



Registration Number:

Date & Session

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27

OPEN ELECTIVE (Statistics) – IV SEMESTER

SEMESTER EXAMINATION: APRIL 2023

(Examination conducted in May 2023)

STOE4: BIOSTATISTICS

(For current batch students only)

Time: 2 Hours

Max Marks: 60

This paper contains TWO printed pages and ONE part.

Usage of scientific calculator is allowed.

PART – A

I. Answer any SIX of the following

10 X 6 = 60

1. A) The following data is the weight of students of class 10 students. Construct a continuous frequency distribution table with class width 3. Hence obtain median mark.
45, 49, 48, 41, 54, 46, 44, 42, 48, 53, 51, 53, 51, 48, 46, 43, 52, 50, 54, 47, 44, 45, 50, 49, 50.

B) Mr. X collected the data on length of plant in different cities and data is given below. Construct stem and leaf using the following data hence find the mode. The data is as follows: 75, 69, 83, 52, 72, 84, 80, 81, 77, 96, 61, 64, 65, 76, 71, 79, 86, 87, 72, 79, 72, 87, 68, 92, 93, 50, 57, 95, 92, 98.

C) Define Poisson distribution. (5+3+2)

2. A) A group of 12 children participated in a psychological study designed to assess the relationship, if any, between age (in years) and Average total sleep time (ATST), (in hours). To obtain a measure for ATST, recordings were taken on each child on five consecutive nights and then averaged. The results obtained are shown in below table. Calculate the Karl Pearson correlation coefficient and comment.

Child	A	B	C	D	E	F	G	H	I	J	K	L
Age (In yrs.)	4.4	6.7	10.5	9.6	12.4	5.5	11.1	8.6	14	10.1	7.2	7.9
ATST (In hrs.)	9.7	9.4	8.6	8.9	7.9	9.3	8.2	8.8	9.6	8.2	8.8	8.6

B) Explain the four scales of measurement with examples. (6+4)

3. A) In a biology experiment a number of cultures were grown in the laboratory. The number of bacteria, in millions are given here. Calculate the variance and coefficient of variation for number of bacteria. No. of bacteria is: 34, 106, 135, 181, 192, 231, 268, 300

B) Explain the three measures of central tendency with formulas and properties. (5+5)

4. A) Define the following. a) Sample space b) Mutually exclusive events c) Exhaustive events

B) State addition and multiplication theorems of probability. If $P(A) = 0.35$, $P(B) = 0.56$, assuming A and B are independent, find $P(A \cup B)$ and $P(A|B)$. (5+5)

5. A) Define the binomial distribution, its properties, and applications in real-life scenarios.

B) Explain the concept of Bayes' theorem and how it is used in real life. (5+5)

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6. A) Define Normal distribution and list out its characteristics.
B) Explain the concept of random sample and statistic, and their role in statistical inference. Illustrate with examples. (5+5)
7. A) Draw the curve of t-distribution and state any three properties the same.
B) Define the size, power of test, critical region, P-value, and how do you interpret them?
C) What is a random variable? Differentiate between discrete random variable and continuous random variable. (3+4+3)
8. A) Explain the concept of Type I and Type II errors with examples.
B) Give the test procedure of test for single population mean. (5+5)
