

2024/FYUG/ODD/SEM/
STADSC-101T/144

FYUG Odd Semester Exam., 2024

STATISTICS
(1st Semester)

Course No. : STADSC-101T

(Descriptive Statistics and Probability)

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 two from the following : $2 \times 2 = 4$

(a) Define time-series data with an example.

(b) Briefly explain the limitations of statistics.

(c) Write the sources of secondary data.

2. Answer either (a) or (b) : 10

(a) (i) Discuss the major sources of collecting primary data. 6

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(2)

- (ii) Write a short note on drafting a questionnaire. 4
- (b) Define the terms 'frequency', 'mid-value of the class-interval', 'width of the class-interval', 'inclusive class-interval' and 'exclusive class-interval' with an example. $2+2+2+2=10$

UNIT—II

3. Answer any two from the following : $2 \times 2 = 4$
- (a) Define geometric mean.
- (b) Name two measures of location.
- (c) What do you mean by measures of central tendency?
4. Answer either (a) or (b) : 10
- (a) (i) Explain the graphic method of locating the values of median, quartiles and mode. $2+2+2=6$
- (ii) If $\bar{x}_i (i = 1, 2, \dots, k)$ are the means of k component series of sizes $n_i, (i = 1, 2, \dots, k)$ respectively, then prove that the mean $\bar{x}$ of the composite series is given by
- $$\bar{x} = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2 + \dots + n_k \bar{x}_k}{n_1 + n_2 + \dots + n_k} \quad 4$$

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(3)

- (b) (i) Define raw moments and central moments of a frequency distribution. Obtain the effect of change of origin and scale on moments. $2+4=6$
- (ii) Establish the relationship between the moments about mean. 4

UNIT—III

5. Answer any two from the following : $2 \times 2 = 4$
- (a) What do you mean by association of attributes? When are two attributes said to be positively or negatively associated?
- (b) Examine the consistency of the following data :
 $N = 500, (A) = 410, (B) = 380, (AB) = 270$
- (c) What is the necessary and sufficient condition for the consistency of data? Also define the coefficient of association.
6. Answer either (a) or (b) : 10
- (a) (i) Describe the fitting of a second-degree polynomial. 5
- (ii) Describe the fitting of the exponential curve of the form $Y = ae^{bX}$. 5

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(4)

- (b) (i) Given the following ultimate class frequencies, find the frequencies of positive class : 5
- $(ABC) = 149$, $(AB\bar{Y}) = 738$, $(A\bar{B}C) = 225$,
 $(A\bar{B}\bar{Y}) = 1196$, $(\alpha BC) = 204$, $(\alpha B\bar{Y}) = 171$,
 $(\alpha \bar{B}C) = 171$ and $(\alpha \bar{B}\bar{Y}) = 21842$
- (ii) 800 candidates of both sexes appeared at an examination. The boys outnumbered the girls by 15% of the total. The number of candidates who passed exceed the number failed by 480. Equal number of boys and girls failed in the examination. Prepare a 2×2 table and find the coefficient of association. Comment. 5

UNIT—IV

7. Answer any two from the following : $2 \times 2 = 4$
- (a) Define Spearman's rank correlation coefficient.
- (b) Define the line of regression of X on Y . What is the relationship between correlation coefficient and regression coefficient?
- (c) Define intra-class correlation coefficient.

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(5)

8. Answer either (a) or (b) : 10
- (a) (i) Define correlation coefficient. What purpose is being served by correlation coefficient? $2+4=6$
- (ii) Define coefficient of determination and correlation ratio. 4
- (b) State and prove the properties of regression coefficients.
 $2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2} = 10$

UNIT—V

9. Answer any two from the following : $2 \times 2 = 4$
- (a) Define random experiment with an example.
- (b) Define sample point and sample space.
- (c) Write the statistical definition of probability.
10. Answer either (a) or (b) : 10
- (a) (i) Explain the limitations of classical and statistical definition. $2+2=4$
- (ii) Let A , B and C are three arbitrary events. Find expression for the events in the context of A , B and C —only A occurs; both A and B , but not C occurs; all three events occur; at least one occurs; at least two occur; one and no more occurs. 6

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- (b) (i) A , B and C are mutually exclusive and exhaustive events associated with a random experiment. Find $P(A)$ given that

$$P(B) = \frac{3}{2} P(A) \text{ and } P(C) = \frac{1}{2} P(B). \quad 3$$

- (ii) Define pairwise and mutually independent events. 2

- (iii) The contents of urns I , II and III are as follows :

1 white, 2 black and 3 red balls

2 white, 1 black and 1 red balls

4 white, 5 black and 3 red balls

One urn is chosen at random and two balls drawn from it. They happen to be white and red. What is the probability that they come from urns I , II or III ? 5

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