

2055

**M.Sc. (Bio-Informatics) Second Semester
MBIN-8007: Statistics and Probability**

Time allowed: 3 Hours

Max. Marks: 60

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting atleast one question from each Unit. Use of Statistical tables and simple calculator is allowed.

1. Answer the following:-

- i) Differentiate between discrete and continuous variable.
- ii) Distinguish between deciles and percentiles.
- iii) State the conditional probability theorem.
- iv) Discuss about scatter diagram and its importance.
- v) Under what conditions, the binomial distribution tends to Poisson distribution?
- vi) Define null and alternative hypothesis with example.
- vii) Discuss about box and whisker plot.
- viii) Write ANOVA table for two-way classification.

$$\left(8 \times 1\frac{1}{2}\right)$$

Unit-I

2(a). Explain the measures of central tendency with their merits and demerits.

(b). Draw histogram and frequency polygon of the following data:

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	12	16	19	17	14	12

(8, 4)

3(a). Define the followings:

- i) Nominal and ordinal scale
- ii) Skewness and kurtosis
- iii) Quartile deviation and standard deviation.

(b). Calculate Karl Pearson's Coefficient of skewness from the following data:

Size:	1	2	3	4	5	6	7
Frequency:	12	20	32	27	14	5	4

(6, 6)

P.T.O.

(2)

Unit-II

4(a). Define the followings:

- i) Independent and mutually-exclusive events with examples.
- ii) Rank Correlation and Linear regression

(b). The probability that a contractor will get a plumbing contract is $2/3$ and the probability that he will not get an electrical contract is $5/9$. If the probability of getting at least one contract is $4/5$, what is the probability that he will get both?

(c) A random variable X has the following probability function:

Value of $X, x:$	0	1	2	3	4	5	6	7
$p(x):$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

- (i) Find k , (ii) Evaluate $P(X < 5)$, $P(X \geq 5)$, and $P(0 < X < 6)$, (4, 4, 4)

5(a). Define the concept of correlation and discuss its various types with examples.

(b). From the following data:

X	18	20	21	17	19	20	24	22
Y	16	17	14	19	20	17	18	21

Obtain the line of regression of Y on X and estimate the value of Y when $X=26$.

(5, 7)

Unit-III

6(a). Define Bernoulli distribution and find its mean, variance and moment generating function (MGF). Under what condition it can be approximated to a binomial distribution.

(b). Explain Mann Whitney test for testing a non-parametric problem. (7, 5)

7(a). Below are given the gain in weights (in kgs.) of pigs fed on two diets A and B.

Gain in weight

Diet A : 25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25

Diet-B : 44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22

Test, if the two diets differ significantly as regards their effect on increase in weight (Given $\alpha = 5\%$).

(b). Define the following:

- (i) One way ANOVA
- (ii) Central Limit Theorem
- (ii) Poisson distribution

(6, 6)