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:

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	4	63	15.75	16.25
B	4	52	13	13.3333
C	4	55	13.75	26.25
D	4	51	12.75	20.9166
1	4	45	11.25	11.5833
2	4	70	17.5	3.66666
3	4	52	13	19.3333
4	4	54	13.5	21.6666

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 $F_{cal} < F_{tab}$, 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:

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:

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 $F_{cal} < F_{tab}$, we do not reject Null Hypothesis.

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