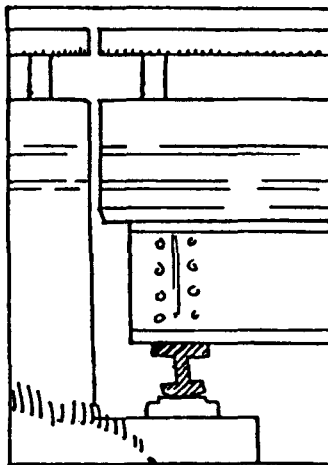


**Concept-Development
Practice Page**

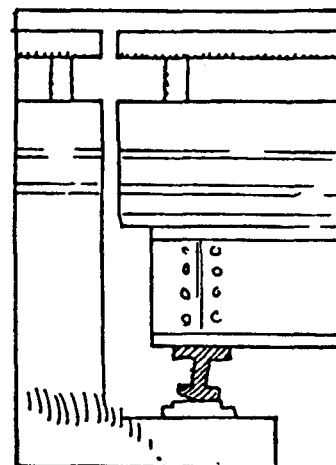
21-2

Thermal Expansion

1. Long steel bridges often have one end fixed while the other end rests on rockers, as shown. Each sketch shows the bridge at a different season of the year. Mark the sketches winter (W) or summer (S). Briefly defend your answer.

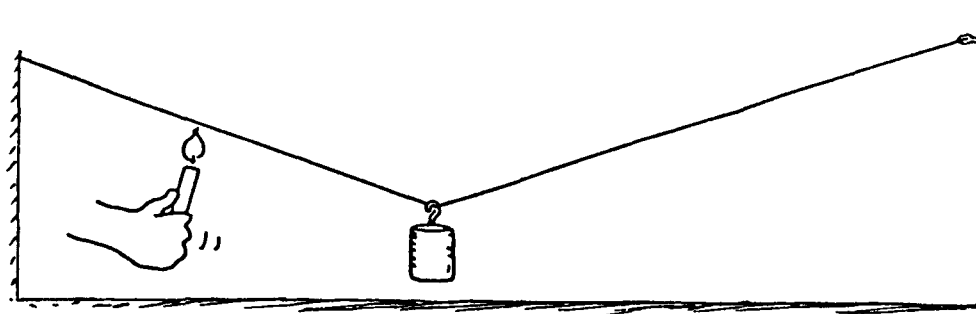


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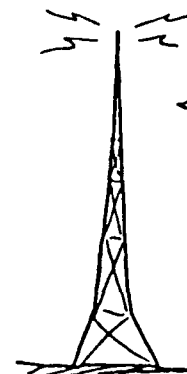
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2. The weight hangs above the floor from the copper wire. When a candle is moved along the wire and heats it, what happens to the height of the weight above the floor? Why?

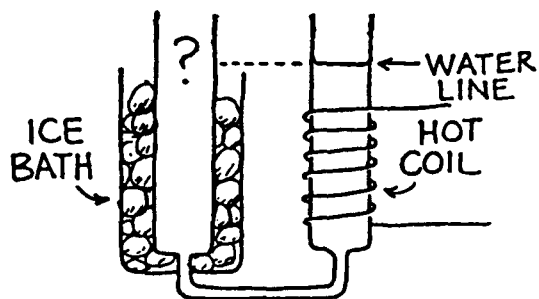


3. A steel television broadcasting tower is taller in the daytime than it is in the cooler nighttime. This is because steel expands (or contracts) about 1 part in 100 000 for each degree Celsius change. By this we mean that a piece of steel 100 000 units long will be 100 001 units long when its temperature increases by 1°C. What is the change in height for a 500-m steel tower when its temperature changes 20°C from day to night?

_____ cm

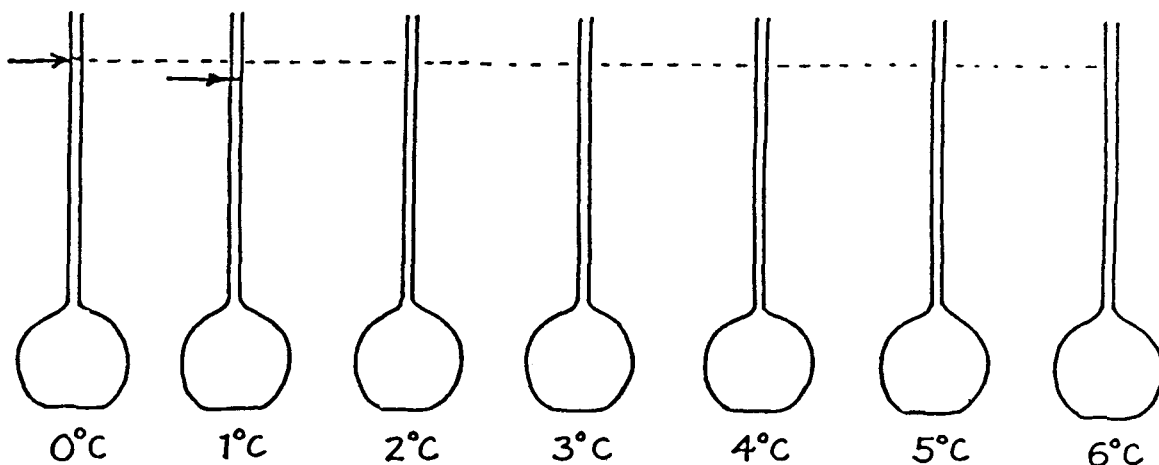


4. A common saying is “water seeks its own level,” and usually it does. Here we see a container of water that is cooled on the left and warmed on the right. Consider the effect of temperature on density. Compared to the water level in the right tube, the water level in the left tube is



(slightly higher) (slightly lower) (the same)

5. The levels of water at 0°C and 1°C are shown below in the first two flasks. At these temperatures there is microscopic slush in the water. There is slightly more slush at 0°C than at 1°C . As the water is heated, some of the slush collapses as it melts, and the level of the water falls in the tube. That's why the level of water is slightly lower in the 1°C -tube. Make rough estimates and sketch in the appropriate levels of water at the other temperatures shown. What is important about the level when the water reaches 4°C ?



6. The diagram at right shows an ice-covered pond. Mark the probable temperatures of water at the top and bottom of the pond.

