

1. Consider the collision between two identical carts on an air track. Each car has the same speed, but they are heading towards each other. Because of Velcro, the two cars are stuck together after the collision. During this collision
 - (a) the momentum of the carts is conserved, but the kinetic energy of the carts is not
 - (b) the kinetic energy of the carts is conserved, but the momentum of the carts is not
 - (c) both the momentum of the carts and the kinetic energy of the carts is conserved
 - (d) neither the momentum of the carts nor the kinetic energy of the carts is conserved

2. The heart of a xerographic copier is the photoconductor. When an image of an original document is focused on the photoconductor
 - (a) charge is created where the original was white
 - (b) charge is created where the original was dark
 - (c) charge is removed where the original was white
 - (d) charge is removed where the original was dark
 - (e) toner particles are created through a chemical reaction, and only where the original was dark

3. A house is wired
 - (a) in parallel, so the voltages across all the devices in use are the same
 - (b) in parallel, so the current through all the devices in use is the same
 - (c) in series, so the voltages across all the devices in use are the same
 - (d) in series, so the current through all the devices in use is the same

4. One reason radio station signals are modulated before broadcast is that antennas need to be a practical length. For example, if a 20,000 Hertz tone were broadcast without modulation, an efficient antenna would need to be about
 - (a) 75 meters long
 - (b) 200 meters long
 - (c) 1750 meters long
 - (d) 2000 meters long
 - (e) 3750 meters long

5. Cameras with viewfinders that show the same image the film will receive are called _____, and other (usually less expensive) cameras exhibit _____.
 - (a) focal plane; reversed images
 - (b) automatic indexing; reflex
 - (c) reflex; parallax
 - (d) focal plane; parallax
 - (e) parallax; reversed images

6. Which of the following is NOT true regarding Compact Disc (CD) players?
 - (a) the data tracks (pits) spiral out away from the center
 - (b) a lens is used to focus the laser light onto the disc
 - (c) blue lasers are currently used, although red ones are in the research stage
 - (d) there is redundancy of data on the disc, to provide for error correction

7. Which is NOT true of the binding of nuclei?
- (a) the nuclear strong force holds all nuclei together by binding $p \leftrightarrow p$, $n \leftrightarrow n$, $p \leftrightarrow n$
 - (b) when ${}^3\text{He}$ is broken up into 2 protons and 1 neutron, energy is released
 - (c) an iron nucleus is more stable than a uranium nucleus
 - (d) the total mass of 2 protons and 2 neutrons while separated is different than the mass of a ${}^4\text{He}$ nucleus
8. Which of the following was NOT true of the U.S. nuclear weapons program?
- (a) the Plutonium bomb used less than a critical mass
 - (b) the fusion material in "Mike" was ${}^2\text{H}$
 - (c) Mike was tested in the New Mexico desert
 - (d) Robert Oppenheimer was the scientific leader of the Manhattan project

Answers:

- 1. A
- 2. C
- 3. A
- 4. E
- 5. C
- 6. C
- 7. B
- 8. C