Chapter 02 Test Bank: Semoconductors

1. Copper is a good conductor.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.01 Conductors
Subtopic: Conductors
Topic: Semiconductors

2. The valence orbit controls the electrical properties of the atom.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.01 Conductors
Subtopic: Conductors
Topic: Semiconductors

3. The core of an atom consists of all the outer orbits.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.01 Conductors
Subtopic: Conductors
Topic: Semiconductors

4. The valence electron is referred to as a free electron.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.01 Conductors
Subtopic: Conductors
Topic: Semiconductors

5. A semiconductor is an element with electrical properties between those of a conductor and those of an insulator.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.01 Conductors
Subtopic: Conductors
Topic: Semiconductors

6. How many valence electrons are there in a germanium semiconductor?

A. 1
B. 2
C. 4
D. None

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.02 Semiconductors
Subtopic: Semiconductors
Topic: Semiconductors

7. Other than germanium, what is another type of semiconductor material generally used?

A. copper
B. helium
C. aluminum
D. silicon

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.02 Semiconductors
Subtopic: Semiconductors
Topic: Semiconductors

8. When silicon atoms combine to form a solid, they arrange themselves into an orderly pattern called

A. an orbit.
B. the valence shell.
C. a crystal.
D. a conductor.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

9. The term used to describe the sharing of valence electrons that gives a crystal solidity is

A. covalent bonding.
B. negative ion.
C. saturation point.
D. reverse bias.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

10. How many electrons are in the valence orbit of a silicon crystal?

A. 2
B. 4
C. 8
D. None

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

11. The temperature of the surrounding air is called

A. ambient.
B. surround sound.
C. atmospheriC.
D. Centigrade.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

12. When the departure of an electron creates a vacancy in the valence orbit, it is called a

A. hole.
B. vacant electron.
C. polarized electron.
D. negative ion.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

13. The merging of a free electron and a hole is referred to as a

A. merger.
B. combination.
C. restoration.
D. recombination.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

14. The amount of time between the creation and disappearance of a free electron is called a

A. light year.
B. millisecond.
C. lifetime.
D. work week.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

15. A pure semiconductor is also referred to as

A. a clean room device.
B. intrinsiC.
C. extrinsiC.
D. transistor.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.04 Intrinsic Semiconductors
Subtopic: Intrinsic Semiconductors
Topic: Semiconductors

16. At room temperature, a silicon crystal acts like an insulator.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.03 Silicon Crystals
Subtopic: Silicon Crystals
Topic: Semiconductors

17. Intrinsic semiconductor has unequal number of free electrons and holes.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.04 Intrinsic Semiconductors
Subtopic: Intrinsic Semiconductors
Topic: Semiconductors

18. Thermal energy produces free electrons and holes in pairs.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.05 Two types of Flow
Subtopic: Two types of Flow
Topic: Semiconductors

19. Doping is a process of adding impurity atoms to an intrinsic crystal to alter its electrical conductivity.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.06 Doping a Semiconductor
Subtopic: Doping a Semiconductor
Topic: Semiconductors

20. A doped semiconductor is called an intrinsic semiconductor.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.06 Doping a Semiconductor
Subtopic: Doping a Semiconductor
Topic: Semiconductors

21. What type of atoms are added to molten silicon in order to increase the number of free electrons?

A. pentavalent
B. trivalent
C. covalent

D. positive

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.06 Doping a Semiconductor
Subtopic: Doping a Semiconductor
Topic: Semiconductors

22. What type of impurity is added to pure silicon to get an excess of holes?

A. pentavalent
B. trivalent
C. covalent
D. positive

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.06 Doping a Semiconductor
Subtopic: Doping a Semiconductor
Topic: Semiconductors

23. A trivalent atom is also called

A. an acceptor atom.
B. a donor atom.
C. copper.
D. a negative ion.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.06 Doping a Semiconductor
Subtopic: Doping a Semiconductor
Topic: Semiconductors

24. What is the most popular and useful semiconductor material?

A. silver
B. copper
C. aluminum
D. silicon

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.06 Doping a Semiconductor
Subtopic: Doping a Semiconductor
Topic: Semiconductors

25. Silicon that has been doped with a pentavalent impurity is called

A. a p-type semiconductor.

B. an n-type semiconductor.
C. a conductor.
D. an insulator.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.07 Two types of Extrinsic Semiconductors
Subtopic: Two types of Extrinsic Semiconductors
Topic: Semiconductors

26. In an n-type semiconductor, the free electrons are called the

A. minority carriers.
B. majority carriers.
C. holes.
D. ions.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.07 Two types of Extrinsic Semiconductors
Subtopic: Two types of Extrinsic Semiconductors
Topic: Semiconductors

27. Silicon that has been doped with a trivalent impurity is called a (an)

A. n-type semiconductor.
B. p-type semiconductor.
C. pn junction.
D. covalent bond.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.07 Two types of Extrinsic Semiconductors
Subtopic: Two types of Extrinsic Semiconductors
Topic: Semiconductors

28. The border between p-type and n-type crystal is called the

A. pn junction.
B. p-type border.
C. n-type margin.
D. p junction.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.08 The Unbiased Diode
Subtopic: The Unbiased Diode
Topic: Semiconductors

29. What is another name for pn crystal?

A. junction diode
B. bipolar transistor
C. dipole
D. field effect device

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.08 The Unbiased Diode
Subtopic: The Unbiased Diode
Topic: Semiconductors

30. When a free electron enters the p region of a junction diode, it becomes a

A. majority carrier.
B. minority carrier.
C. hole.
D. depletion carrier.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Hard
Section: 02.08 The Unbiased Diode
Subtopic: The Unbiased Diode
Topic: Semiconductors

31. Each time an electron diffuses across a pn junction, it creates a pair of ions.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Hard
Section: 02.08 The Unbiased Diode
Subtopic: The Unbiased Diode
Topic: Semiconductors

32. Each pair of positive and negative ions at the pn junction is called a dipole.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Hard
Section: 02.08 The Unbiased Diode
Subtopic: The Unbiased Diode
Topic: Semiconductors

33. As dipoles build up, the region near the pn junction is void of all charges and is called the restoration layer.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Hard
Section: 02.08 The Unbiased Diode
Subtopic: The Unbiased Diode
Topic: Semiconductors

34. Reverse bias is achieved when the negative source terminal is connected to the n-type material, and the positive terminal is connected to the p-type material.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.09 Forward Bias
Subtopic: Forward Bias
Topic: Semiconductors

35. Current flows easily in a forward-biased diode.

FALSE

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.09 Forward Bias
Subtopic: Forward Bias
Topic: Semiconductors

36. A silicon diode will allow a continuous current in the forward direction, if the source voltage is

A. greater than 0.7 V.
B. equal to 7.7 V.
C. less than 0.7 V.
D. zero.

Accessibility: Keyboard Navigation
Bloom's: 3. Apply
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.09 Forward Bias
Subtopic: Forward Bias
Topic: Semiconductors

37. What results when the negative battery terminal is connected to the p side of a pn junction, and the positive battery terminal to the n side?

A. forward bias
B. reverse bias
C. avalanche breakdown

D. a short circuit

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.10 Reverse Bias
Subtopic: Reverse Bias
Topic: Semiconductors

38. When reverse bias is increased

A. forward current increases.
B. depletion layer widens.
C. depletion layer becomes smaller.
D. the diode becomes polarized.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.10 Reverse Bias
Subtopic: Reverse Bias
Topic: Semiconductors

39. What is the approximate current level in a reverse-biased diode?

A. 0.7 mA
B. 0.7 A
C. 1.7 A
D. zero

Accessibility: Keyboard Navigation
Bloom's: 3. Apply
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.10 Reverse Bias
Subtopic: Reverse Bias
Topic: Semiconductors

40. The limit to how much reverse voltage a diode can withstand before it is destroyed is called

A. forward bias.
B. reverse bias.
C. breakup current.
D. breakdown voltage.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.11 Breakdown
Subtopic: Breakdown
Topic: Semiconductors

41. In a Light-emitting diode (LED), what lifts the electrons to higher energy levels?

A. constant current source
B. applied voltage
C. valence electrons
D. light

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.12 Energy Levels
Subtopic: Energy Levels
Topic: Semiconductors

42. In a semiconductor, thermal energy produces free electrons that go to the next higher-energy band called the

A. radiation band.
B. conduction band.
C. electron band.
D. valence band.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.12 Energy Levels
Subtopic: Energy Levels
Topic: Semiconductors

43. The depletion layer does not exist

A. in pn junction diodes.
B. when a diode is first sold.
C. when a diode is first formed.
D. until the holes are injected.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.12 Energy Levels
Subtopic: Energy Levels
Topic: Semiconductors

44. What type of bias gives free electrons more energy?

A. reverse
B. forward
C. negative
D. positive

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.12 Energy Levels
Subtopic: Energy Levels
Topic: Semiconductors

45. When free electrons fall from the conduction band to the valence band, excess energy

A. is radiated in the form of heat and light.
B. is lost due to valence electrons.
C. is radiated in the form of sound.
D. is gained due to hole flow.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.12 Energy Levels
Subtopic: Energy Levels
Topic: Semiconductors

46. What is the term for the temperature inside a diode, right at the pn junction?

A. ambient temperature
B. diode temperature
C. pn temperature
D. junction temperature

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.13 Barrier Potential and Temperature
Subtopic: Barrier Potential and Temperature
Topic: Semiconductors

47. When the reverse voltage increases, holes and electrons

A. recombine.
B. move away from the junction.
C. move toward the junction.
D. remain stationary.

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.14 Reverse-biased Diode
Subtopic: Reverse-biased Diode
Topic: Semiconductors

48. In a silicon atom, what is the distance between the valence band and the conduction band called?

A. energy gap
B. depletion layer
C. pn junction
D. intrinsic

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors

Difficulty: Easy
Section: 02.14 Reverse-biased Diode
Subtopic: Reverse-biased Diode
Topic: Semiconductors

49. What is a disadvantage of a germanium device that prevents its prevalent use in modern computers, consumer electronics, and communication circuits?

A. cost
B. weight
C. excessive reverse current
D. excessive forward current

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Easy
Section: 02.14 Reverse-biased Diode
Subtopic: Reverse-biased Diode
Topic: Semiconductors

50. What is the term for reverse current on the surface of a crystal?

A. crystal current
B. reverse current
C. surface-leakage current
D. avalanche breakdown current

Accessibility: Keyboard Navigation
Bloom's: 2. Understand
Chapter: 02 Semiconductors
Difficulty: Medium
Section: 02.14 Reverse-biased Diode
Subtopic: Reverse-biased Diode
Topic: Semiconductors