

FACULTY OF SCIENCE

M.Sc. II - Semester Examination, April / May 2014

Subject: Biochemistry

Paper - IV: Biostatistics and Data Analysis

Time : 3 Hours

Max. Marks: 80

Note: Answer all questions from Part – A and Part – B. Each question carries 4 marks in Part – A and 12 marks in Part – B.

PART – A (4 x 8 = 32 Marks)

(Short Answer Type)

- 1 Samples and Populations
- 2 Statistics for quality control in biochemistry
- 3 CPU
- 4 Sensitivity and specificity
- 5 Contingency test
- 6 Mann-Whitney test
- 7 Evolution of computers
- 8 Integration

PART – B (4 x 12 = 48 Marks)

(Essay Answer Type)

- 9 (a) What are the commonly used measures of dispersion? Calculate these measures for the following data: 1, 2, 3, 3, 4, 4, 4, 5, 5, 6.
OR
(b) What is probability? Explain the laws of probability with examples. Add a note on Bayesian probability.
- 10 (a) What is Students t-test? A sample of 9 students showed heights of 150, 152, 154, 155, 156, 156, 157, 157 and 160 cm. Can you infer that these students came from a population with average height 155cm? At $\alpha=0.05$, critical values of t at $df =9$ and 10 are 2.26 and 2.23 for 2-tailed test and 1.83 and 1.81 for 1-tailed test.
OR
(b) What tests of significance? Explain type-I and type-II errors? When can one use Wilcoxon test and Kruskal-Wallis test?
- 11 (a) Explain how you can use Poisson distribution to calculate mutation rate of bacteria using the fluctuation test.
OR
(b) Compare and contrast the growth curves of bacteria and viruses. If a bacterial culture has a doubling time of 20 minutes, what will be the cell density after 4 hours of a culture started with 10^6 bacteria? If the culture is infected with phage at $moi=0.01$, and the phage life cycle is also 20 minutes and burst size=100, what will be the cell density after 4 hours for a culture started with 10^6 bacteria.
- 12 (a) Describe the basic structure and function of a computer (and its main components).
OR
(b) Explain how you can use data from gel electrophoresis of restriction digests to draw maps for linear and circular DNA.