**ASSIGNMENT 3.3**

**Problem Statement-1:**

BMW Company is testing the top speed of its new model X70. It has tested 100 units and found the avg top speed to be 230Km/hr with a std dev of 10km/hr Whereas company believes the avg top speed to be 260Km/hr.

Company asks: Do you think being in Indian Road affects the top speed?

**Solution:**

Given,

n=100, x-bar= 230, Standard Deviation=10

μ= 260.

Null Hypothesis: Indian Roads affect the top speed

Alternate Hypothesis: Indian Roads do not affect the top speed

Thus,

Z= (x-bar – μ)/ (σ/ sqrt(n)) = (230-260)/(10/sqrt(100))

= -30.

This result is way less than -1.96, Thus,

Do not accept null hypothesis and thus accept alternate hypothesis which is,

Indian Roads do not affect the top speed.

**Problem Statement-2:**

On an average, males drink 2L water per day with standard deviation σ = 0.7L. We are planning for a full day trip for 50 Men with 110L of water.

 What is the probability that we will run out of water?

 With a Significance level of 5 %, can we say that we will run of water?

**Solution:**

1. Average Water consumption per male per day = 2L

Standard Deviation = 0.7L

x-bar = 110/50 = 2.2L, n= 50

Z-Score calculation = (x-bar – μ)/ (σ/ sqrt(n)) = (2.2-2.0)/(0.7/sqrt(50))

Therefore,

Z-score= 2.020305089

Using Z-tables, Area to the left of 2.0203 value= 0.9783

But,

Our requirement is, Probability of water being not sufficient.

Therefore,

Required probability will be= 1-0.9783 = 0.0217

Thus,

Probability of water being insufficient = 0.0217 or 2.17%

1. Given,

Alpha= 0.05

Null Hypothesis: We run out of water

Alternate Hypothesis: We don’t run out of water

Z-value, already calculated in (a.) is 2.02

This value is beyond 1.96 at 0.05 significance level.

Therefore,

We don’t accept Null Hypothesis and we go with our alternate hypothesis.

Therefore,

At 5% significance level,

We can confirm that we don’t run out of water.