

Answer on Question #58122-Physics-Molecular Physics / Thermodynamics

3 A scientist uses a scale Y for measuring temperature. In this scale, pure water melts at 10oY and boils at 130oY at standard atmospheric pressure. The scientist measures the temperature at which sodium melts to be 127oY. Express this temperature in degrees Celsius

97.5oC

102.6oC

38.6oC

196.6oC

Solution

$$130^{\circ}Y \leftrightarrow 100^{\circ}C$$

$$10^{\circ}Y \leftrightarrow 0^{\circ}C$$

Therefore

$$1 \text{ unit of } ^{\circ}Y = \frac{100 - 0}{130 - 10} = \frac{100}{120} = \frac{5}{6}^{\circ}C$$

$$127^{\circ}Y = 130^{\circ}Y - 3^{\circ}Y = 100^{\circ}C - 3 \cdot \frac{5}{6}^{\circ}C = (100 - 2.5)^{\circ}C = 97.5^{\circ}C$$

Answer: 97.50c.

4 When the junctions of two dissimilar metals are maintained at different temperatures an electromotive force is set up in the circuit of which these junctions are part. A pair of junctions of this kind and the effect are known respectively as

thermistor and Peltier effect

resistance thermometer and Joule effect

pyrometer and Joule effect

thermocouple and Seebeck effect

Answer: thermocouple and Seebeck effect.

A thermocouple is a temperature-measuring device consisting of two dissimilar conductors that contact each other at one or more spots. It produces a voltage when the temperature of one of the spots differs from the reference temperature at other parts of the circuit.

The Seebeck effect is a phenomenon in which a temperature difference between two dissimilar electrical conductors or semiconductors produces a voltage difference between the two substances.

So, a pair of junctions is called thermocouple. It corresponds to the Seebeck effect.