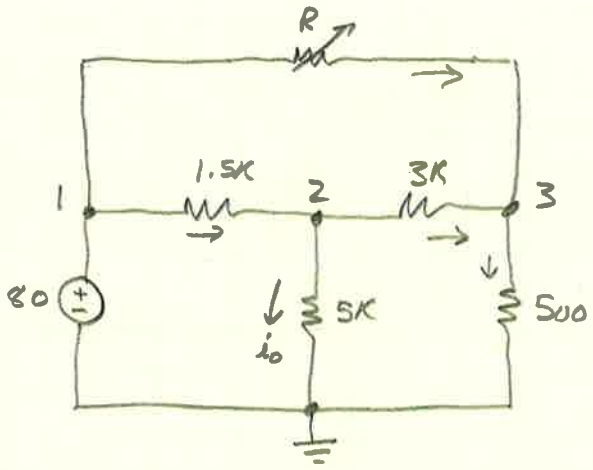
The Variable Resistor R is adjusted until $i_o = 10\,mA$. FIND R



1) assign Reference (at Bottom)

use ohms + Kirchoffs laws.

$V_1 = 80V$

$V_2 = (10mA)(5K) = 50\,V$

$i_{12} = \frac{80-50}{1.5K} = 20\,mA$

$i_{23} = i_{12} - i_o = 10\,mA$

$V_3 = V_2 - i_{23}(3K) = 50 - (10mA)(3K) = 20V$

$i_{500} = \frac{20}{500} = 40\,mA$

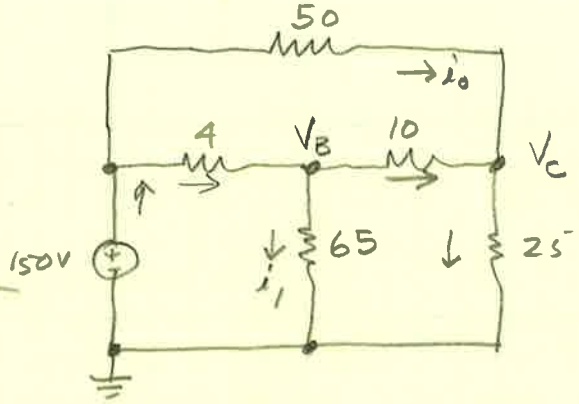
$V_R = 80 - V_3 = 60\,V$

@ node 3: $i_r = i_{500} - i_{3K} = 40mA - 10mA = 30mA$

$R = \frac{V}{I} = \frac{60}{30mA} = \boxed{2K\Omega}$

$i_o = 1A$

a) Find i_1
b) Find Power for all R's
3) Verify $P_{DEV} = P_{ABS}$



a) $V_C = 150 - 50(1) = 100V$
$i_{25} = V_C/25 = 4A$
$i_{10} = i_{25} - i_o = 3A$

$V_B = V_C + i_{10}(10) = 100 + 30 = 130V$
$i_4 = \frac{150 - V_B}{4} = 5A$
$i_{65} = \frac{V_B}{65} = \boxed{2A = i_1}$

b) $P_{50} = i^2R = (1)^2 50 = 50W$
$P_4 = i^2R = (5)^2 4 = 100W$
$P_{65} = i^2R = (2)^2 65 = 260W$
$P_{10} = i^2R = (3)^2 10 = 90W$
$P_{25} = i^2R = (4)^2 25 = 400W$

$P_{ABSORBED} = 900W$

c) $i_{150} = i_{50} + i_4 = 1 + 5 = 6A$

$P_{150} = (-6)(150) = 900W$ DELIVERED ✓