**PRACTICE SET**
**End Semester Examination, December 2025**

**Subject: Statistical Methods**
**Program: M.SC. (Ag) Agronomy**
**Subject code: – 13A.STAT.501**
**Semester - First**

# Course Objective:

The objectives of the course will be to make the students to;
1. Understand frequency distribution classification and tabulation of data and graphical as well as diagrammatic representation of data

2. Comprehend measures of central tendency, dispersion and coefficient of variance

3. Plan and conduct census and sample survey, testing of hypothesis, test of significance and calculate regression and correlation coefficient.

## Section -A

**I. Multiple Choice Questions: -**

1. One major limitation of inferential statistics is:

a) It saves time
b) It depends on assumptions and sampling errors
c) It gives exact population data
d) It is always accurate
(C01) Understand [LOT]

2. Which of the following is a primary data source?

a) Government report
b) Company's balance sheet
c) Direct survey of customers
d) Published article
(C01) Understand [LOT]

3. The process of arranging data into groups according to their characteristics is called:
a) Collection
b) Classification
c) Tabulation
d) Analysis
(C01) Understand [LOT]
4. Data collected for the first time by the researcher is known as:
a) Secondary data
b) Primary data
c) Derived data
d) Experimental data
(C01) Understand [LOT]

5. Tabulation of data helps in:

a) Increasing data volume b) Making data complex

c) Easy comparison and understanding d) Reducing accuracy (C01) Understand [LOT]

6. A table that shows data for more than one characteristic is called:

a) Simple table b) Frequency table

c) Complex table d) Summary table (C01) Remember [LOT]

7. The process of collecting data by observing events directly is known as:

a) Questionnaire method b) Observation method

c) Interview method d) Secondary data collection

(C01) Remember [LOT]

8. Which of the following is NOT a measure of central tendency?

(A) Mean ( B) Median

(C) Mode ( D) Standard Deviation

(C01) Remember [LOT]

9. The sum of the squares deviations for 10 observations taken from their mean 50 is 250. The coefficient of variation is (C01) Remember [LOT]

(A) 10% (B) 40%

(C) 50% (D) None of these

10. Which of the following is NOT a measure of central tendency?

(A) Mean ( B) Median
(C) Mode ( D) Standard Deviation

(C01) Remember [LOT

11. The expected value of a random variable is also called:
a) Mean value b) Median value
c) Mode value d) Variance (CO2) Understand [LOT]

12. The second central moment of a distribution measures:
a) Skewness b) Kurtosis
c) Variance d) Mean (CO2) Remember [LOT]

13. The F-test is used to compare:
a) Two means b) Two variances
c) Two proportions d) Two medians (CO2) Understand [LOT]

14. The Chi-square test is a:
a) Parametric test b) Non-parametric test
c) Both a and b d) None of these (CO2) Remember [LOT]

15. . Association of attributes is studied using:
a) F-test b) Chi-square test
c) t-test d) z-test (CO2) Remember [LOT]

16. The least squares method is used to find: (CO2) Understand [LOT]
a) Trend line b) Variance
c) Mean d) Median

17. Long-term movement of data is known as:
a) Seasonal variation **b) Secular trend**
c) Cyclical variation d) Irregular variation (CO3) Remember [LOT]

18. The short-term regular variation repeating within a year is called:
a) Trend b) Cyclical variation
c) Seasonal variation d) Random variation
(CO3) Undersdand [LOT]

19. The value of Karl Pearson's coefficient of correlation lies between:

a) 0 and 1 b) –1 and 1
c) $-\infty$ and $+\infty$ d) 0 and $\infty$ CO3) Remember [LOT]

20. If r = 0, it means: (CO3) Undersdand [LOT]

a) Perfect positive correlation b) Perfect negative correlation
c) No correlation d) None of these

21. The correlation between height and weight is usually:

a) Positive b) Negative
c) Zero d) Undefined CO3) Remember [LOT]

22. The method of drawing a scatter diagram is useful for:
a) Finding average b) Studying correlation
c) Measuring dispersion d) None of these CO3) Remember [LOT]

23. The test of significance is used to: (CO3) Undersdand [LOT]
a) Find the mean of data b) Test the validity of hypothesis
c) Calculate standard deviation d) None of these

24. The null hypothesis ($H_0$) usually states that:

a) There is no significant difference b) There is significant difference
c) The sample mean equals zero d) Both a and c (CO3) Remember[LOT]

25. The t-test is applicable when:

a) Population standard deviation is known b) Sample size is small and σ is unknown
c) Sample size is large d) None of these (CO3) Remember[LOT]

26. Chi-square test is used to test: (CO3) Undersdand [LOT]
a) The difference between two means b) The independence of attributes
c) The equality of variances d) None of these

27. In a perfect positive correlation, the two regression lines:

a) Coincide b) Are parallel
c) Intersect at right angles d) None of these (CO4) Undersdand [LOT]

28. The purpose of one-way ANOVA is to test: (CO4) Undersdand [LOT]

a) Difference between two means b) Difference among more than two means
c) Relationship between two variables d) None of these

29. In one-way ANOVA, the test statistic used is: (CO4) Undersdand [LOT]

a) t-test b) z-test
c) F-test d) Chi-square test

30. The assumption of one-way ANOVA includes: (CO4) Undersdand [LOT]

a) Normality b) Independence
c) Equal variance d) All of the above

31. In Simple Random Sampling: (CO4) Undersdand [LOT]

a) Each unit has equal chance of selection b) Each unit has unequal chance
c) Only one unit is selected d) None of these

32. The statistic used in one-way ANOVA is distributed as:

a) t-distribution b) Chi-square distribution
c) F-distribution d) Normal distribution

(CO4) Remember [LOT]

## Unit –I Section B)

### 6 MARKS QUESTION

1. State that short notes on ‘data’. (CO1) Remember [LOT]

2. Sketch the histogram to represent the following frequency distribution (CO1) Understand [LOT]

| Daily Wages (Rs.) | 5 – 10 | 10 – 15 | 15 – 20 | 20 – 25 | 25 – 30 |
|---|---|---|---|---|---|
| No. of Workers | 10 | 20 | 35 | 25 | 15 |

3. Construct a frequency Polygon from the following table (CO1) Understand [LOT]

| Weight in (Kg) | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 | 70 – 80 |
|---|---|---|---|---|---|
| No. of Student | 350 | 550 | 600 | 400 | 100 |

4. Draw a Pi Chart to represent the following data on the proposed outlay during a five year plan of a Jharkhand Government:

| **Plan** | **Rs. (in Lack )** |
|---|---|
| Agriculture | 9,000 |
| Industries and Mines | 7,000 |
| Irrigation and Power | 5,000 |
| Transport and Communication | 6,000 |
| MISCELLANEOUS | 3,000 |

(CO1) Understand [LOT]

## Unit -II **Section B)**

### 6 Marks Question

5. Calculate the standard deviation from the given data (CO2) Understand [LOT]

63, 67, 64, 59, 61, 67, 68, 66, 63, 61, 68, 61.

6. Define the Arithmetic and weighted arithmetic mean with example. (CO2) Remember [LOT]

7. Define Median and discuss their merits and demerits. (CO2) Remember [LOT]

8. Describe the standard deviation. (CO2) Understand [LOT]

**(10 Marks) Question**

9. From the following distribution determine the Median : - (C02) Analyze [HOT]

| Marks | 10-20 | 20-30 | 30- 40 | 40-50 | 50- 60 | 60-70 |
|---|---|---|---|---|---|---|
| No. of student | 7 | 20 | 35 | 55 | 28 | 20 |

10. Find the variance and standard deviation of the following frequency Distribution: -

| Variable | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
|---|---|---|---|---|---|---|---|---|
| Frequency | 4 | 4 | 5 | 15 | 8 | 5 | 4 | 5 |

(CO2) Analyze [HOT]

11. Calculate the Quartile s of the following Distribution – (CO2) Apply [HOT]

| Ages (Years) | 15-20 | 20 - 25 | 25 – 30 | 30 – 35 | 35 – 40 | 40 – 45 | 45 – 50 | 50 and Above |
|---|---|---|---|---|---|---|---|---|
| No. of Employees | 13 | 29 | 46 | 60 | 112 | 94 | 45 | 21 |

12. Evaluate the Mode from the following frequency distribution (C02) Analyze [HOT]

| Output in units | 300 -309 | 310-319 | 320- 329 | 330 - 339 | 340-349 | 350-359 | 360-369 | 370-379 |
|---|---|---|---|---|---|---|---|---|
| No. of workers | 9 | 20 | 24 | 38 | 48 | 27 | 17 | 6 |

## Unit-III Section B)

## 6 Marks Question

13. Define the on Population and sample. (CO3) Remember [LOT]

14. Explain the parameter and statistics in sampling distribution? (CO3) Understand [LOT]

15. A sample is collected from the items produced by a factory. The sample size is 81. The standard deviation of the population is 0.3. Find the standard error of the mean of sampling distribution.

(CO3) Understand [LOT]

16. A population consists of six numbers 4, 8, 12, 16, 20, 24. Find population mean and population standard deviation. (CO3) Understand [LOT]

.

**(10 Marks) Question**

17. A population consists of six numbers 4, 8, 12, 16, 20, 24. Consider all samples of size two which can be drawn without from this population, find (a) population mean (ii) Population standard deviation (iii) Mean of the sampling distribution (iv) Standard deviation of the sampling distribution of means

(CO3) Evaluate [HOT]

18. . Take 30 slips of paper and label 5 each -4 and 4, four each -3 and 3, three each -2 and 2 and two each -1, 0, 1. If each slip of paper has the same probability of being drawn find the probability of getting -4, -3, -2, -1, 0, 1, 2, 3, 4. Also find mean and variance of this distribution. (CO3) Evaluate [HOT]

19. A population consists of 5, 10, 14, 18, 13, and 24. Consider all possible samples of size two which can be drawn without replacement from the population. Find (i) the mean of population (ii) Standard deviation of population (iii) Mean of the sampling distribution of means. (CO3) Analyze [HOT]

## Unit – IV Section B)

## 6 Marks Question

20. Describe the hypothesis testing. With example. (CO4) REMEMBER [LOT]
21. Discuss the procedure for testing of hypothesis. (CO4) Understand [LOT]
22. Express the T- test used for in the statistics. (CO4) Understand [LOT]
23. Define F-test in statistics, with formula. (CO4) Remember [LOT]

**(10Marks) Question**

23. A company manufacturing electric bulbs claims that the average life of its bulbs is 1600 hours. The average life and standard deviation of a random sample of 100 such bulbs were 1570 hours and 120 hours respectively. Should we accept the claim of the company? ($t_{5\%} = 1.96$ *two tailed* )

(CO4) Analyze [HOT]

24. Explain the formation of hypothesis test. And how many types of formation hypothesis.

(CO4) Analyze [HOT]

25. The freshman math grades of 250 males and 210 females at a university were distributed as indicate in the following table .Use the Chi-Square random variable to text at the 0.05sinificance level the hypothesis the grade.

Grades

| Person | A | B | C | D | E | Total |
|---|---|---|---|---|---|---|
| Male | 35 | 42 | 85 | 48 | 40 | 250 |
| Female | 28 | 50 | 77 | 35 | 20 | 210 |
| Total | 63 | 92 | 162 | 83 | 60 | 460 |

(CO4) Evaluate [HOT]

**Unit – V**

## 6 Marks Question

26. Define the Regression Co-efficient equation line . (C04) Remember [LOT]
27. Describe the two regression equations of given data (CO4) Understand [LOT]

X: 1 2 3

Y: 5 4 6

28. Estimate 'r' from the given information $\sum X = 225, \sum Y = 189, n = 10, \sum (X - 22)^2 = 85, \sum (Y - 19)^2 = 25, and\ \sum (X - 22)(Y - 10) = 43$ ( CO4) Understand [LOT]

29. Explain the formula of Spearman's Rank correlation coefficient. ( CO4) Understand [LOT]

### (10) Marks) Questin

30. From the following data find the two-regression equation line (CO4)Analyze [HOT]

| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| y | 2 | 4 | 7 | 6 | 5 | 6 | 5 |

31. Two managers are asked to rank a group of employees in order of potential for eventually becoming top mags The ranking are as follows:

| Employees | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| Ranking by Manager1 | 10 | 2 | 1 | 4 | 3 | 6 | 5 | 8 | 7 | 9 |
| Ranking by Manager1 | 9 | 4 | 2 | 3 | 1 | 5 | 6 | 8 | 7 | 10 |

(CO4) Analyze [HOT]

32. Ten students got the following percentage of marks in SM and statistics, calculate the rank correlation.

| Marks in Q M | 78 | 36 | 98 | 25 | 75 | 82 | 90 | 62 | 65 | 39 |
|---|---|---|---|---|---|---|---|---|---|---|
| Marks in statistics | 84 | 51 | 91 | 60 | 68 | 62 | 86 | 58 | 53 | 47 |

(CO4) Evaluate [HOT]

33. (i) The regression coefficient of y on x and x on y are 1.2 and 0.3 respectively. Find the coefficient of correlation.

(ii) If $\sigma_x = 10, \sigma_y = 12, b_{xy} = -0.8$, find *the value of* $r$.

(iii) If $\bar{x} = 6, \bar{} = 7, b_{xy} = 0.65$ *and* $b_{yx} = 0.45$, *then* find *the regression equations*.

(CO4) Analyze [HOT]

---

# Summary Sheet

## CO Wise

| CO | Q. No. | Marks |
|---|---|---|
| CO1 | Section- A 1,2,3,4,5,6,7,8,9,10<br>Section-B 1,2,3,4 | 10<br>24 |
| CO2 | Section-A 11,12,13,14,15,16,<br>Section- B 5,6,7,8,9,10,11,12, | 06<br>64 |
| CO3 | Section-A 17,18,19,20,21,22,23,24,25,26<br>Section-B 13,14,15,16,17,18,19 | 10<br>54 |
| CO4 | Section-A 27,28,29,30,31,32,<br>Section-B 20,21, 22, 23, 24,25,26,27,28,29,30,31,32,33 | 06<br>96 |
| | **Total =** | **270** |

**Unit Wise**

| Unit | Q. No. | Marks |
|---|---|---|
| **Unit 1** | Section- A 1,2,3,4,5,6,7,8,9,10<br>Section-B 1,2,3,4 | **34** |
| **Unit 2** | Section-A 11,12,13,14,15,16,<br>Section- B 5,6,7,8,9,10,11,12, | **70** |
| **Unit 3** | Section-A 17,18,19,20,21,22,23,24,25,26<br>Section-B 13,14,15,16,17,18,19 | **64** |
| **Unit 4** | **Section B 20, 21, 22,23,24,25** | **54** |
| **Unit 5** | **Section-B 26,27,28,29, 30,31,32,33,** | **48** |
| | **Total** | **270** |

## Blooms Taxonomy Level (BTL) Wise

| BTL | Q. No. | Marks |
|---|---|---|
| LOT | Section-A 1,2,3,4,5,6,7,8,9,10, 11, 12, 13, 14,15,16,17, 18, 19, 20 , 21,22,23,24,25,26,31.32,33<br>Section –B | 130 |
| HOT | Section-B 10,11,12,13,18,19,20,21,27,28,29,30,35,36,37,38 | 140 |
| | **Total** | **270** |

# Course Outcome:

## After completion of the course the students will be able to;

CO1 Know about frequency distribution, classification and tabulation of data

CO2 Understand measures of central tendency dispersion, standard error, skewness, etc.

CO3 Comprehend different types of surveys, probability, testing of hypothesis and linear regression and correlation.

CO4 Practice calculating z, t and F – test and $x^2$ – test and regression and correlation coefficient

**Prepared by –Dr. Manoj Kumar Mandal**