TDC Odd Semester Exam., 2020
held in July, 2021

STATISTICS

(Pass)

(1st Semester)

Course No. : STSP–101

(Fundamentals of Statistics)

Full Marks : 35
Pass Marks : 12

Time : 2 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* Define sample and population. 2

(b) Define statistics. Write down the limitations of statistics. 2+3=5

2. *(a)* What is the difference between classification and tabulation? 3

(b) Represent the following data by simple bar diagram : 4

Service Tax Collection (₹ in crore)

Years	2012–13	2013–14	2014–15	2015–16
Service tax	51301	60941	58422	71016

Years	2016–17	2017–18	2018–19
Service tax	97507	132697	180141

UNIT—II

3. *(a)* Define geometric mean and harmonic mean with examples. 1½+1½=3

(b) Prove that standard deviation is independent of change of origin but not of scale. 2

(c) Prove that AM ≥ GM ≥ HM. 2

4. *(a)* Define range and standard deviation with examples. 1½+1½=3

(b) Write a note on skewness and kurtosis. 4

UNIT—III

5. *(a)* Write the properties of correlation coefficient. 3

(b) Show that

$$1 - R^2_{1\cdot 23} = (1 - r^2_{12})(1 - r^2_{13\cdot 2})$$

and hence deduce $R_{1\cdot 23} \geq r_{12}$. 4

6. *(a)* Write down the properties of regression coefficient. 3

(b) Define consistency of data. 1

(c) Explain the terms independence and association as applied to attributes. 3

UNIT—IV

7. *(a)* Give mathematical definition of probability. Write down the properties of probability. 1+3=4

(b) For any two events A and B, prove that

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$ 3

8. *(a)* Prove that $P(\overline{A}) = 1 - P(A)$. 2

(b) Two dice are thrown. Find the probability that the sum of the points in the two dice is equal to 7. 3

(c) Define the following : 2

(i) Mutually exclusive events

(ii) Equally likely events

UNIT—V

9. *(a)* State and prove Bayes' theorem. 1+3=4

(b) For two events A and B, prove that

$$P(A \cap B) = P(A) \cdot P(B|A),\ P(A) > 0$$
$$= P(B) \cdot P(A|B),\ P(B) > 0$$ 3

10. *(a)* A bag contains 6 white, 4 red and 10 black balls. Two balls are drawn at random. Find the probability that they will both be black. 3

(b) Define conditional probability. State and prove the theorem of compound probability. 4

★ ★ ★