

## CH 105 Supplemental Instruction

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Sessions: Monday, 1:20-2:20, EB 132

Wednesday, 1:20-2:20, EB 132

Office Hour: Friday, 1:20-2:20, CTL 241C (Academic Success Center)

### Part 1:

1. Describe the type of energy exhibited by the following:

- A rock stationary at the top of a hill *Potential energy*
- A car on the highway *kinetic energy*
- Gasoline *Potential energy*
- Airplane noise *kinetic energy*
- Electricity *kinetic energy*

2. Convert the following to Kelvins:

•  $19^{\circ}\text{C} + 273\text{K} = 292\text{K}$

•  $100^{\circ}\text{F} \quad (100 - 32) \times \frac{5}{9} = \frac{68 \times 5}{9} = \frac{340}{9} = 37.8^{\circ}\text{C} + 273\text{K} = 310.8\text{K}$

$$\frac{9}{5}(^{\circ}\text{C}) + 32 = ^{\circ}\text{F} \quad ^{\circ}\text{C} + 273 = \text{K}$$

$$(^{\circ}\text{F} - 32) \times \frac{5}{9} = ^{\circ}\text{C}$$

3. The specific heat of Object A is  $3.91 \text{ J/g}^{\circ}\text{C}$  whereas the specific heat of Object B is  $2.2 \text{ J/g}^{\circ}\text{C}$ . Assuming both objects are at room temperature, which object will heat up faster when the heater is turned on?

*Object B*

4. List the three states of matter from lowest to highest in energy.

*Solid, liquid, gas*

5. Define a physical change and provide an example.

*A change that affects the form of a chemical substance but not its chemical composition.*

*Ice to  $\text{H}_2\text{O}$  (l)*

6. Define a chemical change and provide an example.

*A change that effects the chemical composition of a substance.*

*Burning food on the stove*

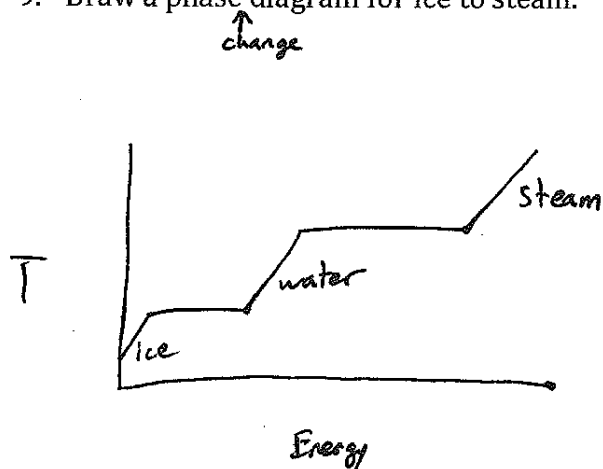
7. Determine if each of the following are physical or chemical changes:

- Wood burning *C*
- Ice melting *P*
- Creating a mixture of tea *P*
- A solution changes from blue to colorless *C*
- The rusting of a penny *C*

8. What type of phase change are the following?

- Water to steam      evaporation
- Ice to Water        melting
- Dry ice to CO<sub>2</sub> gas    sublimation
- Gas to Solid        deposition

9. Draw a phase diagram for ice to steam.



10. Calculate how much energy is required to convert 50 g of ice at -25 °C to steam at 110 °C. (heat of fusion for water is 80 cal/g; heat of vaporization for water is 540 cal/g; specific heat for ice is .5 cal/g °C; specific heat of water is 1 cal/g °C; specific heat of steam is .45 cal/g °C)

$$Q = (50_g)(.5 \text{ cal/g}^\circ\text{C})(25^\circ\text{C}) + (50_g)(80 \text{ cal/g}) + (50_g)(1 \text{ cal/g}^\circ\text{C})(100^\circ\text{C}) + (50_g)(540 \text{ cal/g}) + (50_g)(.45 \text{ cal/g}^\circ\text{C})(10^\circ\text{C})$$

$$= 625 + 4000 + 5000 + 27,000 + 225$$

$$= 36,850 \text{ cal} \rightarrow \frac{36850 \text{ Cal}}{4.184 \text{ Cal/J}} = \boxed{8807.36 \text{ J}}$$