

PHY2250 – HW7: Diodes & Power Supplies (Chapter 27)

1. Trivalent means that the material has _____ valence electrons.
a) Four **b) Three** c) Five d) Eight
2. In a PN junction, the barrier voltage for (doped) silicon is closest to
a) 0.3 V b) 2 V c) 1 V **d) 0.7 V**
3. The voltage across an LED is closest to
a) 0.3 V **b) 2 V** c) 1 V d) 0.7 V
4. An AC signal with amplitude 4 V is passed through a half-wave rectifier consisting of a silicon diode and a resistor. The peak voltage across the resistor will be
a) 3.3 V b) 4 V c) 2 V d) 2.6 V e) 1.3 V
5. An AC signal with amplitude 4 V is passed through a bridge-style full-wave rectifier consisting of a 1:1 transformer, four silicon diodes and a resistor. The peak voltage across the resistor will be
a) 3.3 V b) 4 V c) 2 V **d) 2.6 V** e) 1.3 V
6. An AC signal with amplitude 4 V is passed through a full-wave rectifier consisting of a center-tapped 1:1 transformer, two silicon diodes and a resistor. The peak voltage across the resistor will be
a) 3.3 V b) 4 V c) 2 V d) 2.6 V **e) 1.3 V**
7. The time-average of a full-wave rectified signal with a peak of 170 V is closest to
a) 108 V b) 120 V c) 240 V d) 85 V
8. Putting it all together: In the diagram below, the V_{source} is 120V, transformer steps down by a factor of 10, the 'diamond' shape is a bridge rectifier, and the capacitor and resistor are "very large," what is the (steady-state) DC output voltage?
Answer: $120 / 10 - 1.4 = 10.6 \text{ V}$

