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Term End Examination 2025-2026
Programme – B.Sc.(Ag)-Hons-2024
Course Name – Statistical Methods
Course Code - CC-BAG378 (T)
(Semester III)

Full Marks : 50 **Time : 2:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 20=20

1. *Choose the correct alternative from the following :*

(i) _____ is not a measure of central tendency. Select the correct answer.

a) Mean b) Range

c) Median d) Mode

(ii) The number of observations smaller than _____ is the same as the number of observations larger than it. Select the correct answer.

a) Mean b) Mode

c) Median d) None of these

(iii) Quartile deviation is calculated by _____. Select the correct answer.

a) Third Quartile – First Quartile b) Third Quartile + First Quartile

c) (Third Quartile – First Quartile)/2 d) (Third Quartile + First Quartile)/2

(iv) $P(A) = 0.4, P(B) = 0.7, P(A \cap B) = 0.1$. The events A and B are ____. Select the correct option.

a) Exhaustive b) Mutually exclusive

c) Independent d) None of these

(v) A box contains 20 electric bulbs, out of which 4 are defective. Two bulbs are chosen at random from this box. Compute the probability that at least one of these is defective.

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a) 5/19
b) 6/19
c) 7/19
d) None of these

(vi) Two dice are rolled and the numbers are multiplied together. Compute the probability of the total being 5.

a) 0
b) 1/18
c) 1/12
d) 1/36

(vii) If one card is drawn from a well-shuffled pack of cards, compute the probability of drawing a heart.

a) 4/52
b) 1/52
c) 13/52
d) 1

(viii) Select the distribution where mean and variance are equal.

a) Binomial
b) Poisson
c) Both Binomial and Poisson
d) None of these

(ix) Select the correct statement.

a) If X and Y are independent, then E(XY)=E (X)E(Y).
b) If E(XY)=E(X)E(Y), then X and Y are independent.
c) Both a) and b) are true
d) None of these are true

(x) Select the assumption(s) needed for simple linear regression.

a) There is linear relationship between the variables.
b) Observations are independent of each other.
c) Both a) and b)
d) None of these

(xi) The difference between the true value and the fitted value in a simple linear regression is known as ___. Select the correct answer.

a) independent variable
b) residual
c) dependent variable
d) none of the above

(xii) Choose the option that represents a value that the correlation coefficient cannot take.

a) 0.5
b) -0.5
c) 0
d) 1.5

(xiii) Cause and effect need to be identified for ___. Choose the correct answer.

a) Correlation
b) Regression
c) Both correlation and regression
d) Neither correlation nor regression

(xiv) Choose the number of outcomes in a Bernoulli trial.

a) One
b) Two
c) Three
d) Five

(xv) A hypothesis can be classified as_____. Select the correct option.

a) null
b) simple

c) composite

d) all the above

(xvi) The Null Hypothesis states that Intelligence and Height are two independent attributes. Select the test which may be used to test this hypothesis.

a) Z-test

b) Chi-square test

c) t-test

d) None of these

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(xvii) The value that is used to decide whether the null hypothesis should be rejected or not is called ____. Choose the correct option.

a) Alternative hypothesis

b) Degrees of freedom

c) Critical value

d) None of these

(xviii) Herbicide A has been used for years in order to kill a particular type of weed. An experiment is to be conducted in order to see whether a new herbicide, Herbicide B, is more effective than Herbicide A. Herbicide A will continue to be used unless there is sufficient evidence that Herbicide B is more effective. Choose the alternative hypothesis in this problem.

a) Herbicide A is more effective than Herbicide B

b) Herbicide B is more effective than Herbicide A

c) Herbicide A is not more effective than Herbicide B

d) Herbicide B is not more effective than Herbicide A

(xix) For a two-tailed Z-test, the region of acceptance is _____. Choose the correct option.

a) To the right of the positive critical value

b) To the left of the negative critical value

c) Between the two critical values

d) None of these

(xx) Choose the correct assumption(s) for Analysis of variance model.

a) The difference between true effects of any two treatments is same for all the blocks.

b) The residual effects are assumed to follow normal distribution with zero mean and common variance.

c) Both a) and b)

d) None of these

Group-B

(Short Answer Type Questions) 2.5 x 10=25

2. Discuss random effect model in analysis of variance briefly. (2.5)

3. Explain population and sample briefly. (2.5)

4. Illustrate the concept of sampling unit briefly with examples. (2.5)

5. Explain range and quartile deviation. (2.5)

6. Explain Bayes theorem. (2.5)

7. Write the p.m.f. of Poisson distribution. (2.5)

8. Calculate the value of the correlation coefficient for variables X and Y, if their covariance is 6 and variances are 16 and 9 respectively. (2.5)

9. Explain the concepts of variance and standard deviation. (2.5)

10. Explain the assumptions of one-sample t-test. (2.5)

11. Write the conditions for Binomial distribution. (2.5)

OR

Express arithmetic mean with an example. (2.5)

Group-C

(Long Answer Type Questions) 5 x 1=5

12. Consider the following data for two-sample unpaired t-test: (5)

Treatment A	$n_1 = 15$	$\overline{x_1} = 68.4$	$s_1 = 16.47$
Treatment B	$n_2 = 12$	$\overline{x_2} = 83.42$	$s_2 = 17.63$

Evaluate the value of the test statistic t.

OR

An economics consulting firm has created a model to predict recessions. The model predicts a recession with probability 80% when a recession is indeed coming and with probability 10% when no recession is coming. The unconditional probability of falling into a recession is 20%. If the model predicts a recession, evaluate the probability that a recession will indeed come. (5)

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