LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.A., B.COM.,** DEGREE EXAMINATION – **ECONOMICS & COMMERCE**

THIRD SEMESTER – **APRIL 2012**

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

Date : 02-05-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**SECTION A**

**Answer ALL questions**. **(10 X 2 = 20 marks)**

1. State the axioms of the Probability .

2. Write any four properties of normal distribution.

3. Define conditional probability.

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

5. What is standard normal Variable?

6. State Central Limit Theorem.

7.What is null hypothesis?

8. What is meant by independence of attributes?

9. Distinguish between np chart and p chart.

10. Distinguish between the control limits and tolerance limits.

**SECTION B**

**Answer any FIVE questions: (5 X 8 = 40 Marks)**

11. 800 candidates of both sex appeared in 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.

12. State and prove Baye’s theorem.

13. A Sub-Committee of 6 members is to be formed out of a group consisting of 7

men and 4 women. Calculate the probability that the sub-committee will consist of

(1) exactly 2 women (2) at least 2 women.

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. What is Sampling Technique ? Explain different types of Sampling.

16. In a survey of 200 boys, of which 75 intelligent, 40 had skilled fathers while 85 of the Unintelligent boys has unskilled fathers. Do these figures support the hypothesis that skilled fathers have intelligent boys. Use Chi square –test of 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**

**Answer any TWO questions: (2 X 20 = 40 Marks)**

19.(a) Given (ABC) = 137; (αBC) = 261; (ABC) = 313; (Aβ) = 284; (Aβr) = 417; (αB) = 420;

(αβC) = 490; () = 508; Find the frequencies (AB), (A) and N. (10)

19.(b) Two Urns contain respectively 10 white, 6 red and 9 black and 3 white 7 red and 15 black balls. One ball is drawn from each Urn. Find the probability that (i) Both balls are red (ii) Both balls are of the same colour. (10)

20. (a) A Company has four production sections viz. S1, S2, S3 and S4 , which contribute 30%, 20%, 28% and 22% of the total output. It was observed that those sections respectively produced 1%, 2%, 3% and 4% defective units. If a unit is selected at random and found to be defective, what is the probability that the units so selected has come from either S1 or S4.? (10)

20. (b) The customer accounts of a certain departmental store have an average balance of Rs.120 and a

standard deviation of Rs.40. Assuming that the account balances are normally distributed, find

1. What proportion of accounts is over Rs.150?
2. What proportion of accounts is between Rs.100 and Rs.150?
3. What proportion of accounts is between Rs.60 and Rs.90? (10)

21.(a) 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 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. Prepare a Two- way ANOVA on the data given below.

**Treatment** I

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| A | 30 | 26 | 38 |
| B | 24 | 29 | 28 |
| C | 33 | 24 | 35 |
| D | 36 | 31 | 30 |
| E | 27 | 35 | 33 |

**Treatment I I**

Use the coding method, subtracting 30 from the given numbers. (20)

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