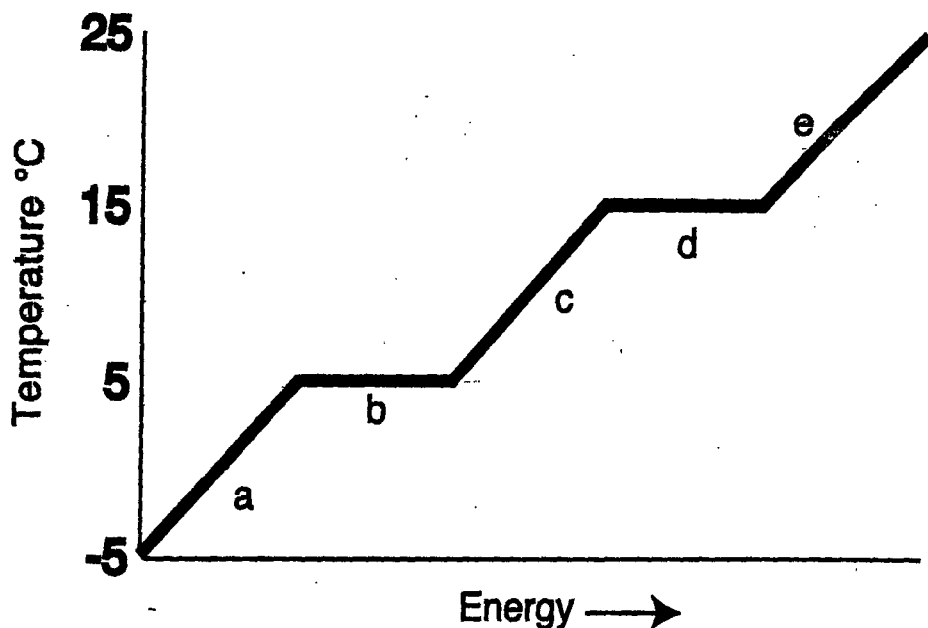


FREEZING AND BOILING POINT GRAPH

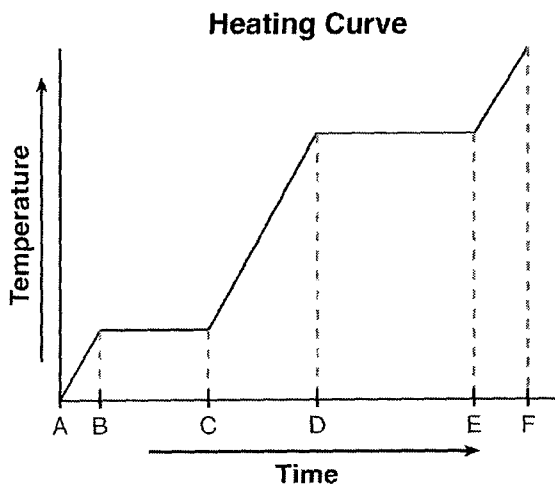
Name _____



Answer the following questions using the chart above.

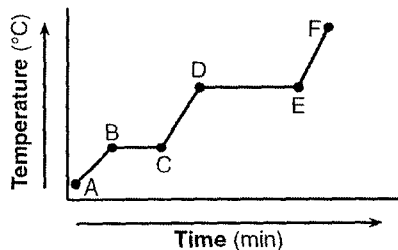
1. What is the freezing point of the substance? _____
2. What is the boiling point of the substance? _____
3. What is the melting point of the substance? _____
4. What letter represents the range where the solid is being warmed? _____
5. What letter represents the range where the liquid is being warmed?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

1. Given the diagram representing a heating curve for a substance:



During which time interval is the average kinetic energy of the particles of the substance constant while the potential energy of the particles increases?

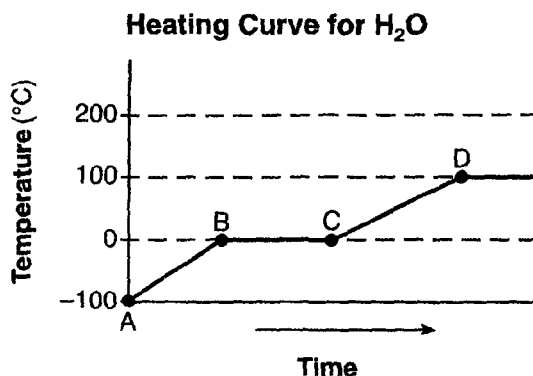
- A) AC B) BC C) CD D) DF
2. The graph below represents the uniform heating of a sample of a substance starting as a solid below its melting point.



Which statement describes what happens to the energy of the particles of the sample during time interval DE?

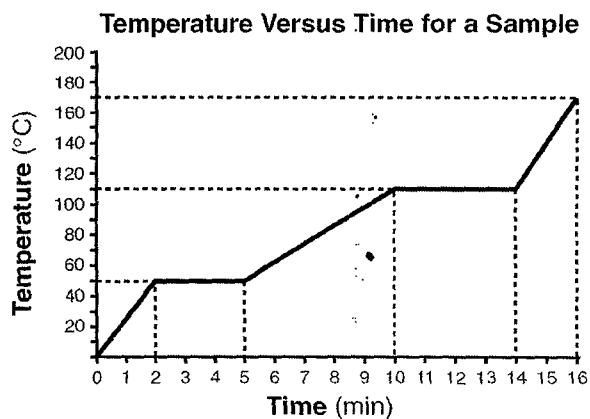
- A) Average kinetic energy increases, and potential energy remains the same.
 B) Average kinetic energy decreases, and potential energy remains the same.
 C) Average kinetic energy remains the same, and potential energy increases.
 D) Average kinetic energy remains the same, and potential energy decreases

3. Base your answer to the following question on The graph below represents the relationship between temperature and time as heat is added to a sample of H₂O



Which statement correctly describes the energy of the particles of the sample during interval BC?

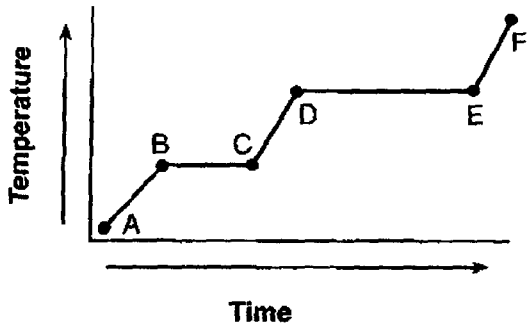
- A) Potential energy decreases and average kinetic energy increases.
 B) Potential energy increases and average kinetic energy increases.
 C) Potential energy increases and average kinetic energy remains the same.
 D) Potential energy remains the same and average kinetic energy increases.
4. Starting as a solid, a sample of a substance is heated at a constant rate. The graph below shows the changes in temperature of this sample.



What is the melting point of the sample and the total time required to completely melt the sample after it has reached its melting point?

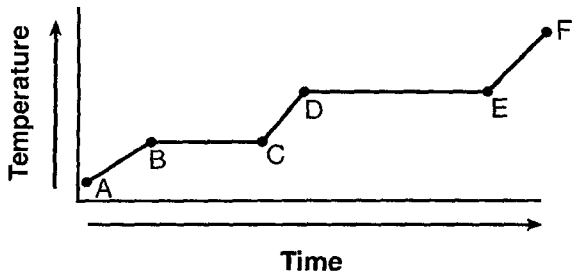
- A) 50°C and 3 min B) 50°C and 5 min
 C) 110°C and 4 min D) 110°C and 14 min

5. Base your answer to the following question on The graph below represents the uniform heating of a substance, starting below its melting point, when the substance is solid.



Which line segments represent an increase in average kinetic energy?

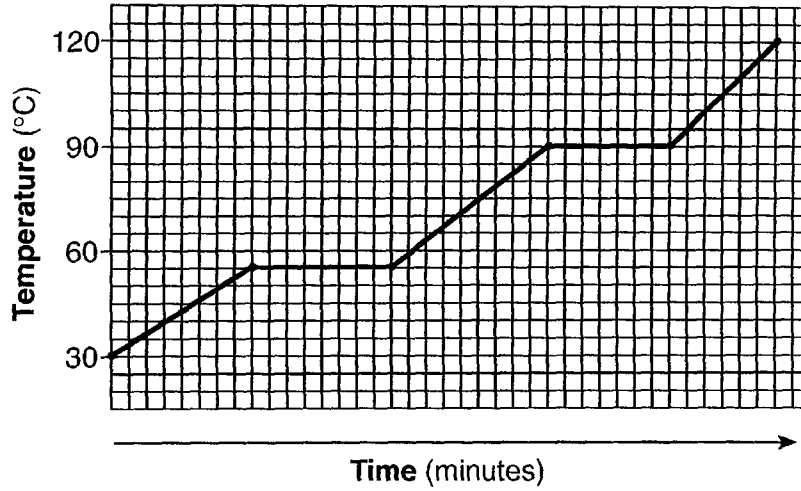
- A) \overline{AB} and \overline{BC} B) \overline{AB} and \overline{CD}
 C) \overline{BC} and \overline{DE} D) \overline{DE} and \overline{EF}
6. Base your answer to the following question on The graph below represents the uniform heating of a substance, starting with the substance as a solid below its melting point.



Which line segment represents an increase in potential energy and no change in average kinetic energy?

- A) \overline{AB} B) \overline{BC} C) \overline{CD} D) \overline{EF}

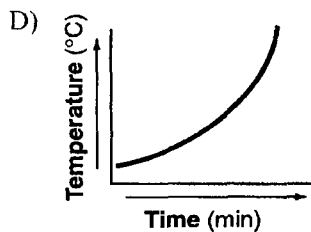
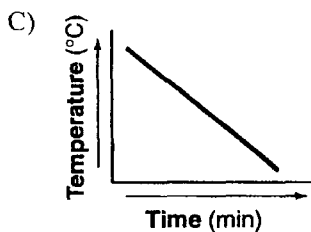
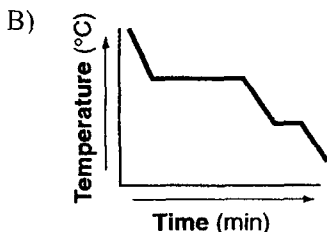
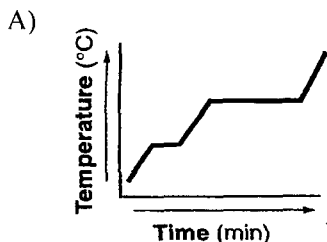
7. The graph below represents the heating curve of a substance that starts as a solid below its freezing point.



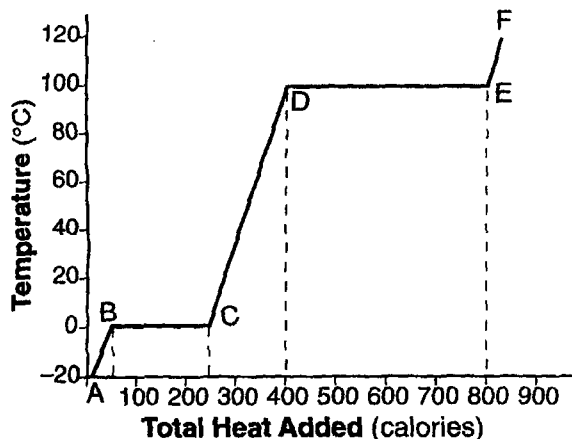
What is the melting point of this substance?

- A) 30°C B) 55°C C) 90°C D) 120°C

8. Which graph could represent the uniform cooling of a substance, starting with the gaseous phase and ending with the solid phase?



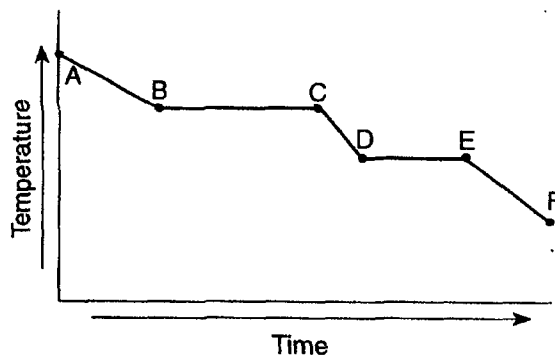
9. The graph below shows the heating curve of 1.0 gram of a solid as it is heated at a constant rate, starting at a temperature below its melting point.



Based on this graph, what is the heat of vaporization?

- A) 200 calories, as measured along line *BC*
- B) 250 calories, as measured along line *BC*
- C) 400 calories, as measured along line *DE*
- D) 800 calories, as measured along line *DE*

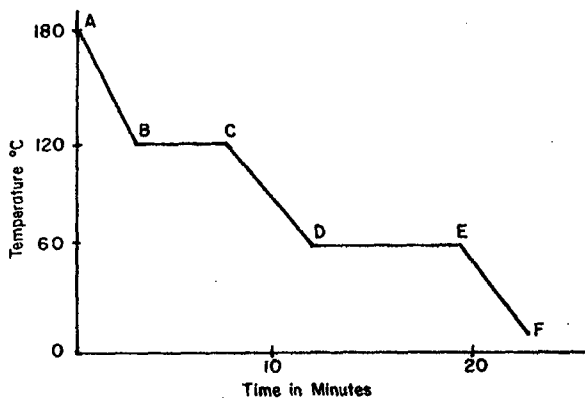
10. The graph below represents the uniform cooling of a substance, starting with the substance as a gas above its boiling point.



During which interval is the substance completely in the liquid phase?

- A) *AB*
- B) *BC*
- C) *CD*
- D) *DE*

Base your answers to questions 11 and 12 on the graph below, which represents uniform cooling of a sample of a pure substance, starting as a gas.



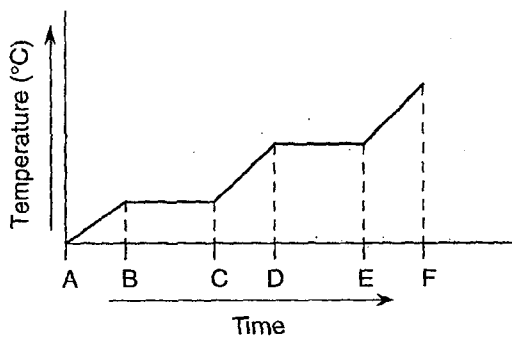
11. Solid and liquid phases can exist in equilibrium between points

- A) *E* and *F* B) *B* and *C*
 C) *C* and *D* D) *D* and *E*

12. The boiling point of the substance is

- A) 10°C B) 60°C
 C) 120°C D) 180°C

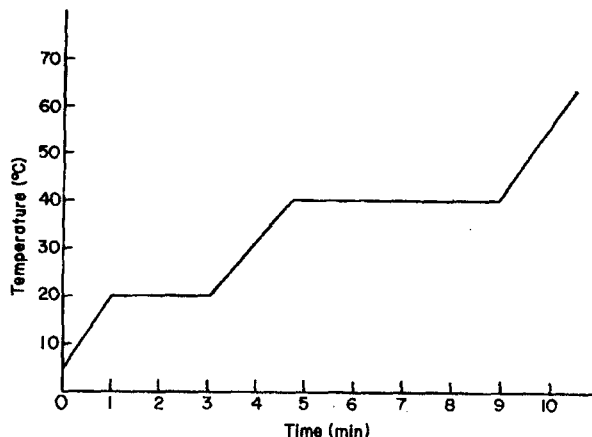
13. Base your answer to the following question on The diagram below represents the uniform heating of a substance that is a solid at Time *A*.



Between which times could the heat of fusion be determined?

- A) *A* and *B* B) *B* and *C*
 C) *C* and *D* D) *E* and *F*

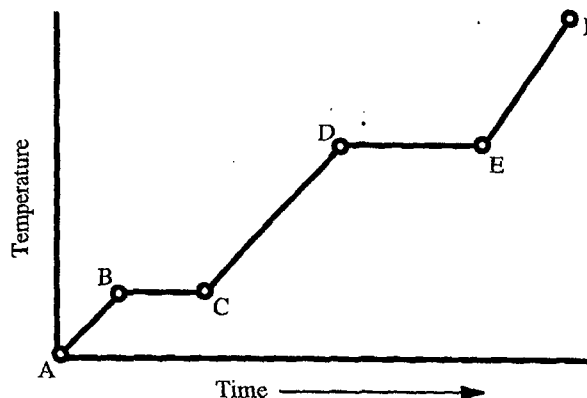
14. Base your answer to the following question on The graph below represents changes of state for an unknown substance.



What is the boiling temperature of the substance?

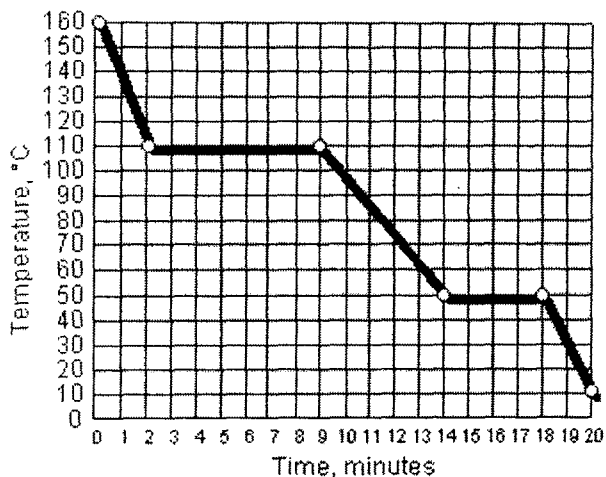
- A) 0°C B) 20°C C) 70°C D) 40°C

15. In this temperature–time graph for the heating of H₂O at a constant rate, the segment DE represents the



- A) gas being warmed
 B) liquid being warmed
 C) liquid changing to gas
 D) solid changing to liquid
 E) gas being warmed

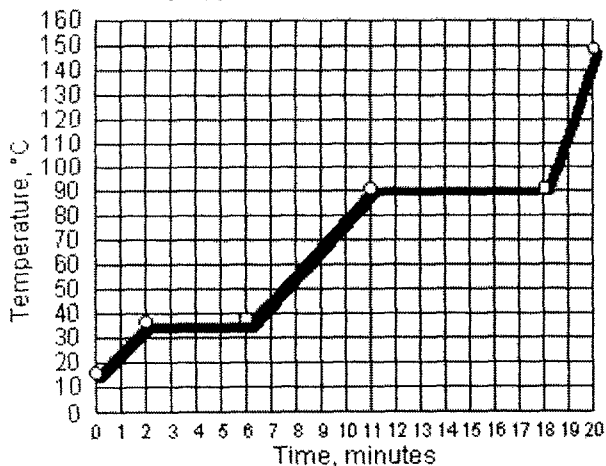
16. The graph represents the uniform cooling of a pure substance, starting with the substance as a gas above its boiling point.



How many minutes pass between the *first* appearance of the liquid phase of the substance and when the substance is *completely* in the solid phase?

- A) 2 B) 4 C) 9 D) 16 E) 22

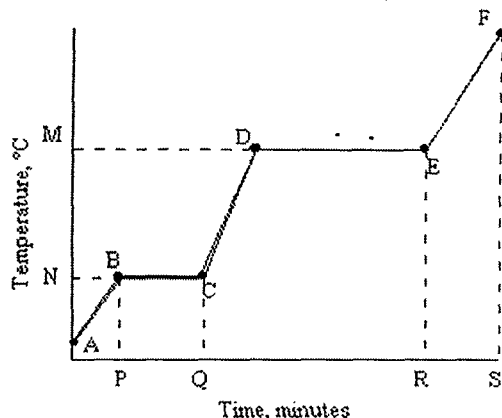
17. Heat is steadily applied to a sample of a pure substance.



What is the melting point of this material?

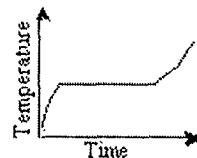
- A) 15°C B) 35°C C) 62°C D) 90°C E) 148°C

18. A pure substance is steadily heated, and the change in temperature with time is graphed. What is the melting temperature of this substance?

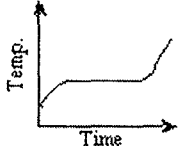
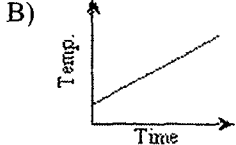
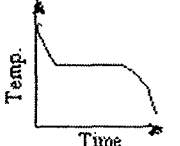
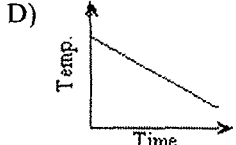


- A) M B) N C) P D) Q E) R

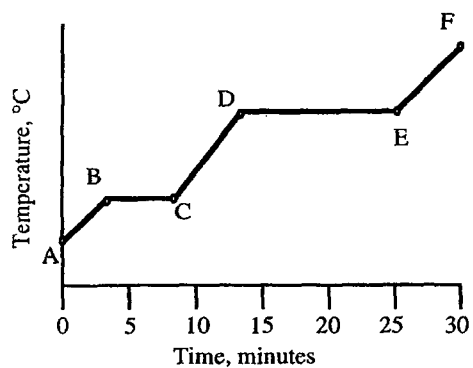
19. The diagram illustrates the melting curve of tin.



Which graph best represents the solidification of tin?

- A)  B) 
- C)  D) 

20. The temperature-time graph is for the heating of water at a constant rate. What is happening during the segment BC?



- A) The solid ice is being melted
- B) The solid ice is being warmed
- C) The liquid water is being warmed
- D) The liquid water is being vaporized
- E) Water vapor is being heated