

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2009 – 10)

SUBJECT CODE: BY/PE/BB33

M. Sc. DEGREE EXAMINATION, NOVEMBER 2010

BIOTECHNOLOGY

THIRD SEMESTER

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

MAX. MARKS: 100

SECTION – A

ANSWER ALL QUESTIONS.

10 x 2 = 20

1. What are pyranoses and furanoses?
2. Define Chemical Shift.
3. Define the two laws of Thermodynamics.
4. Define the bonds that are present in DNA.
5. Differentiate Diagrams and Graphs. Any two differences may be given
6. From the following data of seeds per pod in 7 pods of sugar peas, compute median seeds
Seeds per pod: 6,4,9,5,2,8,12
7. Give the Normal equations for Y on X.
8. Define Null Hypothesis
9. What is the value of $4C_3$?
10. Find the area to the left of $Z = 1.96$.

SECTION – B

ANSWER ANY FOUR QUESTIONS, EACH WITHIN 600 WORDS. (4 x 10 = 40)

11. Explain the principle behind X Ray Diffraction Spectroscopy
12. Briefly explain the active transport taking place across the membrane
13. Some health researchers have reported an inverse relationship between central nervous system malformation and the hardness of the related water supplies. Suppose data were collected on a sample of 9 geographic areas with the following results:

CNS malformations rate (per 1000 births)	Water hardness (ppm)
9	120
8	130
5	90
1	150
4	160
2	100
3	140
6	80
7	200

- Compute co-efficient of correlation. What is your conclusion?
14. The probability that a person will die within a month after a certain heart transplant operation is 18%. What are the probabilities that in three such operations one, two or all three persons will survive?

15. 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

Obtain the estimates of the variance of the populations that have the same variance

16. On the basis of the following data can it be concluded that smoking and lung ailment are independent?

	Lung ailment	No lung ailment
Smokers	75	105
Non Smokers	25	95

SECTION – C

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

17. Explain the Principle, Instrumentation and Applications of MALDI – TOF.

18. a. Explain Sanger Method of Protein Sequencing

b. Write a note on various chromatographic techniques used in protein purification

19. a. Obtain Mean, Median and Mode for the following data

No. of Wasps/Colony	2	3	4	5	6	7	8
No. of Colonies	4	6	8	12	7	7	6

b. The systolic pressure of 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

20. a. A 100 km stretch of trunk road through a forest was surveyed to determine the incidence of death of wild life due to accidents caused by heavy vehicles. The total number of dead animals counted was 75. Calculate the probability of finding no dead wild life in any randomly selected km stretch of this trunk road. What are the probabilities of finding one dead animal and two dead animals?

b. A normal distribution of 1000 variables has an arithmetic mean of 20 and a variance of 9. Using Normal tables, find how many variables lie in the following ranges: (i) 18 to 20; (ii) 23 to 26; and (iii) 26 to 27.5
