LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc., B.Com.,** DEGREE EXAMINATION – **ECONOMICS & COMMERCE**

THIRD SEMESTER – APRIL 2011

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

Date : 15-04-2011 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**SECTION A** **(10 X 2 = 20 marks)**

**Answer ALL questions**.

1. What is meant by independence of attributes?

2. What are the types of sampling?

3. Define Probability of an event.

4. Define conditional probability.

5. State any two properties of normal distribution.

6. State Central Limit Theorem.

7. State Type - I and Type - II error.

8. What is meant by analysis of variance?

9. Explain the various types of control chart.

10. What is meant by probable error? Mention its uses.

**SECTION B (5 X 8 = 40 Marks)**

**Answer any FIVE questions**

11. State and prove multiplication theorem.

12. 800 candidates of both sex appeared at an examination. The boys outnumbered the girls by 15 %

of the total. The number of candidates who passed exceeded the number failed by 480. Equal

number of boys and girls failed in the examination. Prepare a 2x2 table and find the coefficient

of association and Comment.

13. Five men in a company of 20 are graduates, if 3 men are picked out from this 20 at random, what is the probability that (i) all are graduate (ii) at least one is a graduate.

14. Two random samples of sizes 400 and 500 have mean 10.9 and 11.5 respectively. Can the samples be

regarded as drawn from the same population with variance 25? Test at 1% level.

15. The following data is collected on two characteristics:

|  |  |  |
| --- | --- | --- |
|  | **Smokers** | **Non-Smokers** |
| **Literate** | **83** | **57** |
| **Illiterate** | **45** | **68** |

Based on this test whether there is relation between the habit of smoking and literacy.

16 . A company arranged an intensive training course for its team of salesmen. A random sample of 10 salesmen was selected and the value ( in 000) of their sales made in the weeks immediately before and after the course are shown in the following table:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Salesman** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Sales before Training** | **12** | **23** | **5** | **18** | **10** | **21** | **19** | **15** | **8** | **14** |
| **Sales after Training** | **18** | **22** | **15** | **21** | **13** | **22** | **17** | **19** | **12** | **16** |

Test whether there is evidence of an increase in mean sales. Test at 5% level

17. State the advantages and disadvantages of statistical quality control.

18. The number of defects detected in 20 items are given below

Item No : 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

No. of defects : 2 0 4 1 0 0 8 1 2 0 6 0 2 1 0 3 2 1 0 2

Test whether the process is under control. Device a suitable scheme for future

**SECTION C (2 X 20 = 40 Marks)**

**Answer any TWO questions**

19.(a) A number of school-children were examined for the presence or absence of certain

defects of which three chief descriptions were noted; A-development defects;

B-nerve signs; C low nutrition. Given the following ultimate frequencies, find the

frequencies of the classes defined by the presence of the defects.

(ABC) = 57; (BC) = 78

(AB) = 281; (B) = 670

(AC) = 86; (C) = 65

(A) = 453; () = 8310 (10)

19 . (b) A factory manufacturing television has four units A, B, C and D. The units A, B, C and D manufacture 15%, 20%, 30%, and 35%, of the total output respectively. It was found that out of their outputs 1%, 2%, 2% and 3% are defective. A television is chosen at random from the output and found to be defective. What is the probability that, it came from unit D? (10)

20. (a) If 10% of the screws produced by an automatic machines are defectives, find the probability

that out of 20 screws selected at random there are (i) exactly two defectives

(ii)at the most three defectives (iii) at least two defectives (10)

20. (b) The average daily sales of 500 branch offices was Rs.150,000 and the standard deviation

Rs.15,000. Assuming the distribution to be normal, find how many branches have sales between

1. Rs. 1,20,000 and Rs.1,45,000
2. RS.1,40,000 and Rs.1,60,000 (10)

21.(a)Random samples of 400 men and 600 women were asked whether they would like to have a fly-over near their residence 200 men and 325 women were in favor of it. Test the equality of proportion of men and women in the proposal? Test at 5% level. (10)

21. (b) Value of a Variety in two samples are given below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample I | 5 | 6 | 8 | 1 | 12 | 4 | 3 | 9 | 6 | 10 |
| Sample II | 2 | 3 | 6 | 8 | 1 | 10 | 2 | 8 | \* | \* |

Test the significance of the difference between the two sample means. (10)

22. Develop the Two- way ANOVA for the following data:

**Treatment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | A | B | C | D |
| I | 3 | 4 | 6 | 6 |
| II | 6 | 4 | 5 | 3 |
| II | 6 | 6 | 4 | 7 |

**Plots of land**

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