**3.1 Do you think there is evidence that means moisture contents in both types of shingles are within the permissible limits? State your conclusions clearly showing all steps.**

**We will use one sample t test, for both the columns to check whether the moisture content is within permissible limits.**

**Ho: mean moisture content of shingle is >= 0.35**

**Ha: mean moisture content of shingle is < 0.35**

**In case of shingles A:**

**We will have 36 entries and will enter the data of column along with .35 as border value.**

**P value =** 0.07477633144907513

As pvalue > 0.05, we fail to reject the Ho. Mean moisture content in A shingles in not within permissible limits.

In case of shingles B,

**We will have 31 entries, we will have to remove the null values and will enter the data of column along with .35 as border value.**

P value = 0.0020904774003191813

As pvalue < 0.05, we reject the Ho. Mean moisture content in B shingles in within permissible limits.

**3.2 Do you think that the population mean for shingles A and B are equal? Form the hypothesis and conduct the test of the hypothesis. What assumption do you need to check before the test for equality of means is performed?**

**We will perform the paired p test,**

**Ho = Population mean for both shingles are equal.**

**Ha =Population mean for both shingles are not equal.**

**We have removed the columns having null values to maintain symmetry of the data.**

**P value =** 0.3285

**As p value > 0.05 we fail to reject the null hypothesis meaning the population mean for both the shingles A and B are equal.**

**Assumption: In this test, we have assumed that the populations have identical variances.**