LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc. B.Com.,** DEGREE EXAMINATION – **ECO. & COMM.**

FOURTH SEMESTER – **APRIL 2012**

# ST 4205/4200/3202/3200 - ADVANCED STATISTICAL METHODS

 Date : 19-04-2012 Dept. No. Max. : 100 Marks

 Time : 1:00 - 4:00

**SECTION – A**

**Answer ALL the questions:** (10 X 2 = 20)

1. Write the formula for Yule’s Coefficient of partial association between A and B with C.

2. What are the methods of association?

3. State the addition theorem for two events.

4. Define random variable.

5. What is the difference between small sample and large sample test.

6. Define type – II error.

7. Write down the formula for F-test.

8. Explain Error sum of squares.

9. What are the various types of control charts?

10. Give the control limits for R chart.

**SECTION – B**

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

11. Out of 5 lakh literates in a particular district of India, the number of criminals was 2000. Out       of 50 lakh illiterates in a particular in the same district, number of criminals was 80,000. On       the basis of these figures, do you find any association between illiteracy and criminality?

12. For two attributes A and B, we have:

      (AB)= 16, (A) = 36, (αβ) = 10, N = 70. Calculate Yule’s coefficient of association and        Colligation

13. 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** |

14. Explain the method of analysis of variance for One way classification.

15. The following data refers to visual defects found during the inspection of the first 10 samples of size 50

 Each from a lot of two-wheelers manufactured by an automobile company:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample No.** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **No. of Defectives** | 4 | 3 | 2 | 3 | 4 | 4 | 4 | 1 | 3 | 2 |

      Draw the control chart for fraction defectives and state your conclusion.

16. The following table shows the distribution of number of faulty units produced in a single       shift in a factory. The data is for 400 shifts.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No. of faults** | **0** | **1** | **2** | **3** | **4** |
| **No. of shifts** | **138** | **161** | **69** | **27** | **5** |

 ( value of e-1=0.3679)

       Fit a Poisson distribution to the given data.

17. There are 4 boys and 2 girls in room-I and 5 boys and 3 girls in room-II. A girl from one of       the two rooms laughed loudly. What is the probability that the girl who laughed was from       room-I and room-II.

18. The height of ten children selected at random from a given locality had a mean 63.2 cms and       variance 6.25 cms. Test at 5% level of significance the hypothesis that the children of the       given locality are on the average less than 65 cms in all.

**SECTION – C**

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

 19. a) Find the value of ’ K’ and also find Mean and Variance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X** | **0** | **1** | **2** | **3** |
| **P(X)** | **1/8** | **3/8** | **K** | **1/8** |

 b) State and prove Multiplication theorem of probability.

20. a) In a random sample of 500 persons from town A, 200 are found to be consumers of          wheat. In a sample of 400 from town B, 220 are found to be consumers of wheat. Do         these data reveal a significant difference between town A and town B as far as the          proportion of wheat consumers is concerned?

 b) The following data show weekly sales before and after recognition of the sales organization.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
| **Sales before** | 14 | 18 | 13 | 19 | 15 | 14 | 16 | 18 |
| **Sales after** | 21 | 18 | 17 | 23 | 21 | 18 | 22 | 22 |

Test whether there is any significant difference in sales before and after recognition of the

 Sample company.

21. a) The following are the number of defects noted in the final inspection of 20 bales of woolen cloth:

 3, 1, 2, 4, 2, 1, 3 ,5, 2 ,1, 5 , 9, 5, 6, 7, 3, 4, 2, 1,6.

 Draw C-chart and state whether the process is under control or not.

 b) Draw the control chart for Mean and comment on the state of control from the given             data:

|  |  |
| --- | --- |
| **Sample number** |  **Observations** **1 2 3** |
| **1** | **50** | **55** | **52** |
| **2** | **51** | **50** | **53** |
| **3** | **50** | **53** | **48** |
| **4** | **48** | **53** | **50** |
| **5** | **46** | **50** | **44** |
| **6** | **55** | **51** | **56** |

22. The following table gives the yield on 20 sample plot under four varieties of seeds:

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **C** | **D** |
| 20 | 18 | 25 | 24 |
| 21 | 20 | 28 | 30 |
| 23 | 17 | 22 | 28 |
| 16 | 15 | 28 | 25 |
| 20 | 25 | 32 | 28 |

 Perform a One-way ANOVA, using 5% level of significance.

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