

Exercise 10.9

Phase Changes

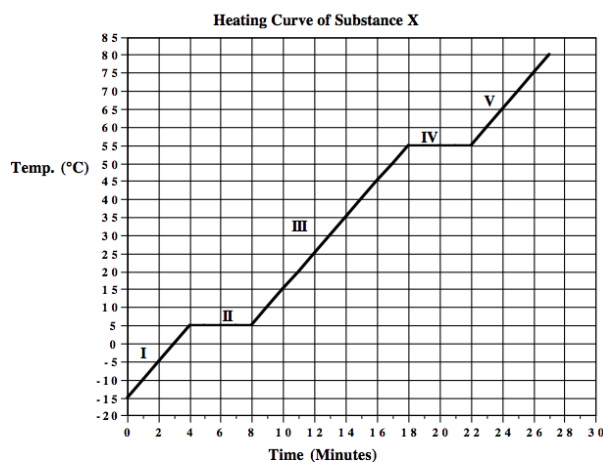
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- Use the diagram below to answer the following questions.
 - In what part of the curve would substance X have a definite shape and definite volume? _____
 - In what part of the curve would substance X have a definite volume but no definite shape? _____
 - In what part of the curve would substance X have no definite shape or volume? _____
 - What part of the curve represents a mixed solid/liquid phase of substance X? _____
 - What part of the curve represents a mixed liquid/vapor phase of substance X? _____
 - What is the melting point temperature of substance X?

 - What is the boiling point temperature of substance X?

 - Use the data below to calculate the amount of energy required to completely melt a 25.0 g block of substance X if the block is at an initial temperature of -10.0°C ? Show all work.



The heating curve shown above is a plot of temperature vs time. It represents the heating of substance X at a constant rate of heat transfer. Answer the following questions using this heating curve:

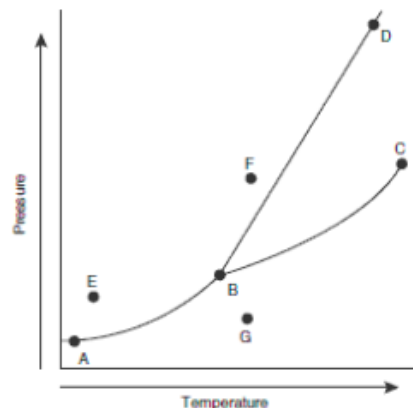
$C_{\text{solid}} = 0.500 \text{ J/g}^{\circ}\text{C}$, $C_{\text{liquid}} = 1.25 \text{ J/g}^{\circ}\text{C}$, $C_{\text{vapor}} = 0.350 \text{ J/g}^{\circ}\text{C}$, heat of fusion = 475 J/g , heat of vaporization = 980 J/g .



- Use the phase diagram below to answer the following questions.
 - What is point C called? List the characteristics of this point. _____

 - What happens to a substance at point E if the temperature is increased at constant pressure? _____
 - Assume point F is at 0°C and 1 atm. Describe the changes that would occur when moving directly from point F to point G (still at 0°C). _____

 - Solid bismuth is less dense than liquid bismuth. How would the phase diagram for bismuth be different than the one above? Explain. _____



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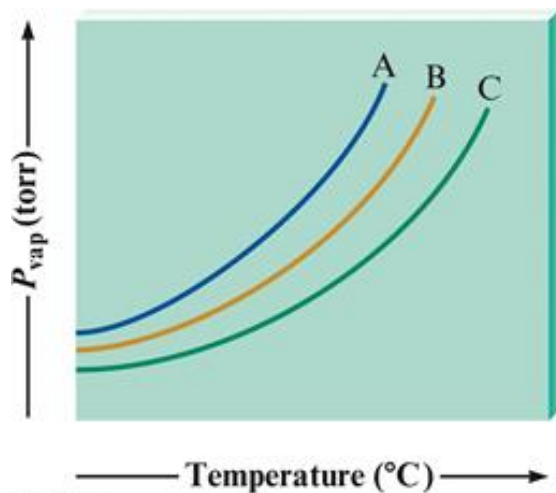
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3. Fill in the blanks using the following terms: colligative properties, depression, elevation, lowering, proportional, solute.

The effects in solution of a nonvolatile (1) _____ on the properties of a solvent are called (2) _____. They include freezing point (3) _____, boiling point (4) _____, and (5) _____ vapor pressure. In each case, the magnitude of the effect is (6) _____ to the number of solute molecules or ions present in the solution.

4. Consider the following vapor pressure versus temperature plot for three different substances: A, B, and C. **If** the three substances are CH_4 , SiH_4 , and NH_3 , match each curve to the correct substance.



A: _____

B: _____

C: _____