



# Alexandria University

## Faculty of Engineering

Electrical Engineering Department

### ECE: Principles and Applications of Electronic Engineering

#### Sheet 1

1. A diode is in series with  $220\ \Omega$ . If the voltage across the resistor is  $6\ \text{V}$ , what is the current through the diode?
2. A diode has a voltage of  $0.7\ \text{V}$  and a current of  $100\ \text{mA}$ . What is the diode power?
3. Two diodes are in series. The first diode has a voltage of  $0.75\ \text{V}$  and the second has a voltage of  $0.8\ \text{V}$ . If the current through the first diode is  $400\ \text{mA}$ , what is the current through the second diode?

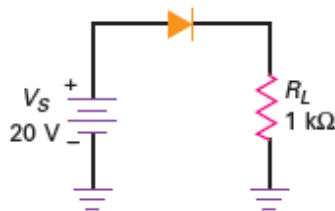


Figure 1

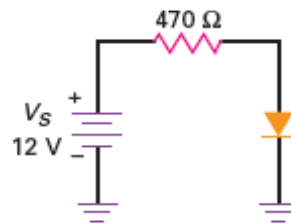


Figure 2

#### For the ideal diode model:

4. In Fig. 1, calculate the load current, load voltage, load power, diode power, and total power.
5. If the resistor is doubled in Fig. 1, what is the load current?
6. In Fig. 2, calculate the load current, load voltage, load power, diode power, and total power.
7. If the resistor is doubled in Fig. 2, what is the load current?
8. If the diode polarity is reversed in Fig. 2, what is the diode current? The diode voltage?

#### For the second approximation model:

9. In Fig. 1, calculate the load current, load voltage, load power, diode power, and total power.
10. If the resistor is doubled in Fig. 1, what is the load current?
11. In Fig. 2, calculate the load current, load voltage, load power, diode power, and total power.
12. If the resistor is doubled in Fig. 2, what is the load current?
13. If the diode polarity is reversed in Fig. 2, what is the diode current? The diode voltage?

#### For the third approximation model:

14. In Fig. 1, calculate the load current, load voltage, load power, diode power, and total power. ( $R_B = 0.23$ )
15. If the resistor is doubled in Fig. 1, what is the load current? ( $R_B = 0.23$ )
16. In Fig. 2, calculate the load current, load voltage, load power, diode power, and total power. ( $R_B = 0.23$ )
17. If the resistor is doubled in Fig. 2, what is the load current? ( $R_B = 0.23$ )

18. If the diode polarity is reversed in Fig. 2, what is the diode current? The diode voltage?  $(R_B = 0.23)$

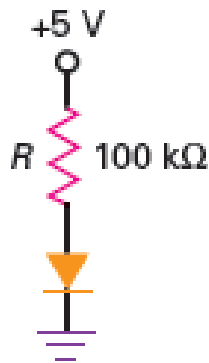


Figure 3

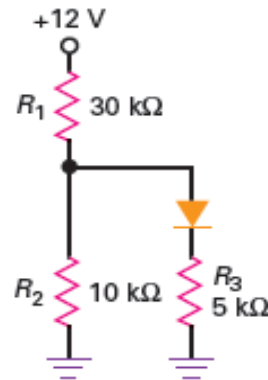


Figure 4

19. Suppose the voltage across the diode of Fig. 3 is 5 V. Is the diode open or shorted?
20. Something causes R to short in Fig. 3. What will the diode voltage be? What will happen to the diode?
21. You measure 0 V across the diode of Fig. 3, Next you check the source voltage and it reads 15 V with respect to ground. What is wrong with the circuit?
22. In Fig. 4, you measure a potential of 13 V at the junction of R1 and R2. (Remember, potentials are always with respect to ground.) Next you measure 0 V at the junction of the diode and the 5-kV resistor. Name some possible troubles.
23. The forward and reverse DMM diode test reading is 0.7 V and 1.8 V. Is this diode good?