

Name _____

STAT 514
Exam II — Fall 1989

1) Manufactured items are produced in lots of 16 items each. Sixteen lots are randomly selected and randomly assigned to one of four heat treatment methods. Each lot is then divided into four subgroups. Each subgroup is assigned to one of four finishing processes. The items are then measured. ~~This experiment is then repeated one more time.~~

a) What type of design is this? Write out the model.

Splt
plot

(nested
fact)

Splt plot

$$T_i + L_{(i)j} + F_{ic} + TF_{(i)c} + FL_{(i)jic} + \epsilon_{(i)jic}$$

whole plot

b) Write out the ANOVA table along with degrees of freedom.

c) What are the correct F tests?

d) If you were going to pool, what would you consider pooling?

2)

a) Could I have a 2×2 Graeco-Latin square? Why?

b) Show the layout of a 3×3 Graeco-Latin Square. With one observation per cell, what problem would I have in the analysis?

c) With a Latin Square where rows and columns correspond to treatments, the F-test may or may not be conservative. Is there some way I could check this?

3)

		Treatment 1					
		A			B		
Nonsensicol (Treatment 2)		0%	20%	40%	60%	80%	100%
		X X	X X	X X	X X	X X	X X
		X X	X X	X X	X X	X X	X X

Assume Treatment 1 is fixed.

a) Write out the model and ANOVA Table with degrees of freedom.

b) Use the algorithm to work out the EMS.

4)

a) Describe how to run problem 1 as a completely randomized block design with the same number of lots and items per lot.

b) Write out the model from a).

5. For problem 2 b), suppose that the observations were

3	7	10
2	8	11
5	9	13

If you were going to get the sums of squares via regression on dummy variables, write out the observations with the values of the corresponding dummy variables.