LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A. DEGREE EXAMINATION – ECONOMICS

THIRD SEMESTER – JUNE 2015

EC 3503 - QUANTITATIVE METHODS IN ECONOMICS

Date : 02/07/2015   Dept. No.   Max. : 100 Marks
Time : 10:00-01:00

PART – A

Answer any FIVE questions in about 75 words each.   **(5 x 4 = 20 marks)**

1. Four cards are drawn at random from a pack of 52 cards. Find the probability that a) They are a King , a Queen , a Jack and an Ace b) Two are Kings and Two are Queens.
2. What do you mean by 'Random Variable'?
3. Let X be a random variable with the following probability distribution

x	--2	8	12
P(X = x)	1/6	1/2	1/3

   Find E (X) and E (X^2) and using the laws of expectation evaluate E ($3X + 2$) ^{2}.
4. What are the characteristics of Binomial Distribution?
5. Among 10000 random digits, in how many cases do we expect that the digit 3 appear at most 950 times. (The area under standard normal curve for Z = 1.667 is 0.4525 approximately).
6. Write a short note on 'Randomized Block Design.
7. What are the uses of χ^2 statistic?

PART – B

Answer any FOUR questions in about 300 words each.   **(4 x 10 = 40 marks)**

8. a. Write a short on ' mathematical expectation'.
   b. Explain the significance of Bayes' theorem.
9. Five cards are drawn successively with replacement from a well shuffled deck of 52 cards. What is the probability that
   i)   All the five cards are spades
   ii) Only three cards are spades
   iii) None is spade.

10. Explain the properties of Normal Distribution.
11. A random variable is normally distributed with µ = 67 and σ = 3. What is the probability that this random variable will assume a value
    (a) between 67 and 70
    (b) between 60 and 70
    (c) between 60 and 65
    (d) below 60
    (e) above 65.

12. In a simple random sample of 600 men taken from a big city 400 are found to be smokers. In another simple random sample of 900 men taken from another city 450 are smokers. Do the data indicate that there is a significant difference in the habit of smoking in the two cities?

13. Explain the components of a one way ANOVA table and also bring out its uses.
14. The number of defects per unit in a sample of 330 units of a manufactured product was found as follows:

Number of defects	0	1	2	3	4
Number of units	214	92	20	3	1

Fit a poisson distribution to the data to have expected frequencies and test for goodness of fit using Chi-square.   (at 5 % level of significance with d.f = 1 the χ^2 value is 3.84).

PART – C

Answer any TWO questions in about 900 words each: **(2 x 20 = 40 marks)**

15. Explain in detail the process of testing hypotheses under different conditions.
16. A group of seven week-old chickens reared on a high protein diet weighted
    12 , 15 , 11 , 16 , 14 ,14 and 16 ounces, a second group of five chickens similarly treated except that they receive a low protein diet weighted 8 , 10 , 14 ,10 and 13 ounces. Test whether there is sufficient evidence that additional protein has increased the weight of the chickens. (the table value of 't' for df = 10 at 5% level of significance is 2.33)
17. Given below is the contingency table for production in three shifts and the number of defective goods turnout. Is it possible that the number of defective goods depends on the shift run by the factory? (df = 4 $\chi^2_{0.05}$ = 9.488)

Shift	Number of defective goods in three weeks			
	1st week	2nd week	3rd week	Total
I	15	5	20	40
II	20	10	20	50
III	25	15	20	60
Total	60	30	60	150

18. The Four samples below have been obtained from normal populations with equal variances. Test the hypothesis that the sample means are equal

S_1	S_2	S_3	S_4
8	12	18	13
10	11	12	9
12	9	16	12
8	14	6	16
7	4	8	15

(The table value of 'F' at 5 % level of significance for v_1 = 3 and v_2 = 16 is 3.24)

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