Hypothesis Testing:

Question No. 01: A coin was tossed 484 times, in which the head turned up 265 times. Test the hypothesis that the coin is unbiased.

Question No. 02: In 256 throws of a six-faced die, the odd numbers appeared 122 times. Would you say that the die is fair at a 5% level of significance?

Test for the proportion of successes:

Question No. 01: 1000 apples are taken at random from a large basket and 100 are found to be rotten. Estimate the proportion of bad apples in the basket and assign limits within which percentage most probably lies.

Question No. 02: A wholesaler of a certain item claims that only 5% of items supplied by him are defective. A random sample of 500 items contained 28 defective items. Test the claim of the wholesale at a 5% level of significance.

Test for difference between proportions:

Question No. 01: In a random sample of 1000 persons from Karachi. 500 are found to be consumers of rice. In another random sample from Lahore 650 out of 1200 are found to be consumers of rice. Do these data reveal a significant difference between these cities so far as the proportion of rice consumers at a 5% level of significance?

Question No. 02: In a simple random sample of 800 men taken from city A, 600 are found to be smokers; and 1200 men are taken from city B of which 700 are smokers. Do the data indicate that there is a significant difference in the habit of smoking between the population of cities A and B at a 1% level of significance?

T-Test

Application No: 01

Question No. 01: The manufacturer of a certain make of LED bulb claims that his bulbs have a mean life of 20 months. A random sample of 7 such bulbs gave the following values. The life of bulbs in months is 19, 21, 25, 16, 17, 14, and 21. Can we check the manufacturer's claim to be valid at a 1% level of significance?

Question No. 02: A random sample of size 15 has 50 as the mean, and the sum of the squares of the deviation taken from the mean is 130. Can this sample be regarded as taken from the population having 53 as the mean? Obtain 95% and 99% confidence limits of the mean for the population.

Application No: 02

Question No. 01: Two types of drugs were used on 6 and 5 patients for reducing their weight. Drug A was imported and Drug B was indigenous. The decrease in weight (in kg) after using the drugs for 90 days was given below: Drug A: 8, 10, 12, 9, 14, 13 Drug B: 7, 9, 14, 12, 8. Is there a significant difference in the efficacy of the drug?

Question No. 02: Two Laboratories A and B carry out independent estimates of sugar content in chocolate made by a firm named X. A sample is taken from each batch and divided into two parts; and sent to the two Laboratories. The sugar content obtained by the laboratories is regarded below (in mg/g).
Lab A: 8, 9, 9, 6, 4, 6
Lab B: 7, 8, 6, 4, 5, 6
Is there a significant difference between the mean sugar content obtained by the two laboratories A & B?

Application No: 03

Question No. 01: A drug is given to 8 patients and differences in their BP were recorded to be: Before Drug A: 112, 113, 118, 120, 119, 113, 110, 122 & After Drug A: 116, 120, 117, 125, 126, 111, 111, 117. Is it reasonable to believe that the drug does not affect the change in BP?

Question No. 02: 7 Students were given intensive coaching and 5 tests were conducted in a month. The scores of 1 & 5 are as follows: Test 1: 52, 43, 52, 27, 36, 43, 61 & Test 5: 63, 41, 62, 36, 31, 53, 70. Do the scores from 1 to 5 show an improvement?

Application No: 04

Question No. 01: A random sample of 27 pairs of observations from a normal population gives a correlation coefficient of 0.55. Is it likely that the variables in the population are uncorrelated?

Question No. 02: Is a correlation coefficient of 0.6 significant? If obtained from a random sample of 11 pairs of values from a normal population.