**Name: Sandip Kumar Shah**

**Roll No: 23081029**

**Lab Number: 6**

Q12

# Working expression:

**F =** 𝑴𝑺𝑻

**T**

𝑴𝑺𝑬

**MST =** 𝑺𝑺𝑻

𝒂 −𝟏

**MSB =** 𝑺𝑺𝑩

𝒃−𝟏

**MSE=** 𝑺𝑺𝑬 (𝒂−𝟏)(𝒃−𝟏)

# Working procedure:

# Define treatments (values A, B, C, D) and values in variable view → Assign type as numeric → Assign values 1 for A, 2 for B, 3 for C, 4 for D → Assign measure in nominal for treatment and scale for values→ Insert data in data view → Analyze → compare means → one way ANOVA → Put value in dependent list → Put treatment in factor→ post HOC→ LSD → continue → OK.

# SPSS Output :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | |
| values | | | | | |
|  | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 4265689.961 | 3 | 1421896.654 | 11.253 | .001 |
| Within Groups | 1768941.150 | 14 | 126352.939 |  |  |
| Total | 6034631.111 | 17 |  |  |  |

**Testing procedure:**

# Setting up Hypothesis:

**H0:** There is no significance difference between treatments

**H1:** There is significance difference between treatments

# Level of significance:

**α = 0.05**

# Decision:

# For treatment, p = 0.001 < α = 0.05, Hence we accept H1 and H0 is rejected

# Conclusion:

Hence, we conclude that there is significant difference between treatments.

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**Lab Number: 6**

Q13

# Working expression:

**F =** 𝑴𝑺𝑻

**T**

𝑴𝑺𝑬

**F =** 𝑴𝑺𝑩

**B**

𝑴𝑺𝑬

**MST =** 𝑺𝑺𝑻

𝒂 −𝟏

**MSB =** 𝑺𝑺𝑩

𝒃−𝟏

**MSE=** 𝑺𝑺𝑬 (𝒂−𝟏)(𝒃−𝟏)

# Working procedure:

Define treatments (values A, B, C, D) and values in variable view **→** Assign type as numeric **→** Assign values 1 for A, 2 for B, 3 for C, 4 for D → Assign measure in nominal for treatment and scale for values**→** Insert data in data view **→** Analyze **→** compare means **→** one way ANOVA **→** Put value in dependent list **→** Put treatment in factor**→** post HOC**→** LSD **→** continue **→** OK.

# SPSS Output :

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ANOVA** | | | | | |
| values | | | | | |
|  | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 95.467 | 3 | 31.822 | .251 | .858 |
| Within Groups | 1013.200 | 8 | 126.650 |  |  |
| Total | 1108.667 | 11 |  |  |  |

**Testing procedure:**

# Setting up Hypothesis:

**H0:** There is no significance difference between treatments

**H1:** There is significance difference between treatments

Level of significance:

**α = 0.05**

# Decision:

For treatment, p = 0.858 > α = 0.05, Hence we accept **H0** and **H1** is rejected.

# Conclusion:

Hence, we conclude that there is no significant difference between treatments.

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Q14. Solution of RBD

**Working expression:**

**F =** 𝑴𝑺𝑻

**T**

𝑴𝑺𝑬

**F =** 𝑴𝑺𝑩

**B**

𝑴𝑺𝑬

**MST =** 𝑺𝑺𝑻

𝒂 −𝟏

**MSB =** 𝑺𝑺𝑩

𝒃−𝟏

**MSE=** 𝑺𝑺𝑬 (𝒂−𝟏)(𝒃−𝟏)

**Working procedure:**

Define Blocks, treatments and values in variable view → Assign type as numeric for blocks, string for treatments and numeric for values → Assign width 8,24,8 for block, treatment and values→ Assign measure scale for blocks, nominal for treatments and scale for values → Insert data in data view → Analyze → General linear model → Univariate → Put values in the dependent variable → Put block and treatment in fixed factors → Click model → Go to custom → Block and treatment in factor and covariates send to model → Type main effects → Sum of square type III → continue → click post Hoc → Send block and treatments in factors in Post Hoc tests for → click LSD → continue → ok → Copy only ANOVA table in word file.

**SPSS Output:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tests of Between-Subjects Effects** | | | | | |
| Dependent Variable: values | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 145.700a | 7 | 20.814 | 3.543 | .027 |
| Intercept | 20865.800 | 1 | 20865.800 | 3551.626 | .000 |
| Block | 12.700 | 4 | 3.175 | .540 | .709 |
| Treatment | 133.000 | 3 | 44.333 | 7.546 | .004 |
| Error | 70.500 | 12 | 5.875 |  |  |
| Total | 21082.000 | 20 |  |  |  |
| Corrected Total | 216.200 | 19 |  |  |  |
| a. R Squared = .674 (Adjusted R Squared = .484) | | | | | |

**Testing procedure**

**Setting up hypothesis:**

H0: There is no significance difference between treatments and blocks

H1: There is significance difference between treatments and blocks

**Level of significance**:

α=0.05

**Decision:**

For treatment, p = 0.004 < α = 0.05, Hence we accept H1 and H0 is rejected

For block, p = 0.709 > α = 0.05, Hence we accept H0 and H1 is rejected

**Conclusion:**

Hence, we conclude that there is significant difference between treatments but there is no significant

difference in blocks