MSE 227L Name _____

Heat Treatment of steel & Hardenability

	Poor	Fair	Average	Good	Excellent
Memorandum Format Used	1	2	3	4	5
Spelling, grammar & punctuation correct	1	2	3	4	5

Report includes:	Poor	Fair	Average	Good	Excellent
Discuss why the air-cooled and furnace-cooled specimens can be quenched in water after one hour.	1	2	3	4	5
Compare Brinell numbers (BHN) found from measured diameters with a **conversion chart** for Rockwell A or C (6 specimens). Go to website or reference book to find this information; include this data in your tables.	1	2	3	4	5
Include tables (results and data measured) for BHN and R_A. Be sure to include measured values from computer.	1	2	3	4	5
Graph BHN (x-axis) vs. Rockwell A or C (y-axis).	1	3	5	8	10
Graph Rockwell A or C hardness (y-axis) vs. tempering temp (x-axis).	1	3	5	8	10
Compute σ_{ult} for all specimens from the average BHN for each specimen.	1	2	3	4	5
Discuss the purpose of quenching and tempering steel.	1	2	3	4	5
Discuss the sources of error for the various hardness testers; compare consistency of test results and accuracy (Rockwell vs Brinell).	1	2	3	4	5
Discuss factors that probably contributed to the scatter in the hardness data and errors in the experiment (their sources)	1	2	3	4	5
Calculate amount of carbide (Fe_3C) present at 1338°F for SAE 1045. Use the phase diagram included in the lab description and show calculations.	1	2	3	4	5
Discuss the expected microstructure for each heat treatment process.	1	2	3	4	5
Discuss the correlation between microstructure and hardness.	1	2	3	4	5
Graph hardness as a function of distance from the quenched end **(show both alloys on the same graph).**	1	3	9	12	15
Discuss the effects of **alloying** on hardenability and the shift in the TTT curve due to alloying.	1	2	3	4	5

	Poor	Fair	Average	Good	Excellent
Overall level of effort apparent	1	2	3	4	5
Quality of graphs	1	2	3	4	5
Quality of Abstract	1	2	3	4	5
Quality of work description	1	2	3	4	5
Quality of conclusions	1	2	3	4	5