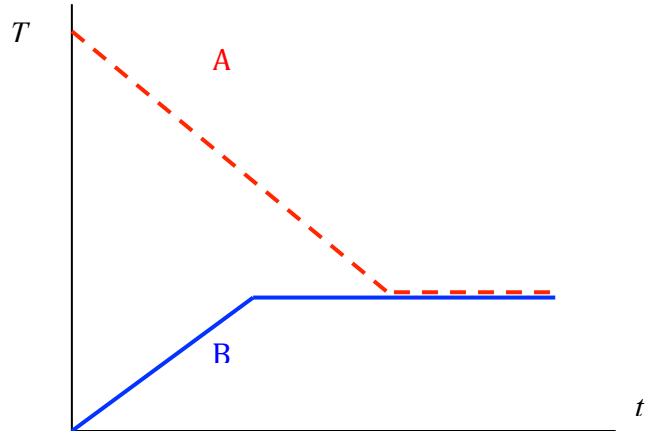


Water and ice in contact

A sample of liquid water A and a sample of ice B of identical masses, are placed in a thermally isolated container and allowed to come to thermal equilibrium. The diagram below is a sketch of the temperature T of the samples verses time t .

Answer each of the following questions and justify your answer in each case.

- (a) Is the equilibrium temperature above, below or at the freezing point of water?
- (b) Does the ice partly melt, or does it undergo no melting?



Solution

- (a) At a phase change, the temperature is constant as heat is added. From the above diagram, the ice initially warms, then stays at constant temperature when there is a change in phase. So the final temperature is at the freezing point of water.
- (b) The ice reaches the freezing point first and then the temperature remains constant. As the water cools, the ice melts. The temperature never rises above the freezing point, therefore, only part of the ice melts.