LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PLANT BIOLOGY & ADV. ZOOLOGY**

THIRD SEMESTER – NOVEMBER 2011

ST 3203 - BIOSTATISTICS

Date : 11-11-2011 Dept. No. Max. : 100 Marks
Time : 9:00 - 12:00

SECTION - A

Answer all the questions **(10x2=20)**

1. Define Mean and Standard deviation
2. State the Axioms of probability
3. State Baye's theorem
4. Give the expression for intercept and slope of a simple linear regression model
5. State any two difference between correlation and regression
6. Define Statistical Hypothesis
7. Write the test statistic for a two independent group t-test
8. Write the layout of a one way ANOVA
9. Define Interaction effect
10. Provide the main effect of A in a 2^3 factorial design

SECTION-B

Answer any five questions **(5x8=40)**

1. Explain variable types with examples
2. Explain the steps involved in chi-square test of independence
3. Give the expression for main effects and interaction effect of a 2^2 factorial design and provide the layout of ANOVA for a 2^2 factorial design
4. Determine Karl Pearson coefficient of correlation for the following data

Drug taken(In days)	**1**	**2**	**1**	**3**	**5**	**8**	**9**	**7**	**8**	**6**
% Reduction of tumor	**46**	**63**	**56**	**45**	**66**	**76**	**83**	**70**	**76**	**69**

5. Crops were cultivated on two different fields and the net yield were observed Field A: 34, 28, 42, 37, 44, 51, 58, 51 and Field B: 36, 33, 48, 38, 50, 49, 54, 53 test whether the mean yield is the same using a two independent group t-test
6. The length of a certain species is assumed to follow normal distribution with mean 45cms and standard deviation 10cm. i) What is the probability of the length to be less than 40cm ii) What is the probability that the length is greater than 60cm

7. Data on weight of a random sample of sun fish is given as follows 5, 3.9, 5.2, 5.5, 2.8, 6.1, 6.4, 2.6, 1.7, 4.3 test the hypothesis H_0: median=3.7 vs H_1: median≠3.7 using Wilcoxon test
8. Two batches of 12 animals were inoculated and other non-inoculated were exposed to infection of a disease. The following frequency was observed. Use Chi-square test of independence and conclude whether inoculation be regarded as effective against the disease?

	Dead	**Surviving**
Innoculated	**13**	**37**
Non-Innoculated	**24**	**26**

SECTION-C

Answer any two questions **(2x20=40)**

1. Three different drugs were tested for curing a certain disease and the days taken to cure are given below.

Drug A	**85**	**75**	**82**	**76**	**71**	**85**
Drug B	**71**	**75**	**73**	**74**	**69**	**82**
Drug C	**59**	**64**	**62**	**69**	**75**	**67**

Construct a one way ANOVA and test whether there is significant difference between the treatments and provide your conclusion

2. Two components of a drug were varied at two levels and the days taken to cure were observed. Analyze the 2^2 factorial design and provide your conclusions

Factor		**Replicates**		
Decil (A)	**Calcium (B)**	**I**	**II**	**III**
-	-	**32**	**28**	**36**
+	-	**23**	**21**	**32**
-	+	**48**	**42**	**40**
+	+	**62**	**65**	**69**

3. (i) Construct regression model of calcium level on bone density (12)

Clacium (X)	**8**	**3**	**4**	**7**	**8**	**0**
Bone Density(Y)	**2**	**4**	**3**	**1**	**3**	**5**

(ii) The incidence of a certain disease in a region is 20%. Six men are selected at random, What is the probability that out of 6 men 4 will be diseased? What is the probability that out of 6 men 4 or more will be diseased? (8)

4. (i) Three treatments were tested for reduction in growth of cancer cell. Compare the effectiveness of the treatments using Kruskal-Wallis test (12)

Treatment A	**15.1**	**11.9**	**13.5**	**12.6**	**16.8**

Treatment B	**14.5**	**15**	**11.3**	**12.3**	**9.7**
Treatment C	**13.2**	**11.8**	**10.5**	**9.3**	**9.9**

(ii) Data on months taken to relapse of a certain disease under two different drug is given

Drug I	**2**	**6.5**	**6.5**	**1**	**4.5**	**3**
Drug II	**10**	**11**	**12**	**8**	**4.5**	**9**

Test whether the two treatment procedures are the same using Mann-Witney U test (8)

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