

GITAM (Deemed to be University)

[MATH2361]

B.Tech. Degree Examination

Biotechnology

III Semester

PROBABILITY AND STATISTICS

(Effective from the admitted batch 2021–22)

Time: 2 Hours

Max.Marks: 30

Instructions: All parts of the unit must be answered in one place only.
Figures in the right hand margin indicate marks allotted.

Section-A

1. **Answer all the questions:** (5×1=5)

- a) What are the sources of collecting secondary data?
- b) The function $f(x) = \frac{k}{1+x^2}$, $-\infty < x < \infty$ is a valid probability density function then find k.
- c) Write the normal equations of the Straight-line fitting.
- d) Define critical region.
- e) Give the test statistic of student's t-test for single mean.

Section-B

- Answer the following:** (5×5=25)

UNIT-I

2. The following table shows the marks obtained by 50 candidates in an examination. Calculate the quartile deviation.

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of candidates	6	5	8	15	7	6	3

OR

3. Calculate the Mean and Median for the following distribution.

Class Interval	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	10	20	20	15	15	20

UNIT-II

4. 3 led bulbs are chosen at random from 12 bulbs of which 5 are defective. Find the probability that
- all are defective
 - one is defective
 - 2 are defective

OR

5. 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at a random.
- a) None is defective b) One is defective c) $P(1 < x < 4)$

UNIT-III

6. Find the lines of regression and hence find the correlation coefficient for the following data:

x	5	10	15	20	25
y	20	40	30	60	50

OR

7. Calculate Karl Pearson's coefficient of Correlation for the following

X	28	41	40	38	35	33	40	32	36	33
Y	23	34	33	34	30	26	28	31	36	38

UNIT-IV

8. In a sample of 1000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance?

OR

9. On the basis of their total scores, 200 candidates of a civil service examination are divided into two groups, the upper 30% and remaining 70%. Consider the first question of the examination. Among the first group, 40 had the correct answer, whereas among the second group, 80 had the correct answer. Based on these results, can one conclude that the first question is not good at discriminating ability of the type being examined here?

UNIT-V

10. Two independent samples of 8 and 7 items respectively had the following values:

Sample I:	9	11	13	11	15	9	12	14
Sample II:	10	12	10	14	9	8	10	-

Is the difference between the means of samples significant?

OR

11. Samples of two types of electric bulbs were tested for length of life and following data were obtained.

	Type-I	Type-II
Sample size	8	7
Sample mean	1234 hrs	1036 hrs
Sample S.D.	36 hrs	40 hrs

Is the difference in the means sufficient to warrant that Type-I is superior to Type-II regarding the length of life?

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