(b) Find the value of c, if θ=3 for the function 5

$$f(x) = \begin{cases} \frac{c\theta^x}{x!} & ; \quad x = 1, 2, 3, \ldots \\ 0 & ; \quad \text{otherwise} \end{cases}$$

10. (a) Define continuous random variable, absolutely continuous random variable and probability density function by giving an example for each. 3x3=9

(b) Derive the mean and variance of Binomial and Poisson distributions. $2^1/_2$x2=5

★★★

PG Even Semester Examination, May 2025

STATISTICS

2nd Semester

Course No. : STS - 554 (IDC) OPEN

(Fundamentals of Data Collection and Analysis)

Full Marks : 70
Pass Marks : 28

Time : 3 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 primary data. Discuss various methods of collecting primary data. 2+6=8

(b) Show that in case of SRSWR as well as in case of SRSWOR, the sample mean is an unbiased estimator of the population mean. 3+3=6

2. (a) Define secondary data. Write down the advantages and disadvantages of primary data over secondary data. 2+7=9

(b) What is the difference between a questionnaire and schedule? 5

Unit - II

3. (a) Define arithmetic mean (AM) and geometric mean (GM) with their merits and demerits. 6

(b) Show that 6

$$AM \geq GM \geq HM$$

Also show that

$$(GM)^2 = AM \times HM$$

(c) Define coefficient of variation. 2

4. (a) Prove that for any discrete distribution standard deviation is not less than mean deviation from mean. 6

(b) Calculate standard deviation from the following data : 8

Class	Frequency
50 - 100	5
100 - 150	8
150 - 200	9
200 - 250	12
250 - 300	18
300 - 350	23
350 - 400	17

Unit - III

5. Define the following : $3^1/_2 \times 4 = 14$

(i) Karl Pearson's correlation coefficient

(ii) Spearman's correlation coefficient

(iii) Chi-square as measure of association

(iv) Scatter plot for assesment of correlation

6. (a) Define linear regression model and state its assumptions. 7

(b) How to detect outliers and its management techniques? 7

Unit - IV

7. (a) Define the following by using Venn diagram

(i) Subset (ii) Powerset (iii) Difference of two sets (iv) Union of two sets 2x4=8

(b) Define the axiomatic definition of probability. 6

8. Define the following : $3^1/_2 \times 4 = 14$

a) Conditional probability

b) Bayes' theorem

c) Independence

d) Classical definition of probability.

Unit - V

9. (a) Define discrete random variable and probability mass function by giving an example. 3+3+3=9