Meticulous Drill & Reamer

Meticulous Drill & Reamer (MD&R) specializes in drilling and boring precise holes in hard metals (e.g., steel alloys, tungsten carbide, and titanium). The company recently contracted to drill holes with 3-centimeter diameters in large carbon-steel alloy disks, and it will have to purchase a special drill to complete this job. MD&R has eliminated all but two of the drills it has been considering: Davis Drills' T2005 and Worth Industrial Tools' AZ100. These producers have each agreed to allow MD&R to use a T2005 and an AZ100 for one week to determine which drill it will purchase. During the one-week trial, MD&R uses each of these drills to drill 31 holes with a target diameter of 3 centimeters in one large carbon-steel alloy disk, then measures the diameter of each hole and records the results. MD&R's results are provided in the accompanying data file BAN_602_Case_3.csv.

MD&R wants to consider both the accuracy (closeness of the diameter to 3 centimeters) and the precision (the variance of the diameter) of the holes drilled by the T2005 and the AZ100 when deciding which model to purchase.

Managerial Report

Prepare a managerial report that addresses the following issues and recommend a drill for MD&R.

1. Provide descriptive statistics of the data from the T2005 and the AZ100 separately. Are the holes drilled by the T2005 or the AZ100 more accurate? That is, which model of drill produces holes with a mean diameter closer to 3 centimeters? (5 + 5 + 4 = 14 points)
2. Conduct a hypothesis test that the T2005 and the AZ100 are equally accurate (that is, have equal means) at $\alpha = 0.05$. Show all the steps of the hypothesis testing. Discuss your findings. (10 + 4 = 14 points)
3. Are the holes drilled by the T2005 or the AZ100 more precise? That is, which model of drill produces holes with a smaller variance? (3 points)
4. Conduct a test of the hypothesis that the T2005 and the AZ100 are equally precise (that is, have equal variances) at $\alpha = 0.05$. Show all the steps of the hypothesis testing. Discuss your findings. (10 + 4 = 14 points)
5. Which drill do you recommend to MD&R and why? (5 points)

Format of the deliverables:

1. The typed managerial report must be in Microsoft Word or PDF format and uploaded on Blackboard by the due date. Each group must upload only one report.
2. The typed managerial report must **not** contain any R code.
3. Please do not copy the questions from the case to your report. You should just answer the questions without typing the questions in your report. The report must answer all the questions separately.
4. You must include graphs and/or tables as asked in the question, followed by a written analysis and interpretation.
5. All computations must be done in R and the executable R script file must be uploaded on Blackboard as well.
6. All computations must be carried out and displayed up to three decimal places unless specifically stated otherwise in a question.
7. You must mention your group number on the first page of your report.
8. The report must be in Times New Roman font with font size 12 and single-line space.
9. The number of pages in the report must not exceed five (5) excluding any cover page.