Lab no. 19

Q) The following table represents the layout of R.B.D of 4 treatments (fertilizers) which is measured under 4 different conditions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Treatments | Condition I | Condition II | Condition III | Condition IV |
| A | 16 | 19 | 18 | 10 |
| B | 11 | 17 | 15 | 9 |
| C | 8 | 19 | 11 | 17 |
| D | 10 | 15 | 8 | 18 |

Carry out the analysis.

Hypothesis:

H0T : There is no significant difference between treatments.

H1T : There is significant difference between treatments.

H0B : There is no significant difference between blocks

H1B : There is significant difference between blocks.

Level of significance:

α=5%

Test statistics:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Anova: Two-Factor Without Replication | | | |  |  |  |
|  |  |  |  |  |  |  |
| *SUMMARY* | *Count* | *Sum* | *Average* | *Variance* |  |  |
| A | 4 | 63 | 15.75 | 16.25 |  |  |
| B | 4 | 52 | 13 | 13.33333 |  |  |
| C | 4 | 55 | 13.75 | 26.25 |  |  |
| D | 4 | 51 | 12.75 | 20.91667 |  |  |
|  |  |  |  |  |  |  |
| 1 | 4 | 45 | 11.25 | 11.58333 |  |  |
| 2 | 4 | 70 | 17.5 | 3.666667 |  |  |
| 3 | 4 | 52 | 13 | 19.33333 |  |  |
| 4 | 4 | 54 | 13.5 | 21.66667 |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |
| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| Treatment | 22.1875 | 3 | 7.395833 | 0.454158 | 0.720775 | 3.862548 |
| Block | 83.6875 | 3 | 27.89583 | 1.713006 | 0.233458 | 3.862548 |
| Error | 146.5625 | 9 | 16.28472 |  |  |  |
|  |  |  |  |  |  |  |
| Total | 252.4375 | 15 |  |  |  |  |

Decision:

Since, In both cases Fcal < Ftab, we do not reject Null Hypothesis.

Hence, there is no significant difference between the four treatments of four fertilizers.

Lab no. 20

Q) The following table gives the result of the experiment on four varieties of a crop in 5 blocks of plot.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Block I | Block II | Block III | Block IV | Block V |
| A 32 | B 33 | D 30 | A 35 | C 36 |
| B 34 | C 34 | C 35 | C 32 | D 29 |
| C 31 | A 34 | B 36 | B 37 | A 37 |
| D 29 | D 26 | A 33 | D 28 | B 35 |

Analyse the above result to test whether there is significant difference between yields of four varieties.

Hypothesis:

H0T : There is no significant difference between treatments.

H1T : There is significant difference between treatments.

H0B : There is no significant difference between blocks

H1B : There is significant difference between blocks.

Level of significance:

α=5%

Test Statistics:

Arranging the table according to treatments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Block I | Block II | Block III | Block IV | Block V |
| A | 32 | 34 | 33 | 35 | 37 |
| B | 34 | 33 | 36 | 37 | 35 |
| C | 31 | 34 | 35 | 32 | 36 |
| D | 29 | 26 | 30 | 28 | 35 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Anova: Two-Factor Without Replication | | | |  |  |  |
|  |  |  |  |  |  |  |
| *SUMMARY* | *Count* | *Sum* | *Average* | *Variance* |  |  |
| A | 5 | 171 | 34.2 | 3.7 |  |  |
| B | 5 | 175 | 35 | 2.5 |  |  |
| C | 5 | 168 | 33.6 | 4.3 |  |  |
| D | 5 | 148 | 29.6 | 11.3 |  |  |
|  |  |  |  |  |  |  |
| 1 | 4 | 126 | 31.5 | 4.333333 |  |  |
| 2 | 4 | 127 | 31.75 | 14.91667 |  |  |
| 3 | 4 | 134 | 33.5 | 7 |  |  |
| 4 | 4 | 132 | 33 | 15.33333 |  |  |
| 5 | 4 | 143 | 35.75 | 0.916667 |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |
| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| Treatments | 86.6 | 3 | 28.86667 | 8.469438 | 0.00272 | 3.490295 |
| Blocks | 46.3 | 4 | 11.575 | 3.396088 | 0.044567 | 3.259167 |
| Error | 40.9 | 12 | 3.408333 |  |  |  |
|  |  |  |  |  |  |  |
| Total | 173.8 | 19 |  |  |  |  |

Decision:

Since, In both cases Fcal < Ftab, we do not reject Null Hypothesis.

Hence, there is no significant difference between the four treatments of four fertilizers.