

M. Sc. DEGREE EXAMINATION, NOVEMBER 2007
BIOTECHNOLOGY
THIRD SEMESTER

COURSE : CORE
PAPER : BIOPHYSICS & BIOSTATISTICS
TIME : 3 HOURS

MAX. MARKS: 100

SECTION – A

ANSWER ALL QUESTIONS.

10 x 2 = 20

1. Explain the term conformation with example.
2. Write about the bonds present in Nucleotide.
3. Define Enthalpy and Entropy
4. What are chaperons?
5. Differentiate Diagram and graph.
6. Find the mean number of potatoes per point given the following frequencies of occurrence.

No. of potatoes per Plant (X)	4	6	3	8	9	5
No. of Plants	17	9	5	20	15	12

7. Suppose, it is known that in a certain area of a large city the average number of rats per quarter block is 2. Assuming that the number of rats follows a poisson distribution, find the probability that in a randomly selected quarter block, there are exactly 5 rats.
8. Define Null Hypothesis
9. Find the coefficient of variation given $\sigma = 3.2$ and $\bar{x} = 84$.
10. What is F – Transformation?

SECTION – B

ANSWER ANY FOUR QUESTIONS, EACH WITHIN 600 WORDS.

4 x 10 = 40

11. Explain Bragg's Law and how XRD is used to study structure of biomolecule.
12. What is MALDI – TOF? Explain its instrumentation and its role in Biological field.
13. Explain in detail about glycoproteins and their functions.
14. From the following data, the weights are gained by 60 fishes of a laboratory test. Calculate the arithmetic mean standard deviation.

Weights (grams)	20	30	40	50	60	70
No. of Fishes	8	12	20	10	6	4

15. The incidence of occupational disease in an industry is such that the workmen have 20% chance of suffering from it. What is the probability that out of 5 workmen selected
- Two will contract the disease
 - No one will suffer
 - Three or more will contract the disease.
16. Two random samples drawn from two normal populations are

Sample I	55	54	52	53	56	58	52	50	51	49	
Sample II	108	107	105	105	106	107	104	103	104	101	105

Check whether the difference in variance of the Population is significant.

SECTION – C

ANSWER ANY TWO QUESTIONS, EACH WITHIN 1500 WORDS. 2 x 20 = 40

17. a) With a neat diagram explain Fluid Mosaic model of plasma membrane.
b) Briefly Explain about transport across membrane.
18. a) What is chemical shift? Explain with an example.
b) Explain protein – protein interactions.
c) Explain the role of ATP.
19. a) In a study of the effect of a dietary component on plasma lipid composition, the following ratios were obtained on a sample of experimental animals.

Measure of dietary component (X)	1	5	3	2	1	1	7	3
Measure of Plasma Lipid Level (Y)	6	1	0	0	1	2	1	5

- Predict the ratio of plasma lipid level with 4 dietary components.
- b) Suppose, the ages time of onset of a certain disease are approximately normally distributed with a mean of 11 years and standard deviation of 3 years. 4 child has just come down with the disease. What is the probability that the child is:
- Between the ages of 8 and 14 years?
 - Over 10 years of age?
20. a) The response of boys and girls to a Particular question are given below
- | | | |
|-------|-----|----|
| | Yes | No |
| Boys | 62 | 34 |
| Girls | 56 | 28 |
- Do boys 4 girls differ significantly in their response?
- b) The systolic pressure 10 persons in the age group of 45 – 50 is given below:
148, 128 147, 127, 150, 145, 124, 140, 142, 149
- In the light of the data, discuss the suggestion that –The average systolic Pressure of the Population is 150.
 - Test for significance at 95%.
