Lab no: 9

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

Conditions

Treatments	I	II	III	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 of the design.

Hypothesis:

$H_{0T:}$ There is no significance difference between treatments.

H_{1T}: There is significance difference between treatments.

H_{0B} : There is no significant difference between blocks.

H_{1B} : There is significant difference between blocks.

Level of significance,

Alpha = 5%

Test statistics:

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
A	4	63	15.75	16.25
				13.3333
B	4	52	13	3
C	4	55	13.75	26.25

D	4	51	12.75	20.9166 7
1	4	45	11.25	11.5833 3
2	4	70	17.5	3.66666 7
3	4	52	13	19.3333 3
4	4	54	13.5	21.6666 7

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
treatment	22.1875	3	7.39583 3	0.45415 8	0.72077 5	3.86254 8
Block	83.6875	3	27.8958 3	1.71300 6	0.23345 8	3.86254 8
Error	146.562 5	9	16.2847 2			
Total	252.437 5	15				

Decision:

Since in both cases, $f_{cal} < f_{tab}$, so we accept H_0 i.e. There is no significance difference between treatments and blocks.

Lab no: 10

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 and also test whether blocks are homogenous or not.

Hypothesis:

H_{0T} : There is no significant difference between treatments.

$H_{1T:}$ There is significant difference between treatments.

H_{0B} : There is no significant difference between blocks.

$H_{1B:}$ There is significant difference between blocks.

Level of significance:

α=5%

Test statistics:

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

I	4	126	31.5	4.333333
II	4	127	31.75	14.91667
III	4	134	33.5	7
IV	4	132	33	15.33333
V	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:

In both cases, $f_{cal} > f_{tab}$, so we reject H_0

Hence we conclude that there is significant difference between treatments and blocks.