Doritos Thermochem Lab

name _____

80/1200

Objective: To experimentally determine the number of Calories in Doritos chips and to compare our measured result to the actual number of Calories in the chips.

Procedure: Observe the set up as shown by the teacher. Set up a ring stand and connect a glass rod to your can to suspend it above the table as shown. You will need a piece of aluminum foil and metal tongs.

Make sure any of the deionized water you put INTO the can goes into it and does not get stuck on the top of the can. The water has to go IN the can to be included in the thermochemistry and your measuements. Water on the can = bigger percent error.

Data Table	
Mass of the empty can	Mass of your chip
Mass of can + water	Start Temp of water (nearest 10th)
Mass of water	End Temp of water (nearest 10th)
Serving Size from nutrition label	Calories per serving from label

CALCULATIONS AND QUESTIONS (2 points each, but #7, 8 and 9 are only one point each = 15 points):
USE LOTS OF PAPER, write all formulas and use units in all math, or you will lose points!

1. Determine the amount of heat gained by your water from the burning chip.
   Use the proper heat formula and use correct units. (2)

2. Convert that number of joules in question one into Calories. This is your measured value. (2)

3. Calculate how many Calories were in your chip. This is your actual value. (2)

4. Determine your % Error for this. (2)

Questions 5– 10 are thermochemistry problems that are unrelated to the lab you just did.

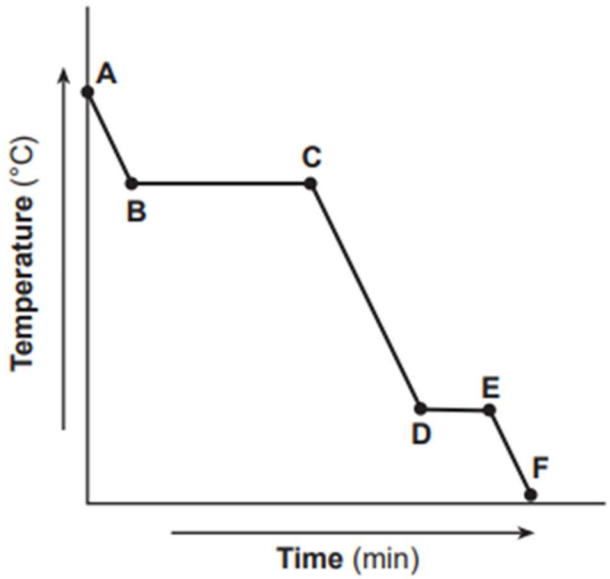
5. Ice has a specific heat capacity constant of 2.10 J/g·K. How much energy does it take to convert a 74.50 g ice cube from your home freezer at -6.00°C to body temperature of 37.0°C?
   (note this is a 3 step problem) (2)

6. If you have 150.75 grams of silver at -12.00°C and it gets warmed to a warm 46.05°C, how much energy IN FOOD CALORIES is needed to do this? (The C of Ag is 0.237 J/g·K) (2)

7. If you ice your sprained ankle after a fall, which best explains the thermochemistry of what happens next?
   A. Cold transfers to your ankle
   B. Heat transfers to your ankle
   C. Cold leaves the ice pack
   D. Heat transfers into the icepack

8. What is the amount of heat energy absorbed when 40.0 grams of water is heated from 10.0°C to 30.0°C?
   A. 1.67×10^3 J B. 5.02×10^3 J C. 3.34×10^3 J D. 2.67×10^5 J

9. During which segments is the potential energy diagram below are decreasing while the average kinetic energy remains constant?
   A. BC and AB
   B. EF and AB
   C. BC and DE
   D. EF and DE



10. On a full sheet of paper, draw a bomb calorimeter with labels.
    Write a paragraph that explains how it works and why a real calorimeter is better than the seltzer can calorimeter you made in lab. Write at least 3 full sentences. DON'T MENTION COST! (4 points)

Pages	Include	Points
cover	Title and descriptive introduction sentence, optional drawing	1 + 1 = 2
2	data table	1
3	calculations and problems	(6 x 2) + (3 x 1) = 15
4	Question 10 from above drawing and paragraph of calorimeter	4
5	Conclusion - tell what you did, and what you measured. Make sure you include YOUR DATA in your story. Tell why you had a big percent error, and explain where it came from (where the energy went instead of the can). Explain what "Calorimeters measure energy in food indirectly" means.	3
Lab due on: _____		Total points: 25