MATH 560 Quiz 1 **Department of Mathematics and Statistics KFUPM**

Name: ----------ID: ----------

Q1. Define the following terms.

a). Design of experiment

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b). Covariate

Q2. Answer the following:

a). List down the basic principles of DOE.

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b). Write the assumptions of random error term in our DOE models.

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c). In a completely randomized design for ANOVA, the number of degrees of freedom for the numerator and denominator are 4 and 25, respectively. The total number of observations must equal:

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d). According to the given information, what is the value of the F statistic? MST=50, MSE=10

Q3. Complete ANOVA table for a completely randomized design using three treatments.

Source	d.f.	SS	MS	F
Treatment		17.04		
Error	9			
Total		31.23		

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Q4. The effect of three different lubricating oils on fuel economy in diesel truck engines is being studied. Fuel economy is measured using brake-specific fuel consumption after the engine has been running for 15 minutes. Five different truck engines are available for the study, and the experimenters conduct the following randomized complete block design. Analyze the data from this experiment, assuming normality at 5% level of significance. (Provide all the 7 traditional steps and also step 8 if needed).

	Truck				
Oil	1	2	3	4	5
1	0.500	0.634	0.487	0.329	0.512
2	0.535	0.675	0.520	0.435	0.540
3	0.513	0.595	0.488	0.400	0.510