Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐   **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech.(Bio Tech.) (Sem.–1)
# BIOSTATISTICS
Subject Code : MTBT-107
M.Code : 23007

Time : 3 Hrs.   Max. Marks : 100

INSTRUCTION TO CANDIDATES :
1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) Briefly describe the inclusion and exclusion rule of probability.   10

   b) One rupee coin is tossed twice. Similarly another two rupee coin is tossed thrice. What are the probabilities of getting heads in one rupee and two rupee coins which are tossed twice and thrice?   10

2. a) Briefly describe how the data can be presented in different forms?   8

   b) What is coefficient of variation? The mean and SD of 10 observations were found to be 65 and 8 respectively. Later on it was found that one number 70 was taken instead of 17. Find the correct mean and SD.   7

   c) What is normal curve? Briefly describe the properties of normal curve.   5

3. a) What is skewness and kurtosis? Mention their importance.   10

   b) A sample of 600 factory workers has a mean PEFR 204 L/min. and SD of 46.3. Can we assume that this sample is from a large population with a mean of 216 L/min. and SD of 46.3?   5

   c) What is paired and unpaired 't' test? Mention their importance.   5

4. a) The weight gain (in pounds) of experimental animal fed on diet A and diet B are given below. Test whether the two diets differ significantly as regards to their effect on increase in weight of experimental animals.   10

   Diet A: 25, 32, 30, 34, 24,14, 32, 24, 30, 31, 35, 25 (n=12)

   Diet B: 44, 22, 10, 47, 31, 40, 30, 32, 35,18, 21, 35, 29, 22, 20 (n=15)

   b) A cancer screening test was carried out by a team of oncologists and a total of 300 people were screened for oral cancer. The findings were: oral cancer is present in 100, under whom 20 gave the history of chewing tobacco; 200 people were without oral cancer, under whom 110 gave the history of chewing tobacco. Test whether oral cancer and tobacco chewing are associated or not? (use χ^2 test).   10

	Chewing tobacco	No chewing tobacco	Total
Oral cancer	20	80	100
No oral cancer	110	90	200
Total	130	170	300

5. a) What do you understand by linear regression? Explain the method of fitting the line $y = a + bx$ using the method of least squares.   5

    b) Find out the regression equation of y on x for the heights of sons and fathers.   15

    Fathers (X) 65, 63, 67, 64, 68, 62, 70, 66, 68, 67, 69, 71

    Sons (Y) 68, 66, 68, 65, 69, 66, 68, 65, 71, 67, 68, 70

6. a) Briefly describe the importance of null hypothesis and alternate hypothesis.   5

    b) Effect of vitamin B_{12} on ionisability of iron was tested at four different concentrations. The data is given below. Perform one-way ANOVA to test the significant variation among the concentrations.   15

Conc. 1	Conc. 2	Conc.3	Conc.4
15.5	15.1	15.2	15.2
14.9	14.5	13.8	13.4
15.1	15.1	14.7	13.8
15.4	14.9	15.1	14.5

7. a) Briefly describe the differences between correlation and regression.   8

    b) Discuss about the randomized block design and its importance in agriculture.   12

8. a) What is polynomial curve? Write a note on quadratic equation.   10

    b) The scores of 6 pupils in two subjects: physics and chemistry are given below. Calculate the coefficient of correlation by the rank difference method also called Spearman rank correlation coefficient.   10

Scores	Students					
	A	B	C	D	E	F
Chemistry	45	53	67	40	35	50
physics	68	76	70	64	54	66

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.