

**GUJARAT TECHNOLOGICAL UNIVERSITY****M.SC. INDUSTRIAL BIOTECHNOLOGY/ POST GRADUATE DIPLOMA IN  
BIOINFORMATICS SEMESTER - 1 WINTER 2021 EXAMINATION****Subject Code:1310105****Date:17 Mar 2022****Subject Name:Statistics****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Draw neat and clean diagrams as required

**Q.1 Write a note on following****(Marks-  
10X2=20)**

1. Define Probability and mention the laws of Probability with Formulae
2. Find Mean, Median and Mode for the following data.  
6.3, 10.5, 12.5, 7.2, 13.5, 12.0, 9.5
3. Explain any four types of events with examples
4. Write the properties of Gaussian Distribution
5. Define sample and population and enlist two differences for each.
6. Mention the differences between Longitudinal and Cross-sectional studies
7. During trials of a new drug, the patients were asked if they faced any side effects. A total of 15 patients participated in the study. What is the probability that 10 of the participated patients reported that they did not face any side effects?
8. What is Correlation Coefficient?
9. Define Null and Alternate Hypothesis
10. What is Discreet and Continuous Data?

**Q.2 Answer the following (Any 2 out of 3)****(Marks-  
2X10=20)**

1. In a nutritional study, 13 children (Experimental group) were given Vitamin A and D capsules along with a usual diet, while another comparable group of 12 children (Placebo group) were only given a usual diet. The result after 6 months of study is represented in the tabulated form below. Determine if the inclusion of Vitamin A and D capsules are responsible for weight gain.

No. of Children	1	2	3	4	5	6	7	8	9	10	11	12	13
Weight gain in the experimental group	5	3	4	3	2	6	3	2	3	6	7	5	3
Weight gain in Placebo group	1	3	2	4	2	1	3	4	3	2	2	3	

2. If the mortality due to a new mutant variation of a disease is found to be fatal for 44 out of 220 people in one sample and in another sample of 220 people the disease is fatal for 66 people. Determine if there is a significant difference in the two mortality rates.
3. The reaction time after consumption of a beverage across 3 age groups, 16-25, 26-35 and 36-45 was taken for a total of 15 participants. Determine if there is any statistically difference between the reaction time for the three groups.

Participants	1	2	3	4	5
Reaction time (16-25 years)	20	10	17	17	16
Reaction time (16-25 years)	19	13	17	12	9
Reaction time (16-25 years)	13	12	10	15	5

**Q.3 Answer the following (Any 6 out of 8)**

**(Marks-6X5=30)**

1. An experiment was carried out aimed at assessing the efficacy of penicillin and penicillin along with neomycin in preventing staphylococcal cross infection during first 14 days after burns. Infection developed in 18 out of 30 patients whose burns were dressed with penicillin as compared to 5 out of 33 patients in whom penicillin and neomycin both were used. What conclusion can one draw from the given data?
2. The Mean for a set of 200 observations is 140 and the Standard Deviation is found to be 25. Determine the Standard Error and the Confidence Interval at 95% confidence Level.
3. For the given set of data calculate Mean, Median, Mode, Standard Deviation, Variance and Standard Error.  
10, 24, 15, 19, 22, 17, 28,13,27,30
4. What is sampling? Write a note on the different sampling techniques with examples.
5. Differentiate between Parametric and Non-Parametric Tests? Give examples of two tests for each.
6. Define conditional probability with example
7. Determine the Pearson's Correlation Coefficient for the following data and conclude the type of correlation observed.  
X= 3, 6 ,9, 12 and Y= 8, 12, 16, 20
8. Define Regression and Mention the different types of Regression. Also write the Significance of Regression and mention the Linear Regression Equation.

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