**BIII (Linear Model) 2018-19 Assignment 2 (Due date October 29, 2018)**

(NO LATE ASSIGMENT WILL BE ACCEPTED, (SHOW R CODE YOU USE FOR THE FOLLOWING PROBLEMS)

Note : Two data sets are given in the attached sheet.

Problem 1

Consider data on Table 15.1. One step in the manufacture of large engines requires that holes of very precise dimensions be drilled. The tools that do the drilling are regularly examined and are adjusted to ensure that the holes meet the required specifications. Part of the examination involves measurement of the diameter of the drilling tool. A team studying the variation in the sizes of the drilled holes selected this measurement procedure as a possible cause of variation in the drilled holes. They decided to use an experiment as one part of this examination. The diameters in millimeters (mm) of five tools were measured by the same operator at three times (8:00 a.m., 11:00 a.m., and 3:00 p.m.). Three measurements were taken on each tool at each time. The person taking the measurements could not tell which tool was being measured, and the measurements were taken in random order.

1. Use different plots ( to be decided by you) to summarize the main features of the data.
2. Use a suitable two way model to explain the data and analyze it. Write a short report on your findings from the plot as well as the ANOVA results.

Problem 2

Consider data on Table 15.2 which describe a study designed to determine how the frequency that a supermarket product is promoted at a discount and the size of the discount affect the price that customers expect to pay for the product. Each one

of you should delete some observations to make this data set unbalanced such that for each of the 40%, 30%, 20% and 10% discounts there are in all 38 observations, spread unequally over the number of promotions. ( e.g. for 40% discount there are 9, 10, 10, 9 observations across the number of promotions).

(a) Use different plots ( to be decided by you) to summarize the main features of the data. Analyze the data with a two-way ANOVA without interaction. ( Justify from your plots if this is a reasonable assumption). Prepare a short report using your plots and ANOVA results, explaining how the expected price depends on the number of promotions and the percent of the discount.