



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A. DEGREE EXAMINATION – ECONOMICS

FOURTH SEMESTER – APRIL 2017

ST 4205/ ST 4200 - ADVANCED STATISTICAL METHODS

Date: 04-05-2017
09:00-12:00

Dept. No.

Max. : 100 Marks

SECTION - A

Answer all the Questions.

(10 X 2 = 20)

1. Write down the formula for Yule's coefficient of association
2. Define probability of an event with an example?
3. Write the sample space for tossing 2 coins? And compute the probability of getting 3 Heads.
4. Write the probability mass function of Poisson distribution.
5. What is a Null and Alternative hypothesis?
6. What is a critical region?
7. Write the situations for using ANOVA.
8. What is Degree of Freedom?
9. Write the applications of quality control?
10. State the difference between variable control chart and attribute control chart.

SECTION - B

Answer any Five Questions.

(5 X 8 = 40)

11. State and prove that the addition theorem of probability for 2 disjoint events
12. Ten coins are tossed simultaneously. Using Binomial distribution find the probability of getting (i) no head (ii) atleast two head (iii) atleast two heads appear. t most seven heads.
13. Three newspapers A, B, C are published in a city. It is estimated from the survey that of all the populations: 20% read A, 16% read B, 14% read C, 8% read both A & B, 5% read both A & C, 4% read both B & C, 2% read all the three. Find what percentage read at least one of the papers?
14. In a bolt factory machines A₁, A₂, A₃ manufacture respectively 25%, 35% and 40% of the total output. Of these 5, 4, and 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine A₂?
15. State the important properties Normal Distribution.
16. In a random sample of 400 persons from a large population 120 are females. Can it be said that males and females are in the ratio 5:3 in the population? Use 1% level of significance
17. In a certain city 125 men in a sample of 500 are found to be self-employed. In another city, the number of self-employed are 375 in a random sample of 1000. Does this indicate that there is a greater population of self employed in the second city than in the first?
18. Write the ANOVA table for one- way classification.

SECTION- C

Answer any TWO of the following:

(2 X 20 = 40)

19. (a) State and prove Boole's Inequality

(10 Marks)

19. (b) State and prove the Bayes' theorem

(10 Marks)

20. (a) An IQ test was administered to 10 men before and after they were trained. The results were given below.

Men	1	2	3	4	5
IQ Before training	110	120	123	132	125
IQ After training	120	118	125	136	121

Test whether there is any significant change in IQ after training.

20. (b) You are given the following data.

Financial Conditions \ IQ	High	Low	Total
Rich	460	140	600
Poor	240	160	400
Total	700	300	1000

Find out whether there is any association between economic condition at home and I.Q.

21. A test was given to five students taken at random from the fifth class of three schools of a town. The individual scores are given below. Carry out ANOVA to find their difference in their means.

School 1	9	7	6	5	8
School 2	7	4	5	4	5
School 3	6	5	6	7	6

22. You are given below the values of sample mean (\bar{X}) and the range (R) for ten samples of sizes 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-Bar	43	49	37	44	45	37	51	46	43	47
R-Bar	5	6	5	7	7	4	8	6	4	6

You may use the following: (for $n=5$, $A_2=0.58$, $D_3=0$, $D_4=2.11$)

\$\$\$\$\$\$\$\$