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 : 2×2=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

UNIT—II

4. Answer any *two* from the following : 2×2=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 : 2×2=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.

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 : 2×2=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.

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 : 2×2=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.

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,

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

* * *