

2024/FYUG/ODD/SEM/  
STADSM-101T/146

FYUG Odd Semester Exam., 2024

**STATISTICS**

( 1st Semester )

Course No. : STADSM-101T

( Basic 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 qualitative data and quantitative data.
  - (b) What is frequency distribution?
  - (c) State the limitations of statistics.
2. (a) Write a note on graphical representation of frequency distribution. 7
- (b) Distinguish between nominal data and ordinal data. 3

**OR**

3. Define statistical data. Write a note on diagrammatic representation of statistical data.  $2+8=10$

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**UNIT—II**

4. Answer any *two* from the following :  $2 \times 2 = 4$
- (a) What are the requisites for an ideal measure of central tendency?
  - (b) Define raw moments and central moments.
  - (c) Write the merits and demerits of median.
5. Describe different measures of central tendency of a frequency distribution, mentioning their merits and demerits. 10

**OR**

6. (a) Define coefficient of variation and skewness.  $2 + 2 = 4$
- (b) Show that standard deviation is independent of change of origin but not of scale. 4
  - (c) Which is the best measure of dispersion and why? 2

**UNIT—III**

7. Answer any *two* from the following :  $2 \times 2 = 4$
- (a) What is a scatter diagram?
  - (b) Show that two independent variables are uncorrelated.
  - (c) Find the angle between the two lines of regression.

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8. (a) What is regression? Derive the two lines of regression.  $2 + 6 = 8$
- (b) When did the lines of regression become perpendicular to each other? 1
  - (c) When did the lines of regression coincide? 1

**OR**

9. (a) Write a note on least square method. 4
- (b) Show that correlation coefficient is the geometric mean between the regression coefficients. 3
  - (c) Prove that arithmetic mean of the regression coefficients is greater than the correlation coefficient  $r$ , provided  $r > 0$ . 3

**UNIT—IV**

10. Answer any *two* from the following :  $2 \times 2 = 4$
- (a) Define sample point and sample space.
  - (b) What is the probability of getting even numbers on both the dice when two dice are thrown simultaneously?
  - (c) Define impossible event and certain event.

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11. (a) Give the statistical definition of probability. State its demerits.  $2+2=4$
- (b) Show that the probability of an impossible event is zero. 2
- (c) Show that  $P(\bar{A}) = 1 - P(A)$ . 2
- (d) Give the axiomatic definition of probability. 2

OR

12. (a) Define mutually exclusive events and equally likely events with an example.  $2+2=4$
- (b) A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls drawn are white and blue? 2
- (c) If  $B \subset A$ , then show that—  
(i)  $P(A \cap \bar{B}) = P(A) - P(B)$ ;  
(ii)  $P(B) \leq P(A)$ .  $2+2=4$

UNIT—V

13. Answer any two from the following :  $2 \times 2 = 4$
- (a) Define independent events and pairwise independent events.
- (b) If  $A$  and  $B$  are independent events then  $\bar{A}$  and  $\bar{B}$  are also independent. Prove.
- (c) Define conditional probability.

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14. (a) State and prove the addition theorem of probability. 6
- (b) Given that  
$$P(A) = \frac{1}{8}, P(B) = \frac{1}{4}, P(A \cap B) = \frac{1}{32}$$
Examine whether the events  $A$  and  $B$  are (i) mutually exclusive and (ii) independent. 2
- (c) State the theorem of total probability. 2

OR

15. (a) State and prove Bayes' theorem. 6
- (b) Show that for any two events  $A$  and  $B$ ,  
$$P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$$
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