TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022

STATISTICS

(1st Semester)

Course No. : STSDSC/GE–101T

(Descriptive Statistics and Probability Theory)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *fifteen* of the following questions : 1×15=15

1. Define population and sample.

2. Explain quantitative and qualitative data.

3. What is histogram?

4. Define cumulative frequency distribution.

5. What do you mean by central tendency of data?

6. Define dispersion with an example.

7. Define skewness and kurtosis.

8. What do you mean by cumulant?

9. What is scatter diagram?

10. What is the difference between correlation and regression?

11. Define Karl Pearson coefficient of correlation.

12. Define random experiment.

13. What do you mean by sample point and sample space?

14. Write classical definition of probability.

15. What is the range of probability of an event?

16. Explain axiomatic approach of probability.

17. Define conditional probability.

18. Write the multiplication theorem of probability.

19. Write one application of Bayes' theorem.

20. Can two events A and B be mutually exclusive and independent both?

SECTION—B

Answer any *five* of the following questions : 2×5=10

21. What do you mean by frequency polygon? What is its advantage?

22. Write a short note on time-series data.

23. Show that the algebraic sum of deviations of set of values from mean is always zero.

24. Show that the sum of squares of the deviations of a set of values is minimum when taken from the mean.

25. Show that the Karl Pearson correlation coefficient lies between –1 and 1.

26. If one of the regression coefficients is greater than one, then show that other regression coefficient must be less than one.

27. Write the merits and demerits of classical definition of probability.

28. State the multiplication theorem of probability for three events *A*, *B* and *C*.

29. Write the merits and demerits of relative frequency approach of probability.

30. Write Bayes' theorem. What is the main criticism of Bayes' theorem?

SECTION—C

Answer any *five* of the following questions : 5×5=25

31. *(a)* Explain the construction of less than cumulative frequency distribution with an example. 3

(b) Explain the construction of histogram with an example. 2

32. *(a)* Explain the construction of frequency polygon with example. 3

(b) What are the steps for the construction of frequency distribution? 2

33. The average salary of male employees in a firm is ₹ 5,200 and that of females was ₹ 4,200. The mean salary of all the employees was ₹ 5,000. Find the percentage of male and female employees.

34. Show that for any frequency distribution, kurtosis is greater than unity.

35. Show with an example that two independent variables are uncorrelated but two uncorrelated variables may not be independent.

36. The coefficient of Spearman's rank correlation between marks in statistics and marks in mathematics obtained by certain group of students is 0·8. If the sum of the squares of the difference in ranks is given by 33, find the number of students in the group.

37. Show that Karl Pearson correlation coefficient is independent of change of origin and scale.

38. Discuss the advantages and disadvantages of axiomatic approach of probability.

39. State and prove the addition theorem of probability for three events *A*, *B* and *C*.

40. State and prove the multiplication theorem of probability for three events *A*, *B* and *C*.

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