**Please insert the requested items in the space provided. Please do not use more than the space provided. If your submission does not adhere to this template, points will be deducted from your assignment.**

***Insert figure here, with border and caption.***

Diagram, schematic

Description automatically generated

**Figure 1**. A Synthetic Scheme for Chemistry

***Type your first and last name below***

***Kevin Lei***

***Insert table of elements with property, with border, caption, and citation.***

**Table 1**. Boiling Points of a Series of Elements. 1

|  |  |  |
| --- | --- | --- |
| **Element** | **Atomic Number** | **Boiling Point (K)** |
| Aluminum | 13 | 2792 |
| Silicon | 14 | 3173 |
| Phosphorous | 15 | 553.6 |
| Sulfur | 16 | 717.87 |
| Chlorine | 17 | 239.11 |

1Periodic Table, <https://ptable.com/#Properties> (accessed September 4, 2022).

***Insert table of elements with property and mathematical transformations (from MS-Excel) here, with border, caption and citation.***

**Table 2.** Boiling Points of a Series of Elements in Different Units with Inverse and Natural Log Transformations. 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Element** | **Atomic Number** | **Boiling Point (K)** | **Inverse** | **Log** | **Boiling Point (°C)** | **Boiling Point (°F)** |
| Aluminum | 13 | 2792 | 0.000358166 | 3.445915414 | 2518.85 | 4565.93 |
| Silicon | 14 | 3173 | 0.000315159 | 3.501470072 | 2899.85 | 5251.73 |
| Phosphorous | 15 | 553.6 | 0.001806358 | 2.743196081 | 280.45 | 536.81 |
| Sulfur | 16 | 717.87 | 0.00139301 | 2.856045804 | 444.72 | 832.496 |
| Chlorine | 17 | 239.11 | 0.004182176 | 2.378597739 | -34.04 | -29.272 |

2Periodic Table, <https://ptable.com/#Properties> (accessed September 4, 2022).

***Insert graph 1 here, with caption.***

**Figure 2**. Graph of the Boiling Point of Elements in Kelvin vs their Atomic Numbers.

***Insert graph 2 here, with caption.***

**Figure 3.** Graph of the Inverse Boiling Point of Elements in Kelvin vs their Atomic Numbers.

***Insert graph 3 here, with caption.***

**Figure 4**. Graph of the Common Log of the Boiling Points of Elements in Kelvin vs their Atomic Numbers.

***Insert graph 4 here, with caption.***

**Figure 5**. Graph of the Boiling Point of Elements in Celsius vs their Atomic Number.

***Insert graph 5 here, with caption.***

**Figure 6**. Graph of the Boiling Points of Elements in Fahrenheit vs their Atomic Numbers.

***Insert graph 6 here, with caption.***

**Figure 7.** Graph of the Boiling Points of Elements in Kelvin, Celsius, and Fahrenheit vs their Atomic Numbers.

**Respond to the following two questions in the space provided.**

1. Make a table like the one below and fill in the values from your graphs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Graph** | **x-Axis Label** | **y-Axis Label** | **Equation Of Best Fit Line** | **R2 Value** |
| **Direct** | Atomic Number | Boiling Point (K) | y = -756.09x + 12836 | 0.7557 |
| **Inverse** | Atomic Number | Inverse Boiling Point (1/K) | y = -0.278x + 7.1551 | 0.8383 |
| **Logarithmic** | Atomic Number | Common Log of Boiling Point (log(K)) | y = 0.0009x - 0.0115 | 0.7656 |
| **°C** | Atomic Number | Boiling Point (°C) | y = -756.09x + 12563 | 0.7557 |
| **°F** | Atomic Number | Boiling Point (°F) | y = -1361x + 22646 | 0.7557 |

1. Choosing between "Direct", "Inverse", and "Logarithmic"; which has an R2 value closest to 1?

Inverse

1. Why are the R2 values for the temperature plot in K, °C, and °F the same?

The R2 values for the temperature plot in Kelvin, degrees Celsius, and degrees Fahrenheit are the same because converting from Kelvin to degrees Celsius or degrees Fahrenheit only requires multiplication by a constant and/or addition of a constant, which means the relationship between dependent and independent variables remain linear. Essentially, the average distance from the points to their respective trendlines remain the same for each of the three units.

**This is the end of your assignment. You should now save this as a pdf and submit it to Gradescope. Remember to tag pages while submitting to Gradescope.**