Report for Experiment 40

Energy Value of Nuts

Prelaboratory Questions

1. Paraffin wax has the chemical formula $C_{25}H_{52}$. Write the balanced equation for the combustion of paraffin with air.

2. How much energy is required to warm 100g of H_2O from 20°C to 80°C if it is in a 140g glass flask (the specific heat of water is 4.18J/g°C; the specific heat of glass is 0.836J/g°C)

$Q = mC\Delta tT$

Q = energy

m = mass (in grams)

C = specific heat

ΔT = change in temperature

3. Predict which of these three nuts – peanuts, cashews, almonds – will furnish the greatest amount of energy per gram. Explain briefly your hypothesis.

Observation and Data

	Sample 1	**Sample 2**	**Sample 3**
type of nut			
initial mass of nut			
mass of beaker			
volume of water			
initial temperature of water			
final temperature of water			
mass of nut remnant			

Analysis and Conclusions

Show all work

Show a sample calculation for each of the questions 1-5, and then record your results in the Summary Table after the questions.

1. Determine the change in mass of the nut before and after combustion.

2. Determine the change in temperature of the water (and, therefore, also of the beaker) before and after combustion.

3. Determine the heat absorbed by the water, using the equation $Q = mC\Delta T$. (the specific heat, C, for water is 4.18 J/g°C).

4. Determine the heat absorbed by the beaker or flask. (The specific heat for glass is 0.836 J/g^{o}C).

5. Determine the total heat absorbed by the water and the beaker. Note: This is also equal to the heat released by the nut.

6. Determine the total heat released per gram of nut (divide the total heat absorbed by the mass of the combusted nut)

Summary Table

	Sample 1	Sample 2	Sample 3
type of nut			
mass of combusted nut			
change in T			
heat absorbed by the water			
heat absorbed by the beaker			
total heat absorbed			
total heat released per gram of nut			