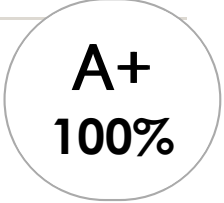


20 Multiple choice questions



A+
100%

1. a quantum (bundle) of energy
 - a. **CORRECT: photon**
 - b. holes
 - c. n-type
 - d. photocells

2. uses magnetic levitation for propulsion
 - a. Planck, Max
 - b. germanium
 - c. **CORRECT: maglev train**
 - d. maltese cross

3. occurs as a consequence of the wave nature of electrons; electrons exhibit diffraction when they pass through a crystal lattice
 - a. electron sea model
 - b. **CORRECT: electron diffraction**
 - c. electron guns
 - d. electron-hole pairs

4. the screen of a cathode ray tube whose surface is coated with a material that fluoresces to emit light when struck with electrons; it is used to form an image of an electrical signal
 - a. **CORRECT: florescent screen**
 - b. maltese cross
 - c. photocells
 - d. filament

5. an evacuated tube with a metal cross in it; used to show that cathode rays travel in straight lines
 - a. photocells
 - b. maglev train
 - c. **CORRECT: maltese cross**
 - d. paddle wheels

6. represent where the electron energies of large number of electrons in matter are spread over bands; the highest occupied energy band is the valence band; above the valence band is the conduction band; between these bands is the forbidden energy gap
- a. **CORRECT: energy bands**
 - b. germanium
 - c. electron guns
 - d. n-type
7. a German physicist who demonstrated the existence of electromagnetic waves after James Clerk Maxwell had predicted them; he also discovered the photoelectric effect but failed to investigate it further
- a. energy bands
 - b. maltese cross
 - c. germanium
 - d. **CORRECT: Hertz, Heinrich**
8. semiconductor material has electrons as the majority carriers and holes as the minority carriers; doped with group V atoms
- a. filament
 - b. **CORRECT: n-type**
 - c. holes
 - d. photon
9. a group IV element, which was originally used in semiconductor devices but now superseded by silicon as the preferred choice
- a. energy bands
 - b. photon
 - c. **CORRECT: germanium**
 - d. filament
10. occur at temperatures above 0 K when some electrons gain sufficient energy to escape from their bonds and exist as free electrons, which leaves a hole behind; the electron and hole form an electron-hole pair
- a. electron guns
 - b. electron diffraction
 - c. electron sea model
 - d. **CORRECT: electron-hole pairs**

11. the emission of electrons by materials when subjected to electromagnetic radiation of appropriate frequency; Einstein explained the photoelectric effect and showed the particle nature of light
- photocells
 - CORRECT: photoelectric effect**
 - meissner effect
 - electron guns
12. a thin wire with high electrical resistance; when current passes through it, it gets hot
- CORRECT: filament**
 - holes
 - photon
 - n-type
13. electrical conduction in doped semiconductors
- electron diffraction
 - electron sea model
 - CORRECT: extrinsic conduction**
 - energy bands
14. describes the circumstances by which in a metal, positive ions in the lattice are surrounded by a moving 'sea' of electrons
- electron guns
 - CORRECT: electron sea model**
 - electron diffraction
 - electron-hole pairs
15. a German scientist credited with discovering quantum theory when investigating black body radiation; he found he could only get agreement between experiment and theory by postulating that light came in photons or quanta or bundles of energy
- CORRECT: Planck, Max**
 - n-type
 - photocells
 - maglev train

16. cells in which the electrons initiating an electric current are produced by the photoelectric effect
- a. holes
 - b. n-type
 - c. photon
 - d. **CORRECT: photocells**
17. devices that produce a narrow beam of electrons in a cathode ray tube by thermionic emission, which consists of a filament, a cathode and two open-cylinder anodes
- a. electron sea model
 - b. **CORRECT: electron guns**
 - c. electron-hole pairs
 - d. energy bands
18. represent the absence of an electron in an energy level; formed when a group IV element (e.g. silicon) is doped with a group III element
- a. **CORRECT: holes**
 - b. filament
 - c. photon
 - d. n-type
19. the exclusion of a magnetic field by a superconductor
- a. **CORRECT: meissner effect**
 - b. filament
 - c. maltese cross
 - d. photoelectric effect
20. discharge tubes used to show that cathode rays carry energy and momentum
- a. photocells
 - b. **CORRECT: paddle wheels**
 - c. maltese cross
 - d. maglev train