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### 2.11 Classwork/HW

Practice \#4: A 5.00-gram sample of liquid ammonium is originally at 210. K. The diagram of the partial heating curve below represents the vaporization of the sample of ammonia at standard pressure due to the addition of heat.


Calculate the total heat absorbed by the 5.00 gram sample during time interval BC

1. The heat energy required to change a unit mass of a solid into a liquid at constant temperature is called
1) heat of vaporization
2) heat of formation
3) heat of solution
4) heat of fusion
2. What is the total number of kilo Joules of heat needed to change 150 . grams of ice to water at $0^{\circ} \mathrm{C}$ ?
1) 50.1
2) 2.22
3) 184
4) 484
3. The heat of vaporization of a liquid is 1,340 Joules per gram. What is the minimum number of Joules needed to change 40.0 grams of the liquid to vapor at the boiling point?
1) 33.5
2) 1,340
3) 3,280
4) 53,600
4. What is the total number of kiloJoules required to boil 100 . grams of water at 1000 C and 1 atmosphere?
1) 22.6 kJ
2) 33.4 kJ
3) 226 kJ
4) 334 kJ
5. What is the minimum number of kilojoules needed to change 40.0 grams of water at 1000 C to steam at the same temperature and pressure?
A) 1,810
B) 904
C) 2.26
D) .400
6. Base your answers to question 6 on the information below.

At a pressure of 101.3 kilopascals and a temperature of 373 K, heat is removed from a sample of water vapor, causing the sample to change from time gaseous phase to time liquid phase. This phase change is represented by the equation below.

$$
\mathrm{H} 2 \mathrm{O}(\mathrm{~g}) \rightarrow \mathrm{H} 2 \mathrm{O}(\mathrm{l})+\text { heat }
$$

Determine the total amount of heat released by 5.00 grams of water vapor during this phase change.
7. Base your answer to the following question on the information below.

Heat is added to a 200.-gram sample of $\mathrm{H} 2 \mathrm{O}(\mathrm{s})$ to melt the sample at $0^{\circ} \mathrm{C}$. Then the resulting $\mathrm{H} 2 \mathrm{O}(\mathrm{l})$ is heated to a final temperature of $65^{\circ} \mathrm{C}$.

Compare the amount of heat required to vaporize a 200.-gram sample of $\mathrm{H} 2 \mathrm{O}(\ell)$ at its boiling point to the amount of heat required to melt a 200.-gram sample of $\mathrm{H} 2 \mathrm{O}(\mathrm{s})$ at its melting point.
8. Base your answer to this question on the information below.

The boiling point of a liquid is the temperature at which the vapor pressure of the liquid is equal to the pressure on the surface of the liquid. The heat of vaporization of ethanol is 838 joules per gram. A sample of ethanol has a mass of 65.0 grams and is boiling at 1.00 atmosphere.

Calculate the minimum amount of heat required to completely vaporize this sample of ethanol.

1. $5.45 \times 10^{4} \mathrm{~J}$
2. $5.45 \times 10^{-4} \mathrm{~J}$
3. $1.29 \times 10^{-1} \mathrm{~J}$
4. $1.29 \times 10^{1} \mathrm{~J}$
