Homework III: (Group of Five or Less)

1. Consider the learning effectiveness of four different training methods (factor A, fixed) and five instructors (factor B, random). Four classes were assigned to each training method-instructor combination. The response variable of interest was the mean improvement per student in the class at the end of the training program. Determine the following:
   - Which factor effect or variance components are significant ?
   - Determine the interval estimate of significant variance components.

Source of Variation	*SS*	*df*	*MS*
Factor *A* (training methods, fixed)	42.1	3	14.0
Factor *B* (instructors, random)	53.9	4	13.5
AB interactions	46.7	12	3.9
Error	126.4	60	2.1
Total	269.1	79	

2. From the data below,

   a) Determine the appropriate linear regression model using natural variables to predict the etch rate and determine which factors are significant.

   b) Repeat a) by using coded variables. How are the model coefficients and their significance compared to a) ?

	Coded Factors			Etch Rate			Factor Levels		
Run	*A*	*B*	*C*	Replicate 1	Replicate 2	Total	Low (−1)		High (+1)
1	−1	−1	−1	550	604	(1) = 1154	*A* (Gap, cm)	0.80	1.20
2	1	−1	−1	669	650	*a* = 1319	*B* (C_2F_6 flow, SCCM)	125	200
3	−1	1	−1	633	601	*b* = 1234	*C* (Power, W)	275	325
4	1	1	−1	642	635	*ab* = 1277			
5	−1	−1	1	1037	1052	*c* = 2089			
6	1	−1	1	749	868	*ac* = 1617			
7	−1	1	1	1075	1063	*bc* = 2138			
8	1	1	1	729	860	*abc* = 1589			

Get data from lect09-2k-factorial.xlsx sheet 'Plasma'