STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2006 – 07 & thereafter)

SUBJECT CODE: BI/PC/BS14

M. Sc. DEGREE EXAMINATION, NOVEMBER 2007
BIOINFORMATICS
FIRST SEMESTER

COURSE : CORE
PAPER : BIOSTATISTICS
TIME : 3 HOURS **MAX. MARKS: 100**

ANSWER ANY SIX QUESTIONS : (6 x 17)

1. a. Distinguish between 'population' and 'sample' of a biological investigation
   b. Define 'tabulation' and state the rules that serve as a guide in tabulating statistical data.

2. a. Draw a histogram and superimpose a frequency polygon for the following data:

Length of Gold fish	3.25 – 3.55	3.55 – 3.85	3.85 – 4.15	4.15 – 4.45	4.45 – 4.75
No of Fishes	2	5	11	5	2

   Find the mode from the graph
   b. Discuss the merits and demerits of the measures of central tendency

3. a. The data given below gives the number of patients affected by different types of Leprosy. Draw a suitable diagram.

Types of Leprosy	Tuberculoid	Lepromatous	Indeterminate	Borderline
No of Patients	148	64	18	10

   b. Calculate the mean and median of protein intake of 400 families

Class interval	15-25	25-35	35-45	45-55	55-65	65-75	75-85
Frequency	30	40	100	110	80	30	10

4. a. How would you measure skewness and kurtosis of a distribution.
   b. In a series of 100 individuals, the mean blood glucose in mg / dl was found to be 155 with standard deviation 52. In the same individuals the mean serum cholestrol levels in mg / dl was found to be 210 with standard deviation 36. Find which character shows greater variation.

5. a. Ten students got the following percentage of marks in Anatomy and Physiology

% marks in Anatomy	78	45	36	78	62	90	65	75	39	41
% marks in Physiology	84	55	50	60	82	86	58	60	47	51

   Find the rank correlation
   b. Obtain the two regression equation, length X in cms and weight Y in g of Fishes. Estimate the weight of a fish of length 2 cms.

X	5	7	3	1	9	12	8	3
Y	8	9	5	4	9	13	7	9

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6. a. State and prove Baye's Theorem
   b. The probability that a person will die with in a month after a certain heart transplant operation is 18%. What are the probabilities that in three such operations; one, two or all three will survive.

7. a. Explain the terms: i) Null hypothesis and Alternative hypothesis
   ii) Type I error & Type II error
   b. A hospital records the weight of every new born child at the hospital. The distribution of weight is normally shaped, has the mean $\mu = 2.9$ kg and has a standard deviation, $\sigma = 0.45$. Find the following
   (i) The percentage of new borns who weighed under 2.1 kg.
   (ii) The percentage of new borns who weighed between 1.8kg and 4.0kg.
   (iii) If 1500 babies have been born at the hospital how many weighed less than 2.5kg?

8. a. In school, Tonsillectomy had been done in 25 students out of 60, while in the other school it was done in 75 out of 400. Find if the difference observed in the two schools is by chance.
   b. A group of 7 patients treated with medicine A weigh 35, 39, 40, 42, 51, 48, 60 kgs. Another group of 9 patients from the same ward of a hospital treated with medicine B weigh 53, 56, 60, 62, 67, 63, 45, 54 kg. Do you agree with the claim that medicine B increases the weight significantly?

9. a. In a random sample of 50 male employees, at the end of the year the mean number of absent hours was found to be 63 hours. In similar sample of 50 females employees the mean was 66 hours. Could these samples be drawn from a population with the same mean and standard deviation 10 hours?
   b. From the following data, use X^2– test and conclude whether inoculation is effective in preventing tuberculosis.

Group	Attacked	Non-Attacked
Inoculated	10	90
Not inoculated	26	74

10. Write short notes on three of the following
   (i) Conditional probability
   (ii) Importance of normal distribution.
   (iii) Sampling techniques
   (iv) Uses of t–test.
   (v) Properties of correlation