LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **BIO MED.INS.SCI. & MLT**

THIRD SEMESTER – NOVEMBER 2011

ST 3901 - STATISTICAL APPLICATIONS IN BIOLOGICAL SCIENCES

Date : 08-11-2011 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

SECTION – A

Answer All the Questions (10 x 2 =20)

1. Define the term Statistics
2. How are statistics being mis-used? Give out anyone mis-interpretation of statistics.
3. Define Weighted Arithmetic Mean.
4. Why is median called a positional average?
5. What is meant by regression analysis?
6. State the meaning and usefulness of Standard Error.
7. Define level of significance and critical region.
8. What do you mean by Type I error and Type II error?
9. State the conditions for the use of t test.
10. Given one way ANOVA table.

SECTION - B

Answer any five questions (5 x 8 =40)

11. Explain the importance and limitations of diagrammatic presentation of data.

12. Determine quartile deviation and its coefficient for the following tabulation of leaf weight in grams

Leaf weight	30 – 32	32 – 34	34 – 36	36 – 38	38 – 40	40 – 42	42 – 44
No . of leaves	12	18	16	14	12	8	6

13. Two referees in a flower beauty competition rank the 10 types of flower as follows.

Referee A	1	6	5	10	3	2	4	9	7	8
Referee B	6	4	9	8	1	2	3	10	5	7

Use the rank-correlation coefficient and find out what degree of agreement is there between the referees.

14. The number of bacteria in 1 ml of blood from 5 persons are 2, 3,7,8,10. Calculate the first, second, third and fourth moments about the mean.

15. Find the confidence interval for the population mean at 95% confidence level in the following:

Case	Population Size	Sample Size	Population S.D	Sample S.D	Sample Mean
A	Not available	36	3	4	100
B	600	36	-	4	100

16. Define the following:
    (i) Parameter and statistic
    (ii) Large sample and small sample
    (iii) Point estimation
    (iv) Confidence limits

17. The height of the ten males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. Is it reasonable to believe that the average height is greater than 64 inches? Test at 5% level of significance.

18. Two Group of animals are tested for their life time and the following data obtained:

	No. of Sample	Mean life in hours	Variance
Group 1	9	600	121
Group 2	8	640	144

Is there significant difference between the means of two group of animals at 5% level of significance?

SECTION –C

Answer any two questions (2 x 20 = 40)

19. Find the two regression equations for the following data:

X	120	145	178	190	201	225	100	267	252	220	200	168
Y	54	68	71	80	94	101	40	102	94	99	82	70

Find the value Y when X = 275 and also Calculate Coefficient of correlation.

20. a) In a city A, 30 % of a random sample of 2000 school children had defective eye – sight. In another city B, 35% of a random sample of 4000 children had the same defect. Is this difference between the proportions significant? Obtain 99% confidence limits for the difference in the population proportions.

b) A certain medicine was given to each of ten patients. The result are given below

Weight before medicine	42	39	48	60	41	55	44	67	69	30

Weight after medicine	38	42	48	67	40	53	48	70	74	40

Use t-test to test the effectiveness of the medicine in reducing the weight.

(10 +10)

21. a) A survey of 320 families with 5 children each revealed the following distribution.

No. of	5	4	3	2	1	0
No . of girls	0	1	2	3	4	5
No. of families	14	56	110	88	40	12

Is this consistent with the hypothesis that male and female births are equally probable?

b) Given the following contingency table for hair colour and eye colour, find the value of X^2. Is there good association between the row?

Eye colour	Hair colour			Total
	Fair	Brown	Black	
Blue	15	5	20	40
Grey	20	10	20	50
Brown	25	15	20	60
Total	60	30	60	150

(10 +10)

22. The following table gives the yield on 15 fields under three variety of seeds (viz. A, B, C)

Yields		
A	B	C
9500	9300	10000
9600	9800	10300
9800	9200	9700
9100	10000	10300
9500	9000	10700

Test the equality of the mean yields under the three groups at 5% level of significance.

Test at 5% level of significance.

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