

(i) Printed Pages : 4 Roll No.

(ii) Questions : 9 Sub. Code :

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Exam. Code :

0	4	3	5
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M.Sc. Bio-Technology 1st Semester

(2125)

BIO-STATISTICS

Paper : MBIO-105

Time Allowed : Three Hours] [Maximum Marks : 80

Note :— Attempt FIVE questions in all, including Question No. 1 which is compulsory and selecting ONE question from each unit.

(Given $t_{0.05}(9) = 2.262$)

(Compulsory Question)

1. Answer the following:

(i) Construct a pie diagram of the following data:

Product	-A	B	C	D
Sales	50	80	40	30

(ii) Define the subjective probability with suitable examples.

(iii) The marks of 5 students in a test are 10, 12, 15, 17, 20. Calculate the standard deviation.

- (iv) Define conditional probability with example.
- (v) Write ANOVA table for Latin square design.
- (vi) Define Type-I and Type-II errors.
- (vii) Define the Binomial distribution and write its probability function.
- (viii) Differentiate between discrete and continuous random variables. 8×2

UNIT-I

2. (a) Discuss mean, median, mode, range and write their formulas.
- (b) Draw the Histogram and Frequency Polygon for the following data:

X	0-10	10-20	20-30	30-40	40-50	50-60
F	7	9	13	18	11	6

8,8

3. (a) The following data are given:

Size of the item	10	11	12	13	14	15	16
Frequency	2	7	11	15	10	4	1

Find the Mean, median and Standard deviation of the above data.

- (b) If two fair dice are thrown simultaneously, calculate the probability of the following events:
- (i) The sum of the numbers is 8,
 - (ii) The sum of the number is divisible by 3,
 - (iii) The sum of the numbers is less than 7. 9,7

UNIT-II

4. (a) The probability that a contractor will get a plumbing contract is $\frac{2}{3}$ and the probability that he will not get an electrical contract is $\frac{5}{9}$. If the probability of getting at least one contract is $\frac{4}{5}$, what is the probability that he will get both?
- (b) Define the followings:
- (i) Independent events with examples,
 - (ii) Baye's Theorem,
 - (iii) Multiplication probability for two events. 7,9
5. (a) In a bolt factory, machines A, B, and C manufacture 25 per cent, 35 per cent and 40 per cent of the total output respectively. Of the total of their output, 5, 4, and 2 per cent are defective bolts. A bolt is drawn at random and is found to be defective. What is the probability that it was manufactured by machine B?
- (b) A husband and wife appear in an interview for two vacancies of the same. The probability of husband's selection is $\frac{1}{7}$ and that of wife's selection is $\frac{1}{5}$. What is the probability that
- (i) both of them will be selected,
 - (ii) only one of them will be selected, and
 - (iii) none of them will be selected. 8,8

UNIT-III

6. (a) Define Bernoulli distribution and find its mean and variance.
- (b) Find $E(X)$ and variance of X of the following data:

x	50	60	70	80
$P(X=x)$	0.2	0.5	0.2	0.1

8,8

7. (a) Define the following:

(i) Probability Mass Function (PMF),

(ii) Poisson Distribution,

(iii) Normal distribution.

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

Value of X , x	0	1	2	3	4
$p(x)$	0.10	0.20	0.40	0.20	0.10

Find

(i) $P(X \leq 2)$ and $P(X > 1)$,

(ii) Cumulative distribution function $F(x)$. 9,7

UNIT-IV

8. (a) Discuss the various advantages and disadvantages of CRD and RBD.

(b) Discuss the various methods of collecting primary data. 8,8

9. (a) A random sample of 10 boys had the following I.Q.'s: 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q. of 100? (Given $\alpha = 5\%$).

(b) Discuss the Latin square design in detail. 8,8