2024/FYUG/ODD/SEM/
STAIDC-101T/148

FYUG Odd Semester Exam., 2024

STATISTICS

(1st Semester)

Course No. : STAIDC-101T

(Introduction to Statistics)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

UNIT—I

1. Answer any *four* from the following : 1×4=4

(a) Define nominal data.

(b) What is quantitative data?

(c) Define population.

(d) Define continuous data.

(e) What are the required informations used to draw a cumulative frequency curve of less than type?

2. Answer any *one* from the following : 2

(a) Define class interval and width of a class.

(b) Define statistics both in plural and singular sense.

3. Answer any *one* from the following : 8

(a) *(i)* Define tabulation. 1

(ii) Explain different parts of a good statistical table. 3

(iii) In a sample study of coffee drinking habits in two towns, the following data were observed :

Town–A :

55% people were male, 40% were coffee drinkers, 28% were male coffee drinkers.

Town–B :

45% people were male, 30% were coffee drinkers, 20% were male coffee drinkers.

Tabulate the above data. 4

(b) *(i)* Define complete enumeration and sample survey. 2+2=4

(ii) Explain the procedure of drawing cumulative frequency curves of less than type and more than type. 4

UNIT—II

4. Answer/Fill in the blank any *four* from the following : 1×4=4

(a) Define measures of central tendency.

(b) Define geometric mean.

(c) $GM^2 =$ _____ × HM.

(d) State two demerits of geometric mean.

(e) State the empirical relation among mean, median and mode.

5. Answer any *one* from the following : 2

(a) For two positive numbers a and b, prove that $AM \geq GM$.

(b) State two merits and demerits of median.

6. Answer any *one* from the following : 8

(a) *(i)* Prove that arithmetic mean is not independent of change of origin and scale. 4

(ii) Define median. 2

(iii) Calculate median from the following data : 2

17, 25, 9, 11, 46, 21, 9, 17, 2

(b) (i) Define mode. State two merits and two demerits of mode. 2+1+1=4

(ii) The numbers of workers in two departments namely *A* and *B* of a company are 500 and 600 respectively. The average monthly salary for department *A* is ₹ 186 and for department *B* is ₹ 175. Calculate average monthly salary of workers for two departments taken together. 4

UNIT—III

7. Answer/Fill in the blank any *four* from the following : 1×4=4

(a) Dispersion means _____.

(b) Write two characteristics of ideal measures of dispersion.

(c) State the relation among mean, median and mode for positive skewness.

(d) What is the value of coefficient of kurtosis (β_2), if the curve is leptokurtic?

(e) State the relation between standard deviation and variance.

8. Answer any *one* from the following : 2

(a) Define mean deviation. State one merit and one demerit of mean deviation.

(b) Why is standard deviation the best measure of dispersion? Explain.

9. Answer any *one* from the following : 8

(a) (i) Define quartile deviation. State two merits and two demerits of quartile deviation. 1+2+2=5

(ii) Prove that standard deviation is not less than mean deviation about mean. 3

(b) (i) Write a note on coefficient of skewness. 1

(ii) Prove that standard deviation is independent of change of origin but not of scale. 1

UNIT—IV

10. Answer/Fill in the blanks any *four* from the following : 1×4=4

(a) Karl Pearson's correlation coefficient lies between _____ and _____.

(b) Define positive correlation.

(c) What is the range of regression coefficients?

(d) Arithmetic mean of regression coefficients is greater than or equal to the _____.

(e) If $r = \pm 1$, then the lines of regression are _____.

11. Answer any *one* from the following : 2

(a) Interpret the meaning of the statement $b_{YX} = -0{\cdot}53$.

(b) State Spearman's rank correlation coefficient.

12. Answer any *one* from the following : 8

(a) (i) If one of the regression coefficients is greater than one, then the other is less than one. Prove it. 4

(ii) Prove that correlation coefficient is the geometric mean of regression coefficients. 4

(b) (i) Prove that correlation coefficient is independent of change of origin and scale. 4

(ii) If $\bar{x} = 36$, $\bar{y} = 85$, $\sigma_x = 11$, $\sigma_y = 8$ and $r_{xy} = 0{\cdot}66$, then obtain the line of regression of X on Y and of Y on X. 4

UNIT—V

13. Answer/Fill in the blanks any *four* from the following : $1 \times 4 = 4$

(a) Define favourable event of a random experiment.

(b) Probability of an event lies between _____ and _____.

(c) If A and B are mutually exclusive events, then $P(A \cap B) =$ _____.

(d) Define classical definition of probability.

(e) State two limitations of classical definition of probability.

14. Answer any *one* from the following : 2

(a) Write axiomatic definition of probability.

(b) If $B \subset A$, then prove that $P(B) \leq P(A)$.

15. Answer any *one* from the following : 8

(a) (i) State and prove additive theorem of probability. 4

(ii) Prove that—

$P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$ 4

(b) (i) If A and B be two independent events, then prove that A and B^C are also independent. 4

(ii) A basket contains 20 tickets marked with numbers from 1 to 20. One ticket is drawn at random. Find the probability that it will be a multiple of 2 or 5. 4

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