

**STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086**  
**(For candidates admitted during the academic year 2008 – 09 & thereafter)**  
**SUBJECT CODE: BI/PC/BS15**

**M. Sc. DEGREE EXAMINATION, NOVEMBER 2008**  
**BIOINFORMATICS**  
**FIRST SEMESTER**

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

**ANSWER ANY SIX QUESTIONS: (6 x 17)**

1. a) Describe briefly the importance of statistical techniques in Biological research.  
 b) Define classification and tabulation. Distinguish between them. (5+12)
2. a) Draw a histogram and superimpose a frequency polygon for the following data.

Age groups in years	15-19	20-24	25-29	30-34	35-39	40-44
No of female	10	25	38	45	42	32

Find the mode from the figure.

- b) The data given below shows the portion of prey consumed and converted, metabolised and un-utilised in the process of consumption by a spider at the final instar larva at the temperature of 27<sup>0</sup> and 32<sup>0</sup>. Draw a suitable diagram.

Temp	Prey consumed and converted	Prey metabolised	Prey un-utilised
27 <sup>0</sup>	8.5g.cal	1.5g.cal	0.75g.cal
32 <sup>0</sup>	9.0g.cal	1.0g.cal	0.5g.cal

(8+9)

3. a) What are the different measures of central tendency. Mention their merits and demerits.  
 b) In a medicine OPD the following patients of different ages were examined. Find the mean, median and mode age of the patients.

Age in Yrs	10-20	20-30	30-40	40-50	50-60	60-70
No.of. Patients	5	19	26	35	15	3

(8+9)

4. a) Compare skewness and kurtosis of a distribution. How would you measure them.  
 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 cholesterol levels in mg/dl was found to be 210 with standard deviation 36, Find which character shows greater variation. (9+8)

5. a) Define correlation coefficient between two variables and state its properties.  
 b) Obtain the two regression equations, Length (X) on weight (Y) and weight on length from the following data of fish.

X(cm)	5	7	3	1	9	12	8	3
Y (g)	8	9	5	4	9	13	7	9

(7+10)

6. a.) The probability of recovery of a certain disease is 0.3. If 6 animals are laid down with disease. Assuming this to be a random sample, What is the probability  
 i) none will recover ii) exactly one will recover iii) exactly 2 will recover  
 iv) 3 or more will cover.
- b) If the probability that an individual suffers from bad reaction from injection of given serum is 0.001. Find the probability that out of 2000 individuals  
 i) none ii) exactly 3  
 iii) more than 2 individuals will suffer from a bad reactions. (8+9)
7. a) Distinguish between Type I error and Type II error.  
 b) Before an increase in dosage of antibiotics of fish reared in a research station, 1000 out of 1200 were in good condition. After an increase in dosage of antibiotics 1300 were in good condition in a sample of 1400. Do you think that there has been any significant increase in good condition of fish after increase in dosage. (7+10)
8. a) The mean length of 200 millet ear heads of variety A was found to be 8cms with S.D 1cms. Out of 400 millet ear head of variety B mean was found to be 11cms with S.D 2cms. Test the hypothesis that both the varieties of ear head at 5% level of significance.  
 b) In order to determine the effect of certain oral contraceptive on weight gain, nine healthy females were weighted prior to the start of its use and again at the end of 3 months period.

Initial Weight (kg)	48.0	56.4	52.0	60.0	54.0	56.0	48.0	56.0	52.0
Wt after 3 month (kgs)	49.2	57.2	56.0	58.0	56.0	57.2	47.2	50.4	52.8

Is there a sufficient evidence to conclude that female experience gain in weight following 3 months of the oral contraceptive use? (7+10)

9. a) A correlation coefficient of 0.8 between length and weight of a species of fish was obtained from measurement made in a sample of 8 fish. Is this correlation coefficient significant?  
 b) In order to relate “smoking cigattes” with ‘lung cancer’, 300 smokers and 400 non-smokers, randomly chosen from a town, were screened for symptoms of cancer. While 50 out of 400 non-smokers showed signs of cancer, as many as 234 out of 300 smokers showed symptoms of cancer. On the basis of this data, can it be suggested that development of lung cancer has a strong bearing on smoking? (8+9)
10. Write short notes on any THREE of the following:  
 i) Conditional probability ii) Marchov chains  
 iii) Sampling Technique iv) Normal Distribution  
 v) ANOVA (6+6+6)

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