**Hypothesis Testing Exercise**

1) A F&B manager wants to determine whether there is any significant difference in the diameter of the cutlet between two units. A randomly selected sample of cutlets was collected from both units and measured . Analyze the data and draw inferences at 5% significance level. Please state the assumptions and tests that you carried out to check validity of the assumptions.

Minitab File : Cutlets.mtw

**ANS**:- **Two-Sample z-test**:

Null Hypothesis (H0) : There is no significant difference in the diameter of the cutlet between the two units.

Alternative hypothesis (H1): There is significant difference in the diameter of the cutlet between the two units.

z value: 0.7228688704678063

pvalue: 0.4722394724599501

**H1 is rejected and Ho is accepted**.

**There is no significant difference in the diameter of the cutlet between the two units.**

2) A hospital wants to determine whether there is any difference in the average Turn Around Time (TAT) of reports of the laboratories on their preferred list. They collected a random sample and recorded TAT for reports of 4 laboratories. TAT is defined as sample collected to report dispatch.

Analyze the data and determine whether there is any difference in average TAT among the different laboratories at 5% significance level.

Minitab File: LabTAT.mtw

**ANS**:- **ANOVA test (analysis of variance) :-**

ANOVA F-statistic: 118.70421654401437

pvalue: 2.1156708949992414e-57

**Ho is rejected and H1 is accepted.**

**There is significant difference between the average TAT among the different laboratories**.

3) Sales of products in four different regions is tabulated for males and females. Find if male-female buyer rations are similar across regions.







**ANS**:- **Chi-square test for independence:-**

Chi-square statistic: 1.595945538661058

pvalue: 0.6603094907091882

H1 is rejected and H0 is accepted.

**All proportions are equal**.

Null Hypothesis Ho: Independence of categorical variables.

(male-female buyer rations are similar across regions (does not vary and are not related) )

Alternate Hypothesis Ha: Dependence of categorical variables.

(male-female buyer rations are NOT similar across regions (does vary and somewhat/significantly related))

**Inference**: As (p-value = 0.6603) > (α = 0.05);

**Accept the Null Hypothesis i.e. Independence of categorical variables.**

**Thus, male-female buyer rations are similar across regions and are not related.**

4) TeleCall uses 4 centers around the globe to process customer order forms. They audit a certain % of the customer order forms. Any error in order form renders it defective and has to be reworked before processing. The manager wants to check whether the defective % varies by centre. Please analyze the data at 5% significance level and help the manager draw appropriate inferences.

Minitab File: CustomerOrderForm.mtw

**ANS**:- **Chi-square test for independence:-**

Chi-square statistic: 3.858960685820355

pvalue: 0.2771020991233135

**H1 is rejected and H0 is accepted**.

Null Hypothesis Ho: Independence of categorical variables.

(customer order forms defective % does not varies by centre)

Alternative hypothesis Ha: Dependence of categorical variables.

(customer order forms defective % varies by centre)

**Inference**: As (p\_value = 0.2771) > (α = 0.05);

**Accept Null Hypothesis i.e. Independence of categorical variables.**

**Thus, customer order forms defective % does not varies by centre**.