

## DIGITAL ASSIGNMENT 4

### (Sampling Techniques-I-Z test for Proportions)

(MAT2001-ELA DA4)

#### Question 1:

In a survey of buying habits, 400 women shoppers are chosen at random in super market A, located in a certain section of Mumbai city. Their average monthly food expenditure is Rs.250 with a S.D of Rs.40. For 400 women shoppers chosen at random in super market B in another section of the city, the average monthly food expenditure is Rs.200 with a standard deviation of Rs.55. Test at 1% level of significance whether the average food expenditure of the two populations of shoppers from which the samples were obtained are equal.

#### R code:

```
> n1=400
> x1=250
> s1=40
> n2=400
> x2=220
> s2=55
> t=(x1-x2)/sqrt(((s1^2)/n1)+((s2^2)/n2))
> t
[1] 8.822575
> #So, t is greater than 3 and the null hypothesis is rejected at 1% level
of significance. Therefore, the average of two shoppers differ
significantly. Since the observed value of the test statistic t=8.82, is
larger than the critical value 3 at 1% level of significance, the data
provide us evidence against the null hypothesis H0 and in favor of H1.
Hence, H1 is accepted and concluded that the average weekly food
expenditure of women shoppers from two super markets A and B are not equal.
```

**Question 2:**

**In a random sample of 1000 persons from town A, 400 are found to be consumers of wheat and in a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B so far as the proportion of wheat consumers is concerned at 5% level of significance?**

**R code:**

```
> > #n1=1000, p1=400/1000=0.4  
> #n2=800, p2=400/800=0.5  
> prop.test(c(400,400),c(1000,800),correct=FALSE)
```

```
      2-sample test for equality of proportions without continuity  
      Correction
```

```
data:  c(400, 400) out of c(1000, 800)  
X-squared = 18, df = 1, p-value = 2.209e-05  
alternative hypothesis: two.sided  
95 percent confidence interval:  
 -0.14606958 -0.05393042  
sample estimates:  
prop 1 prop 2  
  0.4    0.5
```

```
> #Hence the data reveals a significant difference between town A and town  
B so far as the proportion of wheat consumers is concerned.
```