School of Biological and Life sciences
Bachelor of Science Honours in Microbiology
Semester End Examination - May 2024

Duration : 180 Minutes
Max Marks : 100

Sem VI - P1UC602T - Biostatistics

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) How does the concept of the mean serve as a measure of central tendency in biostatistics, and what are its implications for interpreting data in fields such as epidemiology and clinical research? **K1 (2)**

2) Define parametric and non-parametric statistics and discuss their respective assumptions. **K2 (4)**

3) A biology lab measures the weight of 20 mice and finds that the standard deviation of their weights is 2.5 grams. Calculate the standard error of the mean (SEM) for this sample. **K2 (6)**

4) Define the basic laws of probability, including the addition rule, multiplication rule, and complement rule. Explain each law in detail, providing examples to demonstrate how they are applied in calculating probabilities of events. Discuss the importance of these laws in solving probability problems and making informed decisions. **K3 (9)**

5) The incomes (in thousands of dollars) of 15 employees in a company are 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, and 120. Calculate the population mean income. **K3 (9)**

6) Explain how the level of significance is related to the confidence level in confidence intervals. Discuss the interpretation of a 95% confidence interval in relation to a significance level of $\alpha = 0.05$. **K5 (10)**

7) A manufacturing company claims that the average weight of its product is 500 grams. A random sample of 100 products is selected, and the sample mean weight is found to be 498 grams with a standard deviation of 10 grams. Conduct a hypothesis test to determine if there is sufficient evidence to support the company's claim at a significance level of $\alpha = 0.05$. **K4 (12)**

8) Discuss how the mean and variance are calculated for discrete probability distributions. Provide step-by-step explanations for computing the mean and variance of a discrete distribution, using examples such as the binomial distribution or the Poisson distribution.

K5 (15)

9) Describe the interpretation of a 95% confidence interval. What does it mean to say that we are 95% confident that the interval contains the true population parameter?

K5 (15)

10) In a study on plant growth, the heights (in centimeters) of 10 tomato plants were measured: 25, 28, 30, 32, 34, 36, 38, 40, 42, 45. Calculate the variance and standard deviation of the plant heights for this sample.

K6 (18)