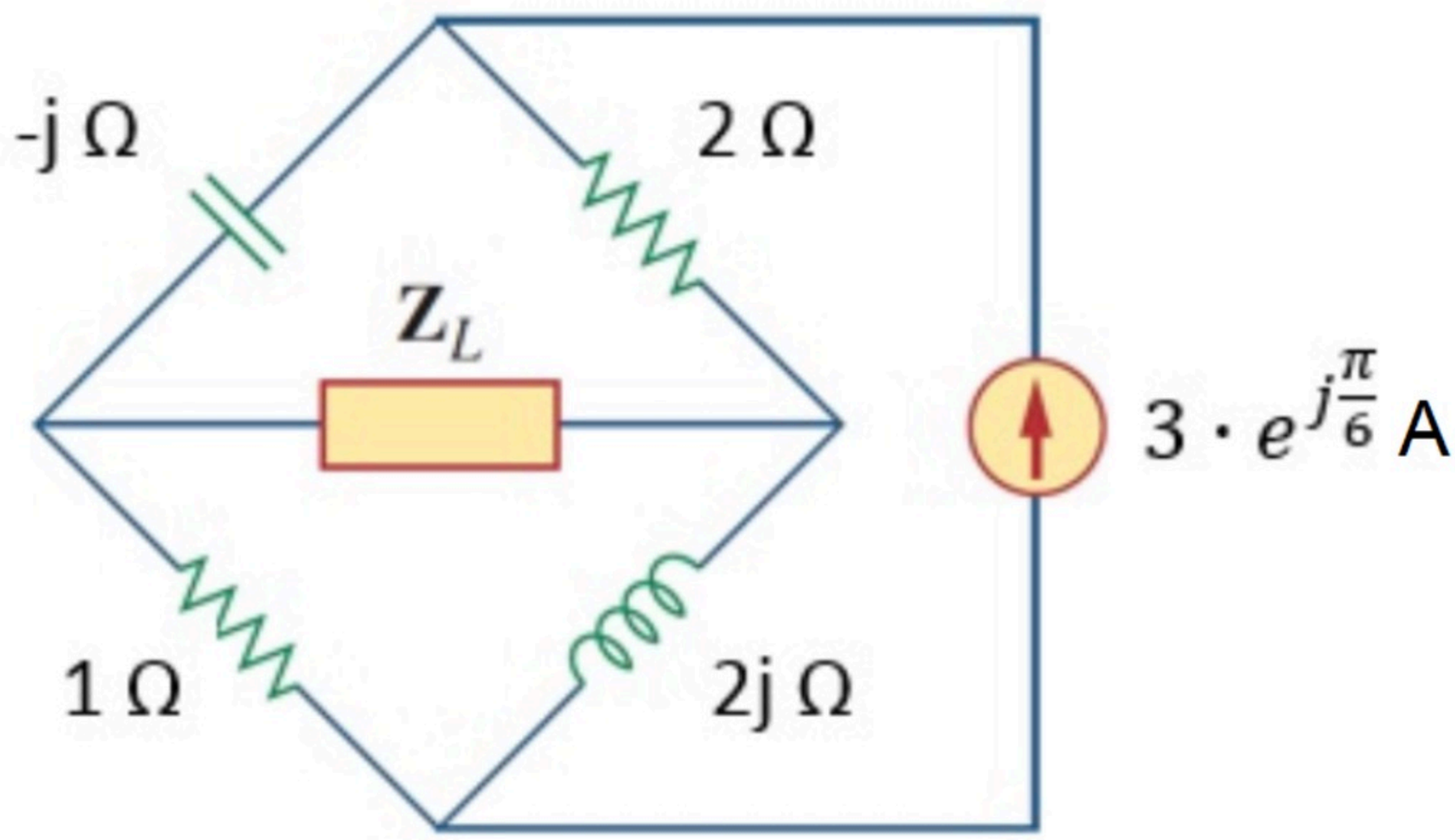
PP AC power 009

Unlimited Attempts.

Find the value of $\mathbf{Z_L} = a + jb$ that will receive the maximum amount of power



Given Variables:

. : . .

Calculate the following:

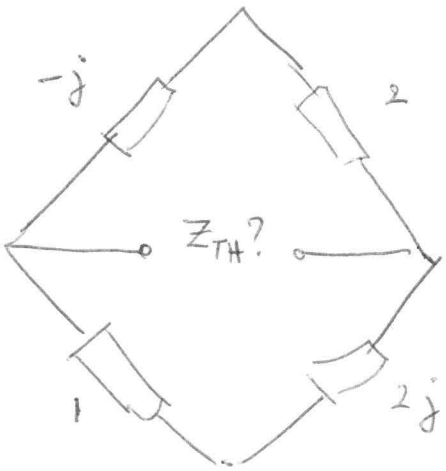
a (ohm) :

1.5 ✓

b (ohm) :

-0.5 ✓

Hint: Find ZTh by setting independent sources to zero.



$$Z_{TH} = (2-j) \,//\, (1+2j) = \frac{1}{\frac{1}{2-j} + \frac{1}{1+2j}}$$

$$= \frac{(2-j)(1+2j)}{2-j+1+2j} = \frac{2-j+4j+2}{3+j} \cdot \frac{3-j}{3-j}$$

$$= \frac{1}{10} \cdot (4+3j)(3-j)$$

$$= \frac{1}{10}(12+9j-4j+3)$$

$$= 1.5 + 0.5j$$

$Z_L^* = Z_{TH}$ FOR MAX POWER

$$\boxed{Z_L = 1.5 - 0.5j}$$