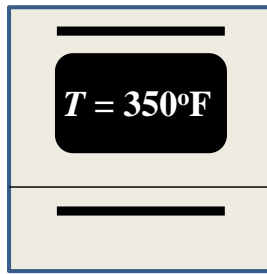


1.53 A cake recipe specifies an oven temperature of 350°F. Express this temperature in °R, K, and °C.

KNOWN: Oven temperature is specified in °F.

FIND: Equivalent temperature in °R, K, and °C.

SCHEMATIC AND GIVEN DATA:



ANALYSIS:

First convert temperature from °F to °R using Eq. 1.18 to solve for temperature in °R

$$T(^{\circ}\text{F}) = T(^{\circ}\text{R}) - 459.67 \rightarrow T(^{\circ}\text{R}) = T(^{\circ}\text{F}) + 459.67$$

$$T_{\text{oven}} (^{\circ}\text{R}) = 350^{\circ}\text{F} + 459.67 = \mathbf{809.67^{\circ}\text{R}}$$

Next apply Eq. 1.16 to solve for temperature in K

$$T(^{\circ}\text{R}) = 1.8T(\text{K}) \rightarrow T(\text{K}) = T(^{\circ}\text{R})/1.8$$

$$T_{\text{oven}} (\text{K}) = 809.67^{\circ}\text{R}/1.8 = \mathbf{449.82 \text{ K}}$$

Finally, apply Eq. 1.17 to solve for temperature in °C

$$T(^{\circ}\text{C}) = T(\text{K}) - 273.15$$

$$T_{\text{oven}} (^{\circ}\text{C}) = 449.82 \text{ K} - 273.15 = \mathbf{176.67^{\circ}\text{C}}$$