| AEPHY2024  **Narrogin SHS Year 11 ATAR PHYSICS Name:** | |
| --- | --- |
| Task No: | 1b |
| Task Type: | Science Inquiry: Experiment Validation |
|  |  |
| Content: | Heating Processes |
|  |  |
| Task Description:  Time Allowed | Validation Test  Reading time: 5 minutes  Working time: 45 minutes |
|  |  |
| Weighting: | 6% (2% Lab report, 4% Validation Test) |
| Materials required | Physics Data Sheet, pens, pencils (including coloured), sharpener, correction fluid, eraser, ruler, highlighters, scientific calculator |
|  |  |

|  |  |  |
| --- | --- | --- |
| **Section** | **Mark** | **Percent** |
| Lab report | /14 | \_\_\_\_% |
| Validation test | / 31 | \_\_\_\_% |
|  | | **Total:**  \_\_\_\_% |

**Question 1 (5 marks)**

Consider the image below of two readings (in degrees Celsius) made by the same thermometer.

A close-up of a thermometer

Description automatically generated

1. Enter the measurements into the table below include a measure of uncertainty.

(2 marks)

1. Convert the measurements in the first column to Kelvin. Place your answer in the final column.

A table with black text

Description automatically generated(1 mark)

1. Calculate the percentage uncertainty of the change in temperature. (2 marks)

**Question 2 (5 marks)**

State the definitions of the following terms:

(2 marks)

1. Thermal equilibrium
2. Heat

Consider a spa containing 5.00 x 102 kg of water at 30.0 °C and a cup of 0.400 kg of water at 70.0 °C.

1. State and explain, making reference to the terms “ heat” and “temperature”, the direction that thermal energy would flow if a person was to place his hand ( of surface temperature 35.0 °C) in both bodies of water.

(3 marks)

**Question 3 (5 marks)**

0.25kg of water at 20.0 °C is placed into a 0.500kg aluminium pan fresh off the stove with a temperature of 150 °C. Assuming that the pan is on an insulated pad and that no significant amount of water boils off, calculate the final temperature of the water and pan system.

cAl = 900 J kg-1 K-1

**Question 4 (7 marks)**

An ice cube at 0.00 °C is placed into an insulated container with 151 g of water at 45.0 °C. In one minute, the ice cube had melted. The final mass of water in the glass was 175 g and the final temperature of the water was 28.0 °C.

1. Using the data provided, calculate the latent heat of fusion of water.

(5 marks)

1. Calculate the percentage error compared with the accepted value.

(2 marks)

**Question 5 (9 marks)**

A diagram of water boiling

Description automatically generatedConsider the heating curve of 0.100 kg of water shown below.

1. Calculate the energy required to fully melt the ice.
2. Calculate the energy required to heat the water from the 105 second mark to 205 second mark.
3. Using the values obtained in part (a) and (b), determine if heat is supplied at a constant rate throughout the heating curve.