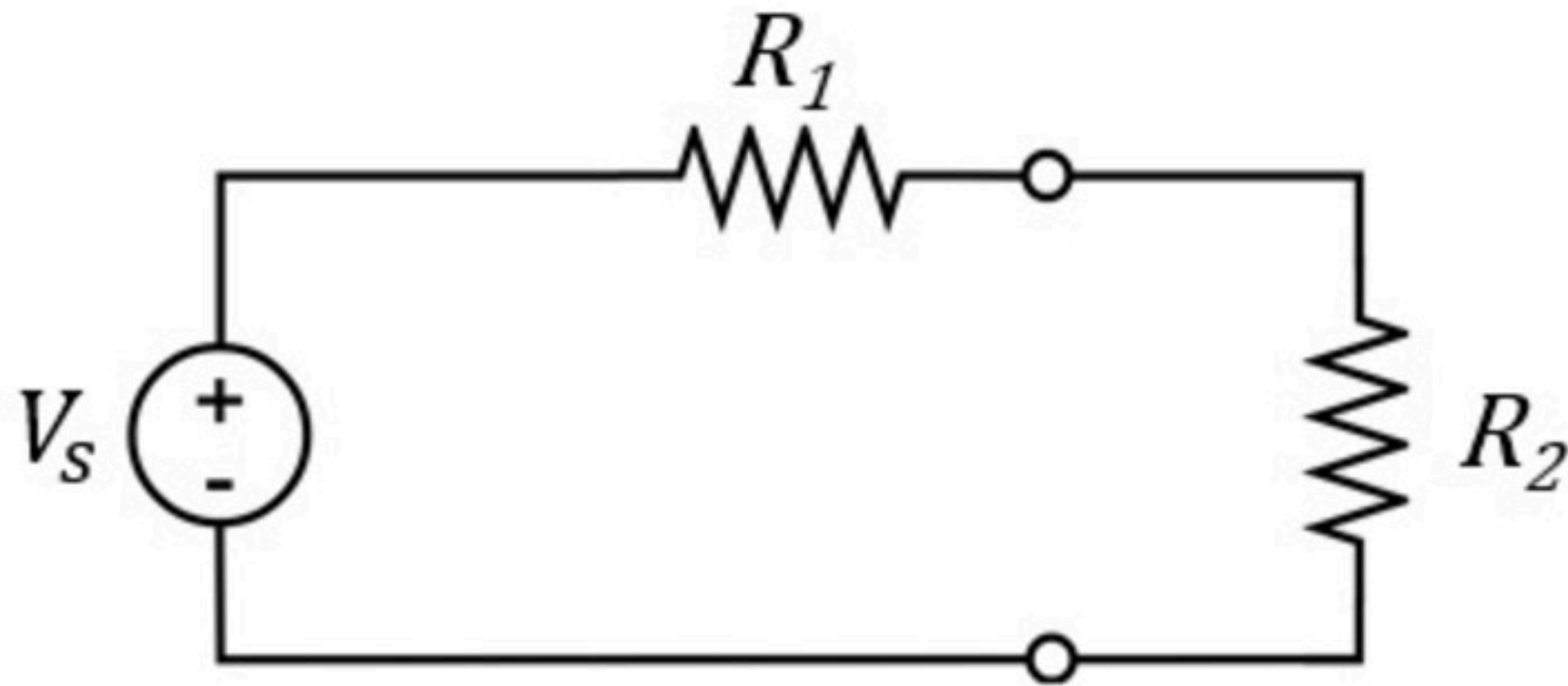


Circuit theorems 008

Problem has been graded.

Determine the resistance R_1 such that the power dissipated in R_2 is maximum.



Given Variables:

V_s : 12 V

R_2 : 7 ohm

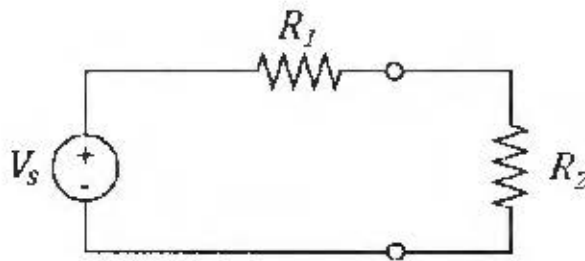
Calculate the following:

R_1 (ohm) :

Determine the resistance R_1 such that the power dissipated in R_2 is maximum.

$$V_s = 12 \text{ V}$$

$$R_2 = 3 \text{ ohm}$$



$$I = \frac{V_s}{R_1 + R_2}$$

$$\begin{aligned} P &= R_2 I^2 \\ &= \frac{R_2 V_s^2}{(R_1 + R_2)^2} \end{aligned}$$

$$P = \frac{3 \cdot 144}{(R_1 + 3)^2}$$

$$\frac{dP}{dR_1} = -2 \cdot \frac{3 \cdot 144}{(R_1 + 3)^3} = 0 \Leftrightarrow R_1 = \infty$$

\hookrightarrow ALWAYS DECREASING

P_{MAX}

WHEN

$$R_1 = 0 \Omega$$