Year 11 Chemistry Practical – Latent Heat of Fusion   NAME_____

Aim: To find the latent heat of fusion (energy absorbed by melting or released by freezing a gram) of water.

Equipment:
- stopwatch
- thermometer
- electronic balance
- foam cups
- ice
- (optional) vegetable oil
- (optional) methylated spirits

Method:
1. Place the empty cup on the electronic balance and zero the balance.

2. Fill the cup to about half full with tap water. Record the mass of the water.

3. Place the thermometer in the cup and record the initial temperature.

4. Remove the thermometer, place the cup on the scales and zero the scales.

5. Place about 5-10g ice in the cup and record the mass of ice added.

6. Return the thermometer to the cup.

7. Every minute, record the temperature in a results table. The temperature should change by less each minute.

8. When the temperature stops changing (or starts going up) record the final temperature.

9. If there is any ice left in the cup, zero another cup on the balance and place the ice in that. Record the mass of ice remaining, and hence calculate how much mass of ice melted.

10. Use the following formula to calculate the heat energy in J lost from the water:

$$E = mc\Delta T$$

change in temperature of the water

mass of water
(before ice was added)

specific heat of water, 4.18 J/g/°C

11. Divide the heat energy absorbed (in J) by the mass of the ice melted (in g) to obtain the latent heat of fusion of water in J per g ($J\ g^{-1}$).

12. Optionally repeat steps 1-11 either with water again, or with vegetable oil or methylated spirits.
    Vegetable oil: $c = 1.67$ J/g/°C, use about 2-4g ice
    Methylated spirits: $c = 2.4$ J/g/°C, use about 3-6g ice

Questions:
1. Why is it important not to let the ice melt much before it is put in the cup?

2. Would you expect to get different results with a beaker instead of a foam cup? Explain.

3. The expected latent heat of fusion of water is 334 J g^{-1}. Compare this with your result and give possible reasons for the difference (if any).

4. Suggest two possible improvements to the experimental method, and explain each.