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TDC (CBCS) Odd Semester Exam., 2022

STATISTICS

(1st Semester)

Course No. : STSDSC/GE-101T

(Descriptive Statistics and Probability)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

UNIT—I

1. Define any *three* of the following : 1×3=3

(a) Population

(b) Time series data

(c) Mid value

(d) Ordinal data

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2. Answer any *one* of the following questions : 2

(a) Distinguish between qualitative data and quantitative data.

(b) What is a statistical table? Name the different parts of a table.

3. Answer any *one* of the following questions : 5

(a) What is an ogive? What are the two types of ogive? State the uses of ogive. 1+2+2=5

(b) Write a note on graphical representation of frequency distribution. 5

UNIT—II

4. Answer any *three* of the following questions : 1×3=3

(a) Define mode.

(b) Write the empirical relationship among mean, median and mode.

(c) Define standard deviation.

(d) "Extreme values have no effect on median." Write true or false.

5. Answer any *one* of the following questions : 2

(a) Show that algebraic sum of deviations of a set of values from their arithmetic mean is zero.

(b) What are the requisites of a good average?

6. Answer any *one* of the following questions : 5

(a) Discuss the different measures of dispersion along with its merits and demerits.

(b) Write a note on skewness and kurtosis.

UNIT—III

7. Answer any *three* of the following questions : 1×3=3

(a) What is Karl Pearson's correlation coefficient?

(b) Define scatter diagram.

(c) What is the limit of correlation coefficient?

(d) When are two lines of regression perpendicular to each other?

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8. Answer any *one* of the following questions : 2

(a) Show that AM of the regression coefficients is greater than the correlation coefficient r, provided $r > 0$.

(b) Define multiple correlation coefficient and partial correlation coefficient.

9. Answer any *one* of the following questions : 5

(a) Show that the coefficient of correlation r is independent of change of origin and scale of the variables. Also prove that for two independent variables, $r = 0$. 3+2=5

(b) Define regression. Obtain the equation of the regression lines of Y on X. 2+3=5

UNIT—IV

10. Answer any *three* of the following questions : 1×3=3

(a) What is a random experiment?

(b) Define sample space.

(c) A, B and C are any three events. Find the symbolic expression for the following event :

All three events occur.

(d) What is the probability of an impossible event?

11. Answer any *one* of the following questions : 2

(a) Show that the probability of an impossible event is zero.

(b) Give the statistical definition of probability. What are its limitations?

12. Answer any *one* of the following questions : 5

(a) *(i)* What do you mean by mutually exclusive event and exhaustive event? 2

(ii) A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls drawn are white and blue? 3

(b) *(i)* State the axiomatic definition of probability. 2

(ii) What is the probability that a leap year selected at random will contain 53 Sundays? 3

UNIT—V

13. Answer any *three* of the following questions : 1×3=3

(a) When are two events A and B said to be independent?

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(b) Under what condition does $P(A|B) = P(A)$ hold?

(c) State the addition law of probability.

(d) Given $P(A) = \frac{1}{8}$, $P(B) = \frac{1}{4}$, $P(A \cap B) = \frac{1}{32}$. Examine whether A and B are mutually exclusive.

14. Answer any *one* of the following questions : 2

(a) If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A|B) = \frac{1}{2}$, find $P(A \cup B)$ and $P(A \cap B)$.

(b) If A and B are independent events, then $\overline{A}$ and $\overline{B}$ are also independent events.

15. Answer any *one* of the following questions : 5

(a) Define conditional probability. State and prove the multiplication law of probability. 1+1+3=5

(b) State and prove Bayes' theorem. 5

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