Melting Point of an Unknown Solid Lab

Purpose: to determine the melting/freezing point of an unknown solid and to graph the heating curve of the substance

Materials:
- large beaker
- test tube containing the unknown solid
- two thermometers
- Bunsen burner
- Ring stand
- Ring
- Wire mesh
- cool water
- timer

Procedure:
1) Obtain a test tube containing the unknown solid from the chemical counter.
2) Fill the large beaker ¾ full of cool water from the tap
3) Place one thermometer into the test tube. Record the temperature. Place the other thermometer into the cool water. Record the temperature
4) Place the entire test tube (without spilling it) into the beaker of cool water. Light your Bunsen burner, place the beaker on the wire mesh on the ring. Gently heat your beaker. Do not boil the water!
5) Start recording the temperature of the test tube and water every 30 seconds. Alternate the readings. (ie, at 30 seconds read the test tube thermometer, at 1 minute read the water thermometer, at 1min 30sec read the test tube thermometer, etc…)
6) Be sure to note at what temperature the solid starts to melt and what temperature it is completely melted at.
7) Once the temperature of the test tube reaches 85 °C, turn off the Bunsen burner and allow the beaker and test tube to cool.
8) Clean up

Questions:
1) Based on the following data, determine the name of the unknown solid. Explain your determination.

   Cinnamic Acid: 42°C   Lauric Acid: 45°C

   Thymol: 50°C   Maleic Anhydride: 53°C

   Palmitic Acid:; 63°C   Stearic Acid: 70°C

2) At the melting point of a substance, it consists of a mixture of solid and liquid portions. State the molecular differences expected between the solid and liquid portions

3) Suppose an insulated container held a solid/liquid mixture of a certain substance at its melting point so that heat neither entered nor left the container. Predict what would be observed

4) Construct a graph of the heating curve of the water and of the unknown solid. Place time on the x-axis and temperature on the y-axis. Plot both curves on the same graph but use different colors.