LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A. & B.COM. DEGREE EXAMINATION – ECONOMICS & COMMERCE
FOURTH SEMESTER – APRIL 2016
ST 4205 - ADVANCED STATISTICAL METHODS

Date: 27-04-2016   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

SECTION – A

Answer ALL the questions: (10 X 2 = 20)

1) Write the formula for Yule's Coefficient of Association between A and B.
2) Check the consistency of the following data: (A) = 20, (AB) = 25, (B) = 15 and N = 50.
3) State the multiplication theorem for two events A and B.
4) Define random variable.
5) Define level of significance.
6) Define null hypothesis.
7) Write down the test statistic of two sample t-test.
8) Write down the one-way ANOVA table.
9) What are the various types of control charts?
10) Give the control limits for c- chart.

SECTION – B

Answer any FIVE of the following: (5 X 8 = 40)

11) 200 candidates appeared for a competitive examination and 60 of them succeeded. 35 received special coaching and out of them 20 candidates succeeded. Prepare a contingency table and using (i) Yules' coefficient of association and (ii) coefficient of contingency , find whether special coaching is effective or not.

12) The probability of 3 students A, B and C solving a problem in Statistics are 1/2, 1/3 and 1/4 . A problem is given to all the 3 students. What is the probability that (i) no one will solve the problem, (ii) only one will solve the problem and (iii) atleast one will solve the problem?

13) For a binomial distribution with parameters n = 5, p = 0.3, find the probabilities of getting (i) atleast 3 successes, (ii) at most 3 successes and (iii) exactly 3 failures.

14) State the properties of normal distribution.

15) Before increase in excise duty on tea, 400 people out of a sample of 500 persons were found to be tea drinkers. After an increase in duty, 400 people were tea drinkers out of a sample of 600 people. Based on the information collected, test whether there is a significant decrease in the consumption of tea?

16) The height of 10 males of a given locality are found to be 175, 168, 155, 170, 152, 170, 175, 160, 160 and 165 cms. Based on this sample of 10 items, test the hypothesis that the mean height of males is 170 cms.

17) The following table gives the yields of 12 samples of plot under three varietie wheat.

A	B	C
6	5	5
7	5	4
3	3	3
8	7	4

Test whether there is any significant difference among the average yields in the 3 varieties of wheat.

18) The following table gives the number of defects in ten woolen carpets manufactured.

S. No	1	2	3	4	5	6	7	8	9	10
No.of defects	3	4	6	7	9	5	10	8	6	2

Draw a c-chart and comment on it.

SECTION – C

Answer any TWO of the following: (2 X 20 = 40)

19) a) Find the value of ' K' and also find Mean and Variance.

X	0	1	2	3	4	5
P(X)	0	k	2k	2k	3k	4k

b) State and prove Bayes' theorem. (12+8)

20) a) In a certain community, 8% of all adults over 50 have diabetes. If a doctor is this community correctly diagnosis 2% of all person with out diabetes as having the disease, what is the probability that an adult over 50 diagnosed by this doctor as having diabetes actually has the disease?

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 the probability of accounts is (i) over Rs.150, (ii) between Rs.100 and Rs.150 and (iii) between Rs.60 and Rs.90?

21) a)The following data show weekly sales before and after recognition of the sales organization.

Sales before	14	18	13	19	15	14	16	18
Sales after	21	18	17	23	21	18	22	22

Test whether there is any significant difference in sales before and after recognition of the Sample company.

b) Draw the control chart for Mean and comment on the state of control from the given data:

Sample no.		1	2	3	4	5	6
Observation	1	5	8	7	5	8	10
	2	6	8	2	5	7	2
	3	8	6	5	4	3	6

22. The following table gives the yield on 3 fertilizers under five varieties of seeds:

	A	B	C
I	30	26	38
II	24	29	28
III	33	24	35
IV	36	31	30
V	27	35	33

Perform a two-way ANOVA, using 5% level of significance.

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