

## Assignment 1 Answers

1. a)  $I = 4A$   
b)  $v = 3.53V$
2. a)  $V_{ab} = 1.5 V$   
b)  $I_{sc} = 0.3A$   
c)  $P_R = 0.225 mW$ ,  $P_{total} = 1.65m \times 1.5 = 2.475 mW$
3.  $V_S = 9V$ ,  $R_p = 810k\Omega$ ,  $R_s = 18\Omega$
4.  $v = 6V$
5.  $P_R = 3mW$  (power consumed in the resistor is 3mW)  
 $P_{5V} = -5mW$  (power supplied by the 5V source is 5mW)  
 $P_{2V} = 2mW$  (power consumed by the 2V source is 2mW)
6.  $P_R = 1W$  (power consumed by the resistor is 1W)  
 $P_{5V} = 5W$  (power consumed by the 5V source is 5W)  
 $P_{1A} = -6W$  (power supplied by the 1A source is 6W)
7.  $1 = V/10 + V/5 + V/2 + V/15 + 3V/15$   
 $\rightarrow V = 0.857 V$
8.  $100 = 150i + 5(50i)$   
 $100 = 400i$   
 $\rightarrow i = 0.25A$
9.  $R_{eq} = (((((2||1)+1)||2)+1)||1)+2 = 2.656\Omega$
10.  $V_O = \frac{-\alpha I_o R_3 R_4}{(R_3 + R_4)}$ ,  $I_o = \frac{V_S}{R_1 + R_2} \Rightarrow V_O/V_S = \frac{-\alpha R_3 R_4}{(R_1 + R_2)(R_3 + R_4)}$ ,  $\alpha = 40$
11.  $V_O = 50V$ ,  $I = 0.5 \times 5k/25k = 0.1A$ ,  $v = 2000V$ ,  $P = 200W$
12.  $i = 6A$ ,  $v = 3V$
13. a)  $R_{ab} = (((80||20)+(12||16))||60||15)+5 = 20||60||15 = 7.5+5 = 12.5\Omega$   
b)  $v = 40 \times 7.5/12.5 = 24V$