LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **NOVEMBER 2012**

# ST 3204/ST 3203 - BIOSTATISTICS

 Date : 09/11/2012 Dept. No. Max. : 100 Marks

 Time : 9:00 - 12:00

**SECTION – A**

**Answer ALL questions:**  (10 x 2 = 20)

1. Write down the uses of Bio-Statistics.
2. State any two properties of Normal Distribution.
3. Calculate coefficient for Range: 37, 57, 27,72,79,87,97,76,67,47
4. What is the probability that the leap year selected at random will have 53 Sundays?
5. Briefly explain Regression analysis.
6. Give the test statistic for a chi-square test.
7. Define type-I error.
8. State the difference between parametric and non-parametric test
9. Write the test statistic for a Z-test for a single proportion.
10. Define mean sum of squares.

**SECTION – B**

**Answer any FIVE of the following:** (5 X 8 = 40)

1. Police records shows the following numbers daily crime reports for a sample of days during the  winter months and a sample of days during the summer months.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Winter** | 18 | 20 | 15 | 22 | 21 | 20 | 24 |
| **Summer** | 22 | 10 | 20 | 35 | 9 | 23 | 21 |

By using co-efficient of variation, which season has consistent crime rate?

1. Calculate Correlation between Plant biology and zoology marks from the given 8 students marks .

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Marks in Plant biology** | 65 | 66 | 67 | 67 | 68 | 69 | 70 | 72 |
|  **Marks in zoology** | 67 | 68 | 65 | 68 | 72 | 72 | 69 | 71 |

1. Seven eggs weight is given below:

 65, 29, 48, 68, 49, 42, 32

Calculate Mean, Median, Mode, Quartile deviation and coefficient of Q.D.

1. An automatic machine was designed to pack exactly 2 kg of vanaspati. A sample of 100 tins was examined to test the machine. The average weight was found to be 1.94 kg with standard deviation 0.10 kg. Is the machine working properly? Test at 1% level of significance.
2. State and Prove Addition theorem of Probability.
3. Below are given the gain in weight in kgs of cows fed on two diets X and Y:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Diet X | 25 | 32 | 30 | 32 | 24 | 14 | 32 |  |  |  |
| Diet Y | 24 | 34 | 22 | 30 | 42 | 31 | 40 | 30 | 32 | 35 |

Test at 5 % level whether the two diets differ as regards their effect on mean increase in weight by using t-test for difference means.

1. The following data,(in tons) are the amount of sulfur oxides emitted by a large industrial plant in  40 days:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **24** | **15** | **20** | **29** | **19** | **18** | **22** | **25** | **27** | **9** |
| **17** | 20 | 17 | 6 | 24 | 14 | 15 | 23 | 24 | 26 |
| **19** | 23 | 28 | 19 | 16 | 22 | 24 | 17 | 20 | 13 |
| **19** | 10 | 23 | 18 | 31 | 13 | 20 | 17 | 24 | 14 |

Use the sign test to test the null hypothesis $μ=21.5$at the 0.05 level of significance**.**

1. From the table given below, test whether the colour of son’s eyes is associated with that of  father’s eyes by using chi-squares test at 5% level.

|  |  |
| --- | --- |
|  | **Eyes Colour in Sons** |
| **Eyes Colour in****Fathers** |  | Not light | Light |
| Not light | 230 | 148 |
| Light | 151 | 471 |

**SECTION – C**

**Answer any TWO of the following:**  (2 X 20 = 40)

1. A former applied three types of fertilizers on 4 separate plots. The figure on yield per acre are tabulated below:

|  |  |
| --- | --- |
| **Fertilizers**  | **Plots** |
| **A** | **B** | **C** | **D** |
| **Nitrogen** | 6 | 4 | 8 | 6 |
| **Potash** | 7 | 6 | 6 | 9 |
| **Phosphates** | 8 | 5 | 10 | 9 |

Test (i) whether the mean yield is the same for the four plots and

 (ii) whether the mean yield is the same for three fertilizers at 0.05 level.

1. (i) Suppose we want to test the effect of a drug on blood pressure. Ten subjects are chosen and the      blood pressure is measured for each subject before and after the administration of the drug.     The result is shown below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **B.P before** | 118 | 113 | 128 | 124 | 136 | 130 | 140 | 130 | 140 | 128 |
| **B.P After** | 127 | 121 | 136 | 131 | 138 | 132 | 141 | 131 | 132 | 120 |

        Does the drug have significant effect on blood pressure? (12)

 (ii) Explain the different types of diagram. (8)

1. (i) Box-I contains 8 Red, 5 Blue, 4 Green balls

 Box-II contains 9 Red, 4 Blue, 3 Green balls

 Box-III contains 6 Red, 7 Blue, 8 Green balls

 Three balls drawn at random from one of the Box and they are found to be 2 green and a blue.      Find

 the probability that it was from Box-I, Box-II and Box-III. (12)

        (ii) It is know that probability of recovery for certain disease is 0.4. If 5 animals are stricken with              the disease (Assume this to be random sample), what is probability that

1. 3 or more will recover? (b) Exactly one will recover?

      I Exactly two will recover? (d) None will recover. (8)

1. (i) In a study of the effect of a dietary component on plasma lipid composition, the

                   following ratios were obtained on a sample of experimental animals.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Dietary****component** | 1 | 5 | 3 | 2 | 2 | 1 | 7 | 3 |
| **Plasma****lipid level** | 6 | 1 | 2 | 3 | 1 | 2 | 1 | 5 |

                    Obtain the Regression equation for these data and predict the ratio of plasma lipid

        level with 6 dietary component. (12)

          (ii) Two diets are compared by conducting an experiment on two sets of 50 and 60

                  experimental animals. The average increase in weight due to the diet A and B are

                respectively 9 kg and 5 kg with standard deviation of 2 kg and 3 kg. Check the

    claim that diet B is superior over diet A at 5% level of significance. (8)

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