

7. The photoelectric effect best demonstrates the
(1) particle nature of light. (2) wave nature of light. (3) both of these (4) none of these (5) —
8. The uncertainty principle applies not only to momentum and position, but also to energy and time. This statement is
(1) true. (2) false. (3) — (4) — (5) —
9. According to the uncertainty principle, the more we know about a particle's momentum, the less we know about its
(1) location. (2) speed. (3) mass (4) kinetic energy. (5) none of these
10. Two beams of light, a red beam and a blue beam, have the same energy. The beam with the greater number of photons is the
(1) red beam. (2) blue beam. (3) both the same (4) — (5) —
11. X-rays may be regarded as
(1) high frequency radio waves. (2) high frequency sound waves. (3) both of these (4) none of these (5) —
12. Which radiation has no electric charge associated with it?
(1) gamma rays (2) alpha rays (3) beta rays (4) all of these (5) none of these
13. When a nucleus emits a beta particle, its atomic number
(1) changes, but its mass number remains constant.
(2) changes, and so does its mass number.
(3) remains constant, and so does its mass number.
(4) remains constant, but its mass number changes.
(5) none of these
14. The atomic number of an element is the same as the number of its
(1) protons. (2) nucleons. (3) neutrons. (4) partons. (5) —
15. The half-life on an isotope is one day. At the end of three days, how much of the isotope remains?
(1) one-eighth (2) one-half (3) one-quarter (4) none (5) —
16. The helium in a child's balloon is composed of
A. former beta particles. B. alpha-particle remnants of previous radioactive processes.
(1) both A and B (2) A only (3) B only (4) neither A nor B (5) —
17. Compared to clocks in a stationary reference frame, clocks in a moving reference frame run
(1) slower. (2) faster. (3) at the same speed. (4) backwards. (5) —

27. **BONUS** Objects infinitely far away are focused by a converging lens

- (1) at the focal point. (2) beyond the focal point. (3) in front of the focal point. (4) — (5) —