

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



B. Tech (Fourth Semester – Regular/Supplementary) Examinations, April 2026

23BBTPC24002– Biostatistics

(Biotechnology)

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions
(The figures in the right-hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

- | | CO # | Blooms Level |
|--|------|--------------|
| a. Differentiate between qualitative and quantitative variables. | CO1 | K1 |
| b. Write the quartile range. | CO2 | K1 |
| c. What is an event? | CO3 | K2 |
| d. Explain bias in sampling. | CO5 | K1 |
| e. Define a null hypothesis (H_0). | CO6 | K2 |

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions.

2. a. The mean of the following data is 25. Find the missing frequency (f)?

Marks CO # Blooms Level
5 CO1 K3

Class Interval	0–10	10–20	20–30	30–40	40–50
Frequency	3	7	f	6	3

b. Compare the mean, median, and mode, including their advantages and limitations.

5 CO2 K2

(OR)

c. Find the mode:

5 CO3 K4

Class Interval	0–10	10–20	20–30	30–40	40–50
Frequency	5	9	10	11	8

d. Describe different types of variables in biological systems with examples?

5 CO1 K3

3. a. Calculate the correlation coefficient (r) of the following series:

5 CO5 K4

X	2	4	6	8	10
Y	4	2	5	7	8

b. Explain standard deviation, variance, and standard error with their applications in biological data?

5 CO2 K2

(OR)

c. Find the standard deviation.

5 CO2 K4

X	5-15	15-25	25-35	35-45	45-55
Y	5	10	15	20	10

d. Explain regression analysis in detail and derive regression equations.

5 CO5 K3

4. a. An electric bulb manufacturing company noticed that 5% bulbs are defective. Using the Poisson distribution, find out that a sample of 200 bulbs will contain no defectives.

5 CO3 K4

- b. Define and explain binomial distribution, including its assumptions, properties, mean, and variance. 5 CO4 K3
- (OR)
- c. In a group of 100 patients, 60 have Disease A, 50 have Disease B, and 30 have both diseases. If one patient is selected at random, find:
 (a) Probability that the patient has Disease A or Disease B
 (b) Probability that the patient has neither disease 5 CO3 K4
- d. Explain the normal distribution in detail and discuss the properties of the normal curve. 5 CO5 K2
5. a. Define sampling and explain its importance and theoretical basis in statistical analysis. 5 CO4 K1
- b. Explain the concept of sample size determination and factors affecting it. 5 CO3 K3
- (OR)
- c. Differentiate between probability and non-probability sampling methods, with merits and limitations. 5 CO3 K3
- d. Explain sampling errors and biasness, and methods to minimize them? 5 CO4 K2
6. a. A drug is administered for typhoid, and the results are shown in the table below. 5 CO6 K4
- | | | |
|---------|---------|------------|
| | Typhoid | No typhoid |
| Drug | 300 | 400 |
| No drug | 380 | 30 |
- Find out whether the drug is effective. (Tabulated value= 3.84)
- b. Describe the one-way ANOVA with detailed steps. 5 CO5 K3
- (OR)
- c. A genetic experiment gives the following observed frequencies: 5 CO5 K4
- | | | | | |
|--------------|----|----|----|---|
| Category | A | B | C | D |
| Observed (O) | 50 | 30 | 15 | 5 |
- Expected ratio = 4: 3: 2: 1. Test the goodness of fit at 5% level (Tabulated value 7.815)
- d. Describe the Student's t-test, its types, assumptions, and applications. 5 CO6 K2

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