination, 2022
Course No.: STAT 311
(Statistical Methods)

Roll No. (in figure) (in words)

Student Index No Reg. No. of.....

Time: 2 hours

Questions are of value as indicated in the margin

Full marks: 50

Part-I

(Objective and Short Answer Type)

(Use only ball pen)

Time: 30 minutes

Marks: 20

Note: 1. Answer in question paper itself
 2. Striking, rewriting or overwriting are not allowed in the objective type questions.

1. Fill in the blanks

1 × 5 = 5

- If Variance of a variable is 81, then standard deviation is _____
- If $X \sim N(\mu, \sigma)$, then $P(\mu - 1.96\sigma < X < \mu + 1.96\sigma) =$ _____
- The mean and standard deviation of 20 observations are 80 and 12 respectively. If 10 is added to each observation, then the value of new mean & standard deviation each are _____ & _____.
- Concept of correlation was given by _____
- Probability of a sure event is _____

2. Choose the correct answer and put tick mark (✓)

1 × 5 = 5

- If two lines of regression are perpendicular then the value of correlation coefficient is -
 (i) -1 (ii) +1 (iii) 0 (iv) Either a or b
- If $X \sim N(\mu=40, \sigma=2)$ then $P(X > 120) = ?$
 (i) 0.1587 (ii) 0.5 (iii) 0.8417 (iv) 0.6826
- Which of the following is/are discrete distribution(s)?
 (i) binomial (ii) normal (iii) Poisson (iv) both a & c
- The Coefficient of Variation of 20, 20, 20, 20 is -
 (i) 19 (ii) $(19)^{1/2}$ (iii) 0 (iv) None of these
- If $X \sim B(40, 0.4)$ then variance of X will be _____.
 (i) 9.6 (ii) 16 (iii) 1.6 (iv) None of these

3. Write short notes on any five

2 × 5 = 10

- Write two applications of chi-square test.
- Write different measures of sequences.
- Define Coefficient of Variation and write its uses.
- Explain the construction of a histogram.
- Define Type-I and Type-II error.
- Write the use of paired t-test.
- Write the properties of Bernoulli/binomial distribution.
- Explain mathematical approach to probability.

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(Statistical Methods)
Part-II
(Descriptive Type)

Time: 90 minutes

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Answer any three of the following questions

Marks: 30

4. (a) Two groups of 15 and 22 values have variables 9 and 6, respectively. If both the group means differ from the combined mean by 8.2, then find the variance of the combined group of values.
(b) Number of children in 8 families are given as 0, 1, 2, 1, 3, 2, 1, 3. Find the standard deviation for the variable 'Number of children'. Also find the standard deviation of the variable 'family size'.
5+5= 10
5. (a) Define Correlation coefficient and explain all the methods of finding correlation in a data set.
(b) Write the important properties of regression coefficient. Explain how regression coefficient differs from correlation coefficient.
5+5= 10
6. Explain the following terms with help of an example:
(a) Mutually Exclusive events
(b) Sample space
(c) Positive and Negative correlations
(d) Null and alternative hypothesis
(e) Random experiment
2x5 = 10
7. (a) A question in statistics is given to three students whose probability of solving are $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$. Find the probability that the problem will be solved by at least any two of them
(b) Explain t-test for two independent sample means with assumption of unequal population variances.
5+5=10
8. Write a short note on various absolute measures of dispersion.

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B. Sc. (Honours) Agriculture Semester-V Examination, 2022
Course No.: STAT 312
(Statistical Techniques)

Roll No. (in figure) (in words)

Student Index No Reg. No. of.....

Time: 2 hours

Full marks: 50

Questions are of value as indicated in the margin

Part-I

(Objective and Short Answer Type)

(Use only ball pen)

Time: 30 minutes

Marks: 20

Note: 1. Answer in question paper itself
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1. Fill in the blanks

1 × 5 = 5

- Let, X be a random variable and c is a constant, then $E(cX+5)=$ _____.
- Let, X be a random variable and, a and b are constants, then $V(aX+b)=$ _____.
- Lack of memory is the characteristic property of _____ distribution.
- In tossing an unbiased dice, the probability of getting first six at 7th trial is _____.
- Moment generating function of negative binomial distribution is given by _____.

2. Choose the correct answer and put tick mark (✓)

1 × 5 = 5

- The unbiased estimator of population variance in case of SRSWR is -
 (i) sample mean (ii) sample variance (iii) sample mean square (iv) none of the above
- If $V(x) = 0$, then $V(2x+9)=?$ (i) 0 (ii) 4 (iii) 9 (iv) 13
- Number of all possible samples under SRSWOR is - (i) $N C_n$ (ii) N^n (iii) $N P_n$ (iv) none of the above
- Any particular value of estimator for a given sample is known as -
 (i) statistic (ii) estimate (iii) parameter (iv) none of the above.
- Conditions under which negative binomial distribution tends to Poisson distribution are -
 (i) $n \rightarrow \infty, p \rightarrow 0, \lambda = np$ infinte (ii) $n \rightarrow \infty, p \rightarrow 0, \lambda = np$ finite
 (iii) $n \rightarrow 0, p \rightarrow \infty, \lambda = np$ finite (iv) none of the above.

3. Write short notes on any five questions

2 × 5 = 10

- Define probability density function
- What is SRSWOR sampling?
- What are the principles of stratification?
- What are the advantages of stratified sampling?
- Define cluster sampling with example.
- What is the relation between t and F distribution?
- What is chi-square distribution?
- Define non-sampling error with example

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(Statistical Techniques)

Part-II

(Descriptive Type)

Time: 90 minutes

Marks: 30

Questions are of value as indicated in the margin

Answer any three of the following questions

4. Derive the mean and variance of geometric distribution. State the lack of memory property of geometric distribution. What is the maximum value of the variance of a binomial distribution?
4+2+4 = 10
 5. Define normal distribution. What are the properties of normal distribution?
2+8 = 10
 6. Explain sampling, complete enumeration, SRSWR and SRSWOR.
6+4 = 10
 7. What are the different methods of allocation of sample size in Stratified sampling? Show that the sample mean is an unbiased estimator for population mean.
2+8=10
 8. Derive moment generating function of Poisson distribution. Discuss about skewness and kurtosis status of Poisson distribution..
5+5=10
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