LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – COMPUTER SC.& COMP.APP.

THIRD SEMESTER – APRIL 2010

ST 3202 / CS 3204/ 3201/ CA 3201/3200-ADVANCED STATISTICAL METHODS

Date & Time: 30/04/2010 / 1:00 - 4:00   Dept. No.   Max. : 100 Marks

SECTION – A   (10 x 2 = 20 Marks)

Answer ALL questions.

1. State Yule's coefficient of association.
2. State the basic rules of probability.
3. Write any two properties of normal distribution.
4. What is random variable?
5. What is sampling error?
6. Explain testing of hypothesis.
7. What is meant by degrees of freedom?
8. What are the types of analysis of variance?
9. State the types of control chart.
10. What is statistical quality control?

SECTION – B   (5 x 8 = 40 Marks)

Answer any FIVE questions.

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 2 x 2 contingency table and using Yule's coefficient, discuss whether special coaching is effective or not.
12. State and prove Baye's theorem of conditional probability.
13. A bag contains 4 white and 6 black balls. Two balls are drawn at random. What is the probability that
    (a) both are white (b) both are black (c) one white and one black

14. A filling machine expected to fill 5 kg of powder into bags. A sample of 10 bags gave the weight 4.7, 4.9, 5.0, 5.1, 5.4, 5.2, 4.6, 5.1, 4.6, and 4.7. Test whether the machine is working properly.
15. The results of a certain survey shows that out of 50 ordinary shops of small size, 35 are managed by men of which 17 are in cities, 12 shops in villages are run by women. Can it be inferred that shops run by women are relatively more in villages that in cities. Use chi-square test.
16. What do you understand by analysis of variance? Explain the basic assumptions in analysis of variance.
17. What are the advantages and disadvantages of statistical quality control.

18. You are given the values of sample means and range for the samples of size 5 each. Draw the mean and range control charts and comment on the state of control.

Sample no:	1	2	3	4	5	6	7	8	9	10
Mean :	43	49	37	4	5	37	51	46	43	47
Range :	5	6	5	7	7	4	8	6	4	6

You may use the following control chart constants for n=5, A_2=0.58, D_3=0, D_4=2.115.

Answer any TWO questions.

19. (a) A, B, and C wash 50%, 30% and 20% of the cars in a service station respectively. They fail to clean the glass in 5%, 7% and 3% of the cars respectively. The glass of a washed car is checked. What is the probability that the glass has been cleaned?

19. (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
(i) What proportion of accounts in over Rs. 150?
(ii) What proportion of accounts in between Rs. 100 and Rs. 150?
(iii) What proportion of accounts in between Rs. 60 and Rs. 90?

20. (a) Before increase in excise duty of 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. Using the standard error of proportion, state whether there is a significant decrease in the consumption of tea?

20. (b) Values 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 population means.

21. The following table gives the yields of 15 samples of plot under three varieties of seed.

A	B	C
20	18	25
21	20	28
23	17	22
16	15	28
20	25	32

Test using analysis of variance whether there is a significant difference in the average yield of seeds.

22. (a) The number of defects on 20 items are given below:

Item No	1	2	3	4	5	6	7	8	9	10
No. of defects	2	0	4	1	0	8	0	1	2	0
Item No.	11	12	13	14	15	16	17	18	19	20
No. of defects	6	0	2	1	0	3	2	1	0	2

Devise a suitable control chart and draw your conclusion.

22 (b) The following data refers to visual defects found during the inspection of the first 10 samples of size   50 each from a lot of Two-wheelers manufactured by an Automobile Company.

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

Draw the 'p' chart to show that the fraction defectives are under control.

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