

2046
NEP U.G. Common-Skill Enhancement Course
Second Semester
Statistics of Decision Analytics with Microsoft Excel

Time allowed: 3 Hours

Max. Marks: 40

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit. Simple non-programmable calculator is allowed.

x-x-x

1. Answer the following:

- (a) Define the type-I and type-II errors.
- (b) What do you mean by Yates' correction?
- (c) If a random variable X takes the values 1,2,3,4 such that

$$2P(X = 1) = 3P(X = 2) = P(X = 3) = 5P(X = 4)$$

Find the probability distribution of X .

- (d) Write down the probability mass function of the Poisson distribution.
- (e) Define exponential distribution.
- (f) Write down the test statistic used for the testing of a single population variance.
- (g) Which test is used for the comparison of proportions between two populations?
- (h) What is the relationship between binomial and Poisson distributions?

(8×1)

Unit-I

- 2. (a) Define random variable, distribution function, and mathematical expectation and variance.
- (b) In four tosses of a coin, let X be random variable the number of heads. Tabulate the all the possible outcomes with corresponding values of X . By simple counting, derive the probability distribution of X and hence calculate expected value and variance of X . (4, 4)
- 3. (a) Write a note on binomial distribution and its inbuilt functions in Excel.
- (b) If the average number of accidents occurring in a week on a highway is 4, use the Poisson distribution to find (i) the probability that exactly two accidents occur in a week. (ii) the probability that more than four accidents occur, and (iii) the expected number of accidents in two weeks. (4, 4)
- 4. (a) Write a note on normal distribution, its chief characteristics and inbuilt Excel functions.
- (b) A coin is biased such that the probability of getting a head is 0.6. The coin is tossed 8 times. Find the (i) the probability of getting exactly 5 heads (ii) the probability of getting at least 6 heads and (iii) the mean and standard deviation of the distribution. (4, 4)

P.T.O.

(2)

Unit-II

5. (a) Define (i) statistical hypothesis, (ii) one-tailed and two-tailed hypothesis, and (iii) level of significance and power of test.

(b) Twenty people were attacked by a disease and only eighteen survived. Will you reject the hypothesis that the survival rate, if attacked by this disease, is 85% in favour of the hypothesis that it is more, at 5% level of significance. (5, 3)

(Note: The given tabulated values of standard normal distribution for two-tailed and one-tailed tests at a 5% level of significance are 1.96 and 1.64, respectively)

6. (a) Write a note on t-test and its inbuilt Excel functions.

(b) The following table shows the results of a survey in which the subjects were a sample of 225 adults residing in a certain metropolitan area. Each subject was asked to indicate which of three policies they favoured with respect to smoking in public places.

Highest education level	Policy Favoured			
	No restrictions on smoking	Smoking allowed in designated areas only	No smoking at all	No opinion
College graduate	5	44	23	3
High-school graduate	15	100	30	5

Can one conclude from these data that, in the sampled population, there is a relationship between level of education and attitude toward smoking in public places, at 5% level of significance? (5, 3)

(Note: The given tabulated values of χ^2 from statistical tables for 3 and 4 degrees of freedom are 7.815 and 9.488 at significance level .05, respectively.)

7. (a) Explain the Chi-square test of independence.

(b) Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results. Test whether the two horses have the same running capacity. Let $\alpha = .05$.

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

(5, 3)

(Note: (i) The given tabulated values of t-distribution tables for 13, 12 and 11 degrees of freedom for two-tailed and one-tailed tests at a 5% level of significance are 1.7709, 1.7823 and 1.7959, and 2.1604, 2.1788, and 2.2010 respectively.

(ii) The given tabulated values of standard normal distribution for two-tailed and one-tailed tests at a 5% level of significance are 1.96 and 1.64, respectively.)

x-x-x