LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION - **BMIS**

THIRD SEMESTER – NOVEMBER 2007

BB3

ST 3901/BI 3800 – STATISTICAL APPLICATIONS IN BIOLOGICAL SCIENCES

Date : 06/11/2007 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

SECTION A

Answer ALL questions. Each carries 2 marks (10x2=20)

1. Write any two sources from which ***Primary data*** are obtained.
2. State any two applications of Statistics in Bio-Medical science studies.
3. Exemplify the significance of ***Co-efficient of Variation***.
4. Illustrate the use of ***Scatter diagram*** by an appropriate example from Bio-sciences.
5. Explain the importance of ***Regression equation.***
6. Describe the terms '***Probability***' and '***Random variable***'.
7. Declare any four characteristics of ***Normal distribution***.
8. What are the advantages of ***Sampling***? Point out any two sampling techniques.
9. Define ***Null Hypothesis*** and ***Alternate Hypothesis.***
10. Mention any two uses of ANOVA while conducting Biological experiments.

SECTION B

Answer any FIVE questions (5x8 =40)

11. What is meant by Classification of data? Explain any four types of classification of data.

12. State the significance of Diagrammatic representation of data. Illustrate any four Diagrammatic representations of data.

13. Explain the following measures of Dispersion and state their merits and demerits:
    [a] Range [b] Quartile Deviation [b] Standard deviation

14. Comment upon the amount of Variability present in the following data, which are measured in two different units for an attribute from 6 subjects:

Measurement Type1:	50	75	62.5	80	65	85
Measurement Type2:	20	30	25	32	26	34

15. The following are Microalbuminuria level (in mg) of 8 patients undergoing drug therapy for diabetes :
    174 184 128 162 178 158 180 120.
    Can we conclude, on the basis of these data that the population average of Microalbuminuria level is more than 150 mg? Test the claim at level of significance α=0.05.

[PTO]

16. The Weights (in Kg.) of 7 Obese Women before and after 10-weeks of VLCD(very low calorie diet) treatment are given in the following table. Test whether these data provide sufficient evidence to allow us to conclude that the treatment is effective in causing weight reduction in obese women? Let α=0.05

Before VLCD:	113	114	96	103	104	105	81
After VLCD:	88	89	78	89	83	77	67

17. A research study reveals that out of 210 families of females with primary unipolar major depression, they found that alcoholism was found in 89. Of 299 control families, alcoholism was present in 94.Do these data provide us sufficient evidence for us to conclude that alcoholism is more likely to be present in families of subjects with unipolar depression? Let the level of significance =.05.
18. Explain any three sampling techniques.

SECTION C

Answer any TWO questions (2 x 20 =40*)*

19. In study on identifying risk factors for cardiovascular disease, the researcher suspects that Waist circumference(in cm),X and Deep Abdominal adipose tissue area(in cm^2),Y may have an Association. A sample data from 10 subjects were given below:

X:	74	83	80	73	79	74	76	89	92	86
Y:	25	42	29	32	42	33	36	60	70	78

[i] Represent the relationship between Waist circumference and Deep Abdominal adipose tissue area using appropriate diagram.

[ii] Compute the Co-efficient of Correlation between Waist circumference and Deep Abdominal adipose tissue area.

[iii] Predict the value of Deep Abdominal adipose tissue area(in cm^2),Y, when Waist circumference is 90.

20.[a] The following data reveal the Transverse diameter measurements on the hearts of adult males and females.

Male(in cm):	12	13	14	13	15	13	14	15
Female(in cm):	10	11	9	10	11	8	9	10

Can we conclude, on the basis of these data that the Average Transverse diameter of hearts in Male population is significantly higher than the female population.

[b] In a survey of injection drug users in a large city, it is found that 20 out of 500 were HIV positive. Is it reasonable to conclude that fewer that 5% of the injection drug users in the sampled population are HIV positive? Test at 5% level of significance. [15+5]

21. In an experiment, the plasma glucose levels were collected from two independent random samples of strains of mice A and B.

Strain A:	54	99	105	46	70	87	55	58
Strain B:	93	91	93	150	80	104	128	83

Do these data provide sufficient evidence to indicate that:

[i] the variability is larger in the population of Strain A mice that in the population of strain B mice?

[ii] Are the average plasma levels are same in both strains of mice? Assume that variances are equal. Let α=0.05.

22. In a certain prosthetic device experiment, the physical therapist suspects that the rate of learning is different for patients of different ages and designed an experiment in accordance with age against 3 methods. The Time (in days) required to learn the use of the Prosthetic device are given in the following table. Test the following claims at 5% level of significance

[i] Can we conclude that all age group effects are equal

[ii] Can we conclude that all teaching method effects are equal

Age Group	Method		
	A	B	C
Under 20	7	9	10
20 to 29	8	9	10
30 to 39	9	9	12
40 to 49	10	9	12
50 and over	11	12	14

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