MET CS 555 Assignment 5 – 20 points

SUBMISSION REQUIREMENTS: **Please submit a single document (word or PDF) for submission.  Your submission should contain a summary of your results (and answers to questions asked on the homework) as well as your R code used to generate your results (please append to the end of your submission). Please use R for the calculations whenever possible. You will lose points if you are not utilizing R.**

**The data “A05.csv” is from 3 groups of students (math, chemistry, and physics) on an IQ-related test.** **Save the data, and read the data into R. Use this data to address the following questions:**

1. How many students are in each group? Summarize the data relating to both test score and age by the student group (separately). Use appropriate numerical and/or graphical summaries. **(3 points)**
2. Do the test scores vary by student group? Perform a one-way ANOVA using the aov or Anova function in R to assess. Use a significance level of α=0.05. Summarize the results **using the 5-step procedure.**  If the overall model results are significant, perform the appropriate pairwise comparisons using Tukey’s procedure to adjust for multiple comparisons and summarize these results. **(7 points )**
3. Create an appropriate number of dummy variables for the student group and re-run the one-way ANOVA using the lm function with the newly created dummy variables. Set chemistry students as the reference group. Confirm the results are the same (specifically point out test statistics, p-values, etc., that show the results are equivalent). What is the interpretation of the beta estimates from the regression model? **(4 points)**
4. Re-do the one-way ANOVA adjusting for age (**ANCOVA**). Focus on the output relating to comparing test scores by student type. Explain how this analysis differs from the analysis in step 2 above (not the results, but how this analysis differs in terms of the questions it answers as opposed to the one above). Did you obtain different results? Summarize briefly (no need to go through the 5 –step procedure here). Lastly, present the least square means and interpret these.  **(6 points)**