



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A. DEGREE EXAMINATION – ECONOMICS

THIRD SEMESTER – NOVEMBER 2013

EC 3503 – QUANTITATIVE METHODS IN ECONOMICS

Date : 06/11/2013
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer any FIVE questions in about 75 words each:

(5 x 4 = 20 marks)

1. A bag contains 5 white balls , 6 red balls and 7 Blue balls . Two balls are drawn at random. What is the probability that both are white?
2. Define ‘Random Variable’
3. Bring out the properties of mathematical expectation.
4. Distinguish between Type I error and Type II error.
5. Let X be a random variable with the following probability distribution

x	-3	6	9
P(X = x)	1/6	1/2	1/3

Find $E (X)$ and $E (X^2)$.

6. State the probability density function of Poisson Distribution. What are it properties?
7. Describe the components of an One-Way ANOVA Table.

PART – B

Answer any FOUR questions in about 300 words each:

(4 x 10 = 40 marks)

8. Explain the Addition and Multiplication theorems of probability with suitable examples.
9. The mean and variance of a binomial distribution are 3 and 2 respectively. Find the probability that the variate takes values :
 - (a) less than or equal to 2
 - (b) greater than or equal to 7.
10. Explain the properties of Normal Distribution.
11. The marks obtained in a certain examination follow the normal distribution with Mean 45 and standard deviation 10. If 1000 students appeared at the examination, calculate the number of students scoring
 - (a) less than 40 marks
 - (b) more than 60 marks and
 - (c) Between 40 and 50 marks.
12. Bring out the application of ‘t’ distribution.
13. In a certain city 380 men out of 800 were found to be smokers. Discuss whether the information supports the view that the majority of men in the city are non – smokers.(For right tailed test the significant value of Z at 5 % level of significance is 1.645)
14. An automobile company gives you the following information about age groups and the liking for particular model of car which its plans to introduce.

	Age groups				Total
	Below 20	20 - 39	40-59	60 and above	
Persons who liked the Car	140	80	40	20	280
Disliked the Car	60	50	30	80	220
Total	200	130	70	100	500

On the basis of this data can it be conducted that the model appeal is independent of the age group. (given for $v = 3$ $X^2_{\alpha,0.05} = 7.815$) .

PART – C

Answer any TWO questions in about 900 words each:

(2 x 20 = 40 marks)

15. a) Explain Bayes' theorem with an example. (5 marks)
- b) A factory produces a certain type of outputs by three types of machines. The respective daily production figures are : Machine I : 3000 units ; Machine –II : 2500 units and Machine – III : 4500 units. Past experience shows that 1 % of the output produced by machine –I is defective. The corresponding fraction of defectives for the other two 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 is from the output of (a) machine-I (b) Machine-II and (c) Machine III ? (15 marks)
16. Explain in detail the process of testing hypotheses.
17. The mean population of a random sample of 400 villages in Madurai district was found to be 400 with a standard deviation of 12. The mean population of a random sample of 400 villages in Coimbatore district was found to be 395 with a standard deviation of 15. Is the difference between the two districts means statistically significant? (Z – value at 1% = 2.58)
18. The three samples below have been obtained from normal populations with equal variances. Test the hypothesis that the sample means are equal

8	7	12
10	5	9
7	10	13
14	9	12
11	9	14

(The table value of 'F' at 5 % level of significance for $v_1 = 2$ and $v_2 = 12$ is 3.88)

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