LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **COMMERCE**

THIRD SEMESTER – **NOVEMBER 2012**

# ST 3202 - ADVANCED STATISTICAL METHODS

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

Time : 9:00 - 12:00

**SECTION A**

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

1. What is meant by independence of attributes?

2. What are the types of probability sampling?

3. Define probability and give an example.

4. Write Any four properties of normal distribution

5. Explain the term standard error.

6. State Central Limit Theorem.

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

8. Explain the different type of errors in hypothesis testing

9. State the assumptions made in analysis of variance.

10. Distinguish between np chart and p chart.

**SECTION B**

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

11. From the following data, prepare a 2X2 table and using Yule’s coefficient of association, discuss

Whether there is association between literacy and unemployment.

Literate unemployed 220 persons

Literate employed 20 persons

Literate employed 180 persons

Total number of persons 500.

12. State and prove multiplication theorem.

13. Student A can solve a problem in statistics in 4 out of 5 chances and B can do it in 2 out of 3 chances

If both A and B try the problem, find the probability that the problem will be solved.

14. After correcting the proofs of the first 50 pages of a book, it is found that on the average there are 3

errors per 5 pages. Use poisson probabilities and estimate the number of pages with 0,1,2,3 errors in

the whole book of 1000 pages (e-0.6=.5488)

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

16. Out of 8000 graduates in a town,800 are females and out of 1600 graduate employees 120 are

females. Use Chi-square to determine if any distinction is made in appointment on the basis of sex?

Test at 5% level.

17. Explain the various types of control charts.

18. You are given below the values of sample mean (X) and the range (R) for ten samples of size 5

Each. Draw mean and range charts and comment on the state of control of the process.

Sample No: 1 2 3 4 5 6 7 8 9 10

X: 43 49 37 44 45 37 51 46 43 47

R: 5 6 5 7 7 4 8 6 4 6

You may use the following :(for n=5, A2=0.58, D3=0, D4=2.11)

**SECTION C**

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

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

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

19.(b) ) There are 3 boxes containing respectively 1 White,2 Red, 3 block; 2 white,3 red, 1 black ball;

3 white , 1 red and 2 black ball. A box is chosen at random and from it two balls are drawn

At random. The two balls are 1 red and 1 white. What is the probability that they come from

(i) The first box (ii) second box (iii) third box. (10)

20. (a) 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)

20. (b) 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.(a) The marks obtained by a group of 9 regular course students and another group of 11 part- time

course students in a test are given below:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Regular** | **56** | **62** | **63** | **54** | **60** | **51** | **67** | **69** | **58** |  |  |
| **Part time** | **62** | **70** | **71** | **62** | **60** | **56** | **75** | **64** | **72** | **68** | **66** |

Examine whether the marks obtained by regular students and part time students differ significantly at

5% level. (10)

21. (b) The number of defects defected 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. (10)

22. Perform two-way **ANNOVA** for the data given below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Treatment** | | | |
| **Plots of Land**  **I**  **II**  **III** | **A**  **38**  **45**  **40** | **B**  **40**  **42**  **38** | **C**  **41**  **49**  **42** | **D**  **39**  **36**  **42** |

Using coding method subtracting 40 from the given number. (20)

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