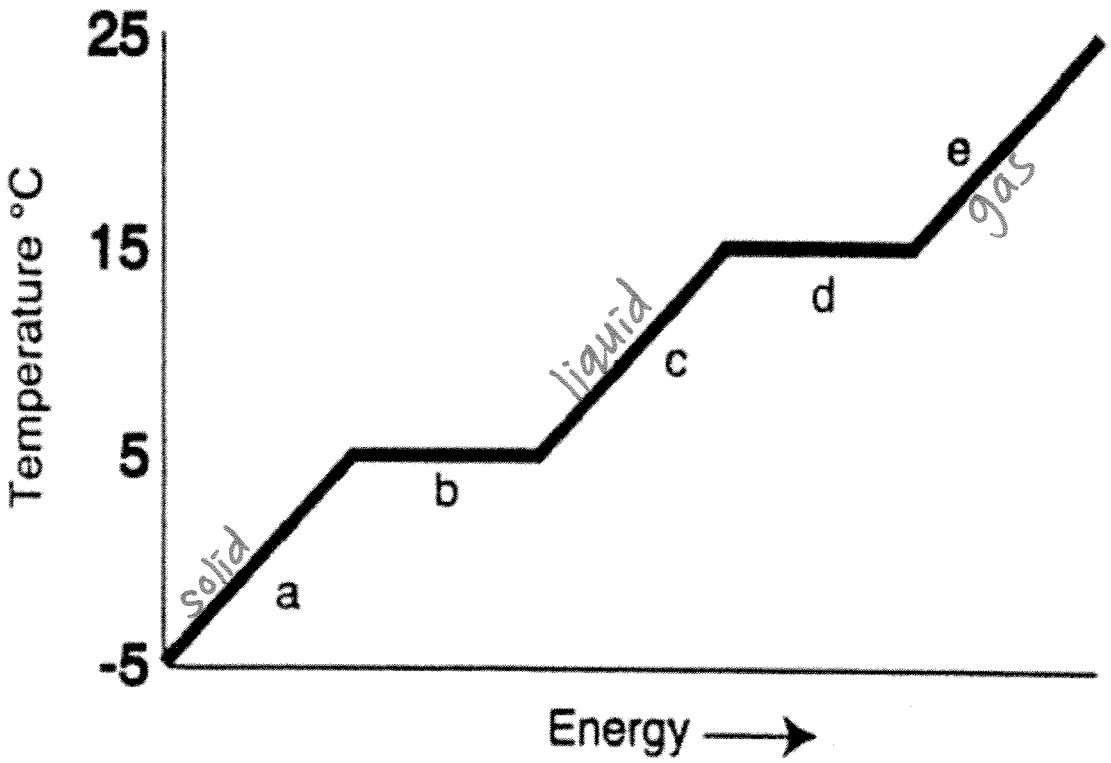
Warm-Up #44 Name:_____Date:_____



1. What letter represents condensation?
   D
2. What letter represents melting?
   B
3. What is the freezing point of the substance?
   5 °C
4. What is the boiling point of the substance?
   15 °C
5. What letter(s) shows a change in kinetic energy?
   A, C, & E (Temp = average kinetic Energy) ∴ ΔT = ΔK.E.
6. As heat is added to a substance undergoing a substance change, the temperature remains constant because the energy is being used to –
   a. break covalent bonds
   b. lower the specific heat capacity
   c. overcome intermolecular forces
   d. oppose electron cloud repulsions

Molar Heat of Fusion and Melting Point for Selected Substances

Substance	Melting Point (°C)	ΔH_{fus} (kJ/mol)
Argon	−190	1.18
Benzene	5.5	9.87
Mercury	−39	2.29
Water	0	6.01

ΔH_{fus} = energy (kJ) needed to melt one mole of a substance

7. Which substance requires the greatest amount of heat to melt a 1.00 mol sample?
   Benzene because it has the highest ΔH_{fus}
8. Which substance will release the greatest amount of heat when 1.00 mol is frozen?
   Benzene because it has the highest ΔH_{fus}
9. Place the substances in order of increasing strength of intermolecular forces in the solid state.
   weak → strong
   Lowest melt pt → highest melt pt.
   Argon, Mercury, Water, Benzene
10. Is freezing (solidification) an endothermic or exothermic process?
    Exothermic because solid particles have less E than liquid particles, thus E is lost
11. Using the table, calculate the amount of heat released when 3.00 mol of water is frozen.
    ? kJ

given : 3 mol H_2O
want : kJ
ΔH_{fus} of H_2O = 6.01 kJ/mol

$$\frac{3 \text{ mol } H_2O \mid 6.01 \text{ kJ}}{\mid 1 \text{ mol}} = 18.03 \text{ kJ} = \boxed{18.0 \text{ kJ}}$$

12. Using the table, calculate the mass of mercury that can be melted when 14.61 kJ of heat is applied.
    ? g Hg

given : 14.61 kJ
want : g Hg
ΔH_{fus} of Hg = 2.29 kJ/mol

$$\frac{14.61 \text{ kJ} \mid 1 \text{ mol Hg}}{\mid 2.29 \text{ kJ}} = \frac{6.3799 \text{ mol Hg} \mid 200.59 \text{ g Hg}}{\mid 1 \text{ mol Hg}} = 1279.7 = \boxed{1280. \text{ g Hg}}$$