

## **ST2007 – Applications in Statistical Inference**

### **Assignment – 03**

**Index Number: S14878**

#### **Question 01**

a.

**Statistical test: Anova test**

b.

**Path: analyze>compare mean >one way anova**

**Dependent list- Conductivity**

**Factor- Coating Type**

c.

**$H_0$  : All the means of the four groups are equal /  $\mu_1 = \mu_2 = \mu_3 = \mu_4$**

**$H_1$  : At least one mean is not equal to the rest/  $\mu_i \neq \mu_j$**

d.

**Decision rule: If  $p \leq \alpha$ , then we reject  $H_0$ .**

**Statistical conclusion:**

**$p = 0.000$  and  $\alpha = 0.05$**

**$P < \alpha$**

**reject  $H_0$ .**



**General conclusion: There is enough evidence to conclude that at least one mean is not equal to the rest at 5% significance level**

e.

**Statistical test: post hoc test**

**H0 : Variability of 4 groups are equal.**

**H1 : Variability of 4 groups are not equal.**

**Decision Rule: If  $p \leq \alpha$ , then reject H0.**

**Statistical conclusion**

$$p = 0.122 \quad \text{and} \quad \alpha = 0.05$$

$$p < \alpha$$

**$\therefore$  we not reject H0.**

**Reason for the choice:**

**By the test of homogeneity of variances we can say that our H0 can't reject so we can do post hoc test to this scenario**

f.

ype 1 and type 3

Type 1 and type 4

Type 2 and type 3

Type 2 and type 4

## Question 02

a.

**Path:**

Analyze-->correlate-->Bivariate

Select the variable we want to find the correlation of into the “variable” box

Tick Pearson option from “correlation coefficients”.

Select “Two-tailed” in test of significance box.

Tick “flag significant correlation”

Then click ok.

b.

Pair of Variable	Suitability	Reason (if not suitable)
<b>Make &amp; Price</b>	Not Suitable	The Pearson’s correlation value is in between 0 and 0.2. Hence it has very weak relationship between make & price. Therefore, this type of relations is not suitable to check Pearson’s correlation.
<b>Fuel_type &amp; Body_style</b>	Not Suitable	The Pearson’s correlation value is in between 0 and 0.2. Hence it has very weak relationship between fuel type and body style . Therefore, this type of relations is not suitable to check Pearson’s correlation.
<b>Height &amp; Price</b>	Not Suitable	The Pearson’s correlation value is in between 0.2 and 0.4. Hence it has very weak relationship between height and price. Therefore, this type of relations is not suitable to check Pearson’s correlation.
<b>Price &amp; Width</b>	Suitable	

		No Comment
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c.

Before calculating the Pearson's correlation coefficient, we should perform a scatter plot and graphically check whether the association between the two variables is linear. If the relationship is not linear, Pearson's correlation coefficient is not an appropriate statistic for measuring their association. If the between two variable has relationship according to the scatter plot we can follow the below path for get the results.

d. (Complete the table for the valid variables only)

<b>Pair of Variable</b>	<b>Direction</b>	<b>Strength</b>	<b>Significance at 0.01 significance level</b>
<b>Make &amp; Price</b>	Negative	Very weak	Not significance
<b>Fuel_type &amp; Body_style</b>	Positive	Very weak	Not significance
<b>Height &amp; Price</b>	Positive	weak	significance
<b>Price &amp; Width</b>	Positive	Very strong	significance

### Question 03

a.

**H<sub>0</sub>** : There is no relationship between “work class ” and “income” variables.

**H<sub>1</sub>** : There is a relationship between “work class” and “income” variables.

b.

**Statistical test:** Chi-Squared test of independent for categorical variables

c.

**Path:**

Analyze -----> Descriptive Statistics -----> Crosstabs

d.

**Decision rule:**

If  $p \leq \alpha$  , then reject **H<sub>0</sub>**.

**Statistical conclusion:**

$\alpha = 0.05$  ,  $p = 0.000$

$\alpha > p$

reject H<sub>0</sub> at 5% significance level.

**General conclusion:**

There is not enough evidence to conclude that at 5% significance There is no relationship between work class and income.



e.

**Explanation:** hence  $12.5 < 20$  this result is acceptable.

f.

**Adjustment:**

g.

## Question 04

a.

**Statistical test:** Chi-Squared, One-Variable Test

**Reason:**

b.

**H<sub>0</sub> :**  $p_1 = 0.25, p_2 = 0.3, p_3 = 0.2, p_4 = 0.15, p_5 = 0.1$

**H<sub>1</sub> :**  $p_i \text{ not equal } p_{0i} \text{ for at least one } i$

c.

Transform -----> Automatic Recode

d.

**Order of Proportions:**

e.

**Test statistic: 1534.840**

**Decision rule:** If  $p \leq \alpha$ , then reject  $H_0$ .

**Statistical conclusion:**

**$\alpha = 0.05$        $p = 0.000$**

**$\alpha > p$  value**

reject  $H_0$  at 5% significance level.

**General conclusion:**

There is not enough evidence to conclude that, at 5% significance level for at least one pair paired is not equal to given proposition

f.

go to data tab  
click weight cases  
tick weight cases  
enter frequency column to frequency variable