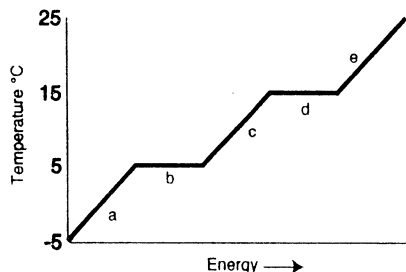# ANSWER KEY

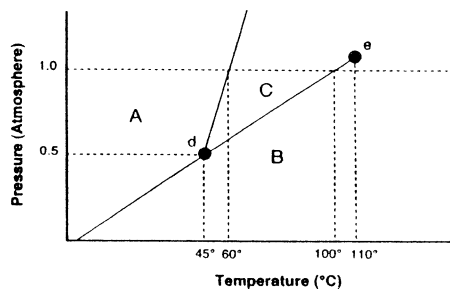## FREEZING AND BOILING POINT GRAPH

Name _____

Answer the following questions using the chart above.

1. What is the freezing point of the substance? **5°C**
2. What is the boiling point of the substance? **15°C**
3. What is the melting point of the substance? **5°C**
4. What letter represents the range where the solid is being warmed? **A**
5. What letter represents the range where the liquid is being warmed? **C**
6. What letter represents the range where the vapor is being warmed? **E**
7. What letter represents the melting of the solid? **B**
8. What letter represents the vaporization of the liquid? **D**
9. What letter(s) shows a change in potential energy? **B,D**
10. What letter(s) shows a change in kinetic energy? **A,C,E**
11. What letter represents condensation? **D**
12. What letter represents crystallization? **B**

Page 13

PHASE DIAGRAM

Name _____

Answer the following questions using the chart above.

1. What section represents the solid phase? **A**
2. What section represents the liquid phase? **C**
3. What section represents the gas phase? **B**
4. What letter represents the triple point? **D**
5. What letter represents the critical point? **E**
6. What is this substance's normal melting point? **60°C**
7. What is this substance's normal boiling point? **100°C**
8. Above what temperature is it impossible to liquify this substance no matter what the pressure? **110°C**
9. At what temperature and pressure do all three phases coexist? **0.5atm, 45°C**
10. Is the density of the solid greater than or less than the density of the liquid? **greater than**
11. Would an increase in pressure cause this substance to freeze or melt? **freeze**

Page 14

HEAT AND ITS MEASUREMENT

Name _____

Heat (or energy) can be measured in units of calories or joules. When there is a temperature change (ΔT), heat (Q) can be calculated using this formula:

> **Q = mass x ΔT x specific heat capacity**
> (ΔT = Final Temp - Initial Temp)

During a phase change, we use this formula:

> **Q = mass x heat fusion (or heat of vaporization)**
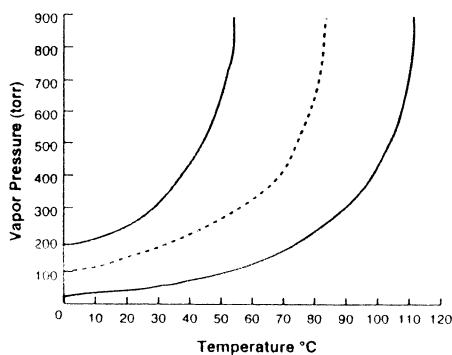
Solve the following problems

1. How many joules of heat are given off when 50 g of water cool from 75°C to 25°C? (Specific heat of water = 4.18 J/g°C) **1000**

2. How many calories are given off by the water in Problem 1? (Specific heat of water = 1.0 cal/g°C) **250**

3. How many joules does it take to melt 35 g of ice at 0°C? (heat of fusion = 33 J/g) **12,000**

4. How many calories are given off when 85 g of steam condense to liquid water? (heat of vaporization = 539.4 cal/g) **46,000**

5. How many joules of heat are necessary to raise the temperature of 25 g of water from 10°C to 60°C? **5,000**

6. How many calories are given off when 50 g of water at 0°C freezes? (heat of fusion = 79.72 cal/g) **4000**

Page 15

VAPOR PRESSURE AND BOILING

Name _____

A liquid will boil when its vapor pressure equals atmospheric pressure. Answer the questions following the graph.

1. At what temperature would Liquid A boil at an atmospheric pressure of 400 torr? **22°C**
2. Liquid B? **52°C**
3. Liquid C? **85°C**
4. How low must the atmospheric pressure be for Liquid A to boil at 35°C? **550 torr**
5. Liquid B? **285 torr**
6. Liquid C? **110 torr**
7. What is the normal boiling point of Liquid A? **43°C**
8. Liquid B? **68°C**
9. Liquid C? **100°C**
10. Which liquid has the strongest intermolecular forces? **C**

Page 16