***Analysis of Variance***

**Question Number – 1:**

Given the results for each level of the factor below and using ANOVA, what is the value of the computed F-value for the main effect?

**Answer:** 0.302476679

**Reference: Template.xlsx/ANOVA/Copy the data to a free space and from Data Analysis tool tab select ANOVA: Single Factor and take answer under F label in the table. (Clear all the pre-existing data at first)**

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 |
| 62.4 | 71.3 | 56.2 | 31.9 |
| 71.3 | 65.7 | 106.7 | 72.1 |
| 61 | 69.7 | 111 | 105.4 |
| 88.6 | 76.2 | 115.9 | 49.2 |
| 52.3 | 101 | 58.6 | 106.1 |
| 78.7 | 64 | 28.6 | 93 |
| 32.6 | 47.7 |  | 44.3 |
| 33.1 | 65.9 |  | 90 |
| 70.8 | 64.1 |  | 39.8 |
| 98.2 | 100.7 |  | 96 |
| 34.8 | 77.9 |  | 77 |
| 68.4 | 66.2 |  | 21 |
| 61.5 | 92.3 |  | 48.6 |
| 72 | 106.9 |  | 94.5 |
| 85.1 | 98.8 |  | 38.6 |
| 115.1 | 58.4 |  | 119.2 |
|  | 92.5 |  | 77.2 |
|  | 35.7 |  | 23.4 |
|  | 68.5 |  | 95.6 |
|  | 29 |  | 82.6 |
|  |  |  | 61.4 |
|  |  |  | 99.7 |
|  |  |  | 72.3 |

**Question Number – 2:**

Given the results for each level of the factor below and using ANOVA, what is the value of the mean square for the main effect?

**Answer:** 1483.872427

**Reference: Template.xlsx/ANOVA/Copy the data to a free space and from Data Analysis tool tab select ANOVA: Single Factor and take answer under MS label (Within Groups) in the table. (Clear all the pre-existing data at first)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| 66 | 38.3 | 115.3 | 96 | 41.4 |
| 115 | 77.3 | 95.9 | 27.5 | 98.7 |
| 75.4 | 69.8 | 85.5 | 36.7 | 21.8 |
| 59.5 | 54.4 | 51.2 | 85 | 65.1 |
| 118.3 | 108 | 71.5 | 25.9 | 62 |
| 78.8 | 51.5 | 124.9 | 51.2 | 33.7 |
| 80 | 38.7 | 99.8 | 30.2 | 103.9 |
| 83.9 | 44.5 | 98.3 | 52.7 | 111.9 |
| 100.6 | 120.6 | 36.1 | 62.3 | 50.3 |
| 109.5 | 120.3 | 66.5 | 77.7 | 79.3 |
| 85.6 | 93.5 | 57.2 | 69.4 | 55.3 |
| 40.3 | 99.1 |  | 60.8 | 62.8 |
| 73.5 | 45.1 |  | 25.3 | 79.5 |
| 94.8 | 40.2 |  | 95.4 | 44.6 |
| 118.5 | 95.6 |  | 111.4 | 50.4 |
| 57.7 | 35.1 |  | 22.7 | 81.5 |
| 50.5 | 33.5 |  | 89.2 | 91.7 |
| 110.6 | 92.3 |  | 95.2 | 24.4 |
| 66.9 | 52.3 |  | 99.6 | 66.6 |
| 51.5 |  |  | 63 | 24.4 |
|  |  |  | 86.2 |  |
|  |  |  | 73.5 |  |

**Question Number – 3:**

Given the results for each level of the factor below and using ANOVA, what is the value of the total sum of squares?

**Answer:** 50024.74213

**Reference: Template.xlsx/ANOVA/Copy the data to a free space and from Data Analysis tool tab select ANOVA: Single Factor and take answer from the intersection of row label Total and column label SS in the table. (Clear all the pre-existing data at first)**

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 |
| 126.8 | 108.6 | 57.8 | 20.3 |
| 36.1 | 63 | 58.1 | 42.8 |
| 105 | 20.9 | 125.2 | 35.1 |
|  | 58.6 | 104 | 46.2 |
|  | 63.7 | 32 | 111.8 |
|  | 42.6 | 55.9 | 92.5 |
|  | 112.3 | 45.3 | 27.9 |
|  | 31.1 | 33.1 | 108 |
|  | 85.7 | 74.6 |  |
|  | 100.6 | 116.9 |  |
|  | 55.4 | 98.3 |  |
|  | 100.2 | 30.4 |  |
|  | 47.8 | 28.1 |  |
|  | 77.5 | 35 |  |
|  | 37.3 | 110.9 |  |
|  | 49.5 | 99.5 |  |
|  | 112.6 | 42.5 |  |
|  |  | 43.4 |  |
|  |  | 81.9 |  |

**Question Number – 4:**

Given the results for each level of the factor below and using ANOVA, what is the value of the total degrees of freedom?

**Answer:** 47

**Reference: Template.xlsx/ANOVA/Copy the data to a free space and from Data Analysis tool tab select ANOVA: Single Factor and take answer from the intersection of row label Total and column label df in the table. (Clear all the pre-existing data at first)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| 26.6 | 116.8 | 95.1 | 64.7 | 65.6 |
| 97.4 | 104.9 | 78.7 | 53.8 | 113.8 |
| 30.5 | 74.7 | 103 | 32.1 | 64.9 |
| 58.8 | 21.1 |  |  | 65.9 |
| 95.6 | 73.8 |  |  | 66 |
| 33.2 | 42.6 |  |  | 36.9 |
| 47.1 | 95.2 |  |  | 40.9 |
| 72.4 | 110.9 |  |  | 73.1 |
|  | 90.1 |  |  | 42.3 |
|  | 54.4 |  |  | 49 |
|  | 110.8 |  |  | 69.5 |
|  | 39 |  |  | 115.4 |
|  | 93 |  |  | 112.3 |
|  | 95 |  |  | 97.2 |
|  |  |  |  | 52 |
|  |  |  |  | 53 |
|  |  |  |  | 106.8 |
|  |  |  |  | 29.4 |
|  |  |  |  | 104.5 |
|  |  |  |  | 95.5 |

**Question Number – 5:**

Given the results for each level of the factor below and using ANOVA, what is the value of the significance of the main effect?

**Answer:** 0.132271267406004

**Reference: Template.xlsx/ANOVA/Copy the data to a free space and from Data Analysis tool tab select ANOVA: Single Factor and take answer under P-value in the table. (Clear all the pre-existing data at first)**

**Question Number – 6:**

Given

**Answer:** 0.

**Reference: Template.xlsx/ANOVA/Copy the data to a free space and from Data Analysis tool tab select ANOVA: Single Factor and take answer under F label in the table. (Clear all the pre-existing data at first)**