



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc., B.COM., B.A. DEGREE EXAMINATION – PHYSICS, MATHS., COMM., ECO.,

THIRD SEMESTER – NOVEMBER 2016

ST 3205 / ST 3202 / ST 4200 / ST 4205 - ADVANCED STATISTICAL METHODS

Date: 10-11-2016
Time: 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 Empirical probability of an event with an example.
3. Write the sample space for tossing 3 coins. And compute the probability of getting 3 Heads.
4. Write the probability mass function of Poisson distributions with 2 examples.
5. What is a Null and Alternative hypothesis? What are the different forms of Alternative hypothesis?
6. What is level of significance?
7. Write the situations for using ANOVA.
8. What is Degrees of Freedom?
9. Write any 4 applications of quality control?
10. State the difference between np chart and p chart.

SECTION- B

Answer any Five Questions.

(5 X 8 =40)

11. (a) The following table shows the association among wives and husbands of their heights. Find the coefficient of contingency between the two.

Husband \ Wives	Tall	Medium	Short
Tall	30	50	20
Medium	20	30	10
Short	10	20	10

11. (b) State and prove addition theorem of probability for 2 disjoint events
12. (a) Ten coins are tossed simultaneously. Using Binomial distribution find the probability of getting (i) at least seven heads (ii) exactly seven heads (iii) at most seven heads.
12. (b) 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?
13. A factory produces a certain type of outputs by 3 machines. The respective daily productions are machine-1: 3000 units, machine 2: 2500 units and machine-3:4500 units. Past experience shows that 1% of the output from machine-1 is defective. The corresponding fraction of defectives for the other 2 machines is 1.2% and 2% respectively. An item is drawn at random from the day's production run and is found to be defective. What is the probability that it comes from the out of machine-1, 2, and 3 respectively.
14. Define the probability density function of Normal Distribution and state its properties.
- 15 A Random sample of 200 tins of Coconut oil gave an average weight of 4.95 kg per with a standard deviation of 0.21. Do we accept the hypothesis of average net weight of 5 kg per tin@ 1% level?

16. In a large city A , 20 percent of a random sample of 900 school children had defective eye-sight. In another large city B, 15 percent of a random sample of 1600 children had the same defect. Is this difference between the two proportions significant? Use 1% level of significance.
17. State the assumptions of ANOVA and write the ANOVA table for one- way classification.
18. 20 tape-recorders were examined for quality control test. The numbers of defects for each tape-recorder are given below: 2, 4, 3, 1, 1, 2, 5, 3, 6, 7, 3, 1, 4, 2, 3, 1, 6, 1, 1, 1. Prepare a C-chart and conclude on it.

SECTION- C

Answer any TWO of the following:

(2 X 20 =40)

19. (a) State and prove multiplication theorem on probability.

(10 Marks)

19. (b) State and prove 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	6	7	8	9	10
Sales Before	167	124	157	155	163	154	156	168	133	143
Sales After	170	138	158	158	156	167	168	172	142	138

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

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

Fathers	Intelligent Boys	Not intelligent boys	Total
Skilled father	24	12	36
Unskilled Father	32	32	64
Total	56	44	100

Do these figures support the hypothesis that skilled father have intelligent boys

21. Perform two-way ANOVA for the data given below: Using coding method subtracting 40 from the given number

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

22. 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-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, A2=0.58, D3=0, D4=2.11)
