ENGR 131

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Assignment			

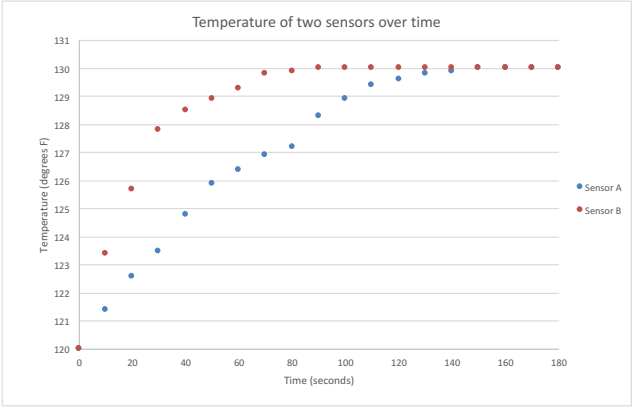
Academic Integrity Statement: I/We have not used material obtained from any other unauthorized source, either modified or unmodified. Neither have I/we provided access to my/our work to another. The solution I/we am/are submitting is my/our own original work.

Problem Determine when the sensors are subjected to the same conditions if any differences exist in the temperature measurments.

Imported Data

Time (seconds)	Sensor A Temperature (degrees F)	Sensor B Temperature (degrees F)
0	120	120
10	121.4	123.4
20	122.6	125.7
30	123.5	127.8
40	124.8	128.5
50	125.9	128.9
60	126.4	129.3
70	126.9	129.8
80	127.2	129.9
90	128.3	130
100	128.9	130
110	129.4	130
120	129.6	130
130	129.8	130
140	129.9	130
150	130	130
160	130	130
170	130	130
180	130	130

Plot of Temperatures

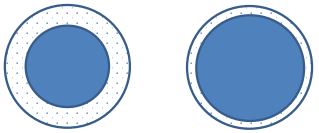


Answers to Questions

a) The data generated by this test apparatus is continuous and numerical. This is because the data (both x and y) can take on any value within a range. Hence a scatterplot is the best type of plot to represent this type of data. Also the data is measured not theoretical because it is not calculated but instead measured.

b) Temperature sensor B has a faster response time. This is because temperature sensor B reaches 130 degrees F (maximum temperature) before Temperature sensor A.

c) Temperature sensor B has a faster response time than Temperature sensor A. Follow the diagram.



View from above

Sensor A
Size of Thermocouple = 0.35 in
Size of Thermowell = 0.50 in

Sensor B
Size of Thermocouple = 0.45 in
Size of Thermowell = 0.50 in

In Sensor A, there is more space between the thermowell and the thermocouple. When the temperature is recorded, some heat may be lost in that space. On the other hand, in sensor B there is less space between the thermowell and the thermocouple so the chances of heat being lost to the surroundings decreases and leads to a more accurate response time.

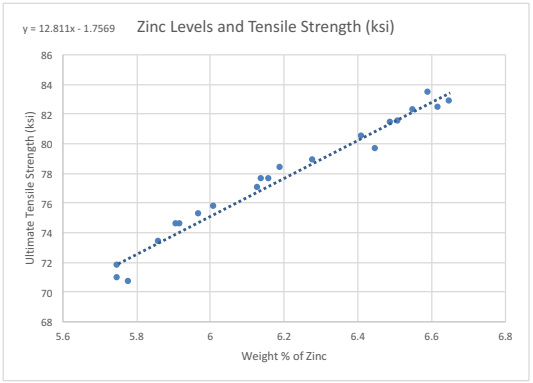
Problem Description Show the relationship between the weight percent zinc and the tensile strength in ksi.

Imported Data

Weight % Zn	Ultimate Tensile Strength (Mpa)	Ultimate Tensile Strength (ksi)
6.16	535	77.60
6.59	575	83.40
6.41	555	80.50
5.86	506	73.39
6.45	549	79.63
6.65	571	82.82
6.14	535	77.60
6.13	531	77.02
6.62	568	82.38
6.28	544	78.90
6.19	540	78.32
5.78	487	70.63
5.75	489	70.92
5.91	514	74.55
6.55	567	82.24
5.92	514	74.55
5.97	519	75.27
6.51	562	81.51
5.75	495	71.79
6.49	561	81.37
6.01	522	75.71

1 Mpa= 0.1450377 ksi

Plot of Zinc Levels and tensile strength (ksi)



Output: Answers to Questions

a) The data generated by this test apparatus is continuous and numerical. This is because the data (both x and y) can take on any value within a range. Hence a scatterplot is the best type of plot to represent this type of data. Also the data is measured not theoretical because it is not calculated but instead measured.

b) The independent variable in this the percent weight of Zinc. This is because this variable stands alone and isn't changed by other variables being measured in the experiment. The dependant variable in this experiment is the ultimate tensile strength. This is because this variable depends another variable such as the percent weight of Zinc.

c) The correlation between weight percent zinc and tensile strength is high positive correlation. This is because, approximately, as the weight percent zinch increases the tensile strength increases aswell.

d) The equation of the trendline: y = 12.811x - 1.7569. This equation has a positive slope because weight percent zinc and tensile strength has a positive correlation.