

In-Class Questions and Problems – 1

Show all work on this sheet.

Example 1. Convert 50°C to Kelvin temperature.

Example 2. Helium gas atoms have a mass of 6.8×10^{-27} kg. What is the average speed of a He atom in a gas 0°C ?

Example 3. Sand has a specific heat of $0.5 \text{ cal/gram}^{\circ}\text{C}$. How many calories does it take to raise the temperature of 100 g of sand from 60°C to 70°C ?

Example 4. How much would this amount of heat energy (example 3) raise the temperature of 100 grams of water?

Example 5. How much energy does is required to take 10 grams of ice at 0°C and produce 10 grams of steam at 100°C ?

- Heat flows from a hotter source to a cooler region by which methods? Mark all that apply.
 - convection
 - radiation
 - conduction
 - expiration
 - reduction
- Water has a higher specific heat capacity than sand. Which will cool down faster in the evening and warm up faster in the morning Sun?
 - How does this influence the direction of the winds on the beach in the day and night?

3. Water boils at a lower temperature in the mountains than at sea level. The primary reason is that:
 - a. The temperature in the mountains is cooler.
 - b. The air pressure is less in the mountains.
 - c. The air is cleaner with less pollution.
 - d. The water is purer in the mountains than from the faucet.
4. Compare the temperature of a glass of ice water (stirred completely) nearly full of ice to a glass of ice water (stirred completely) half full of ice.
 - a. The nearly full of ice glass is colder.
 - b. The half full of ice glass is colder.
 - c. They are at the same temperature.

Explain:

5. The temperature of helium gas is directly related to the kinetic energy of the gas. If a quantity of helium in a closed container at 100°C has the kinetic energy of the helium atoms doubled, what is the resulting temperature of the gas?
 - a. 200°C
 - b. 746 Kelvin
 - c. 400°C
 - d. 540 Kelvin
6. A 3 kg rock falls into a small container of water through a distance of 20 m and acquires 588 J of kinetic energy. Assuming all of this energy goes into heating 1 kg of water in the container, what is the change in temperature of the water?
7. Calculate the energy to convert 50g of ice at 0°C to water at 50°C .
8. A bag of Peanut M&M's® has 220 Calories. If this was used to heat the body of a 50 kg girl (assume all water), how many degrees Celsius would it raise her body temperature? (These are kilocalories.)