

7 A platinum resistance thermometer has resistance of 52.5 ohms and 9.75 ohms at 0 degrees Celsius and 100 degrees Celsius respectively. When the resistance is 8.25 ohms, find the temperature.

### Solution

As is well known, resistance is growing when the temperature is growing.

So, we have from condition of the problem, that platinum resistance thermometer has resistance of  $R_1=52.5$  ohms at  $t_1=100$  degrees Celsius and  $R_0=9.75$  ohms at  $t_0=0$  degrees Celsius.

If the resistance depends on temperature due to linear law  $R = R_0 + at \Rightarrow$ ,

$$R_0 = 9.750hms$$

$$a = \frac{R_1 - R_0}{t_1 - t_0} = \frac{52,50hms - 9,750hms}{100deg} = 0,4275 \frac{Ohms}{deg}$$

From whence we have that the temperature for the resistance  $R_2= 8.25$  ohms is

$$t_2 = t_0 + \frac{R_2 - R_0}{a} = 0 - \frac{1.50hms}{0,4275 \frac{Ohms}{deg}} \approx -3,51deg$$

### Answer

$$t_2 \approx -3,51deg$$