

Assessment

DIRECTIONS: Read each question carefully. Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. Which of the following is a postulate of Einstein's theory of special relativity?
   a. The laws of physics are the same in all inertial frames of reference.
   b. The laws of physics are relative in all frames of reference.
   c. The speed of light in a vacuum is relative to the observer.
   d. The speed of light in a vacuum is relative to the source.

2. Which of the following **BEST** describes relativity of simultaneity?
   a. Two events occurring simultaneously in one reference frame are simultaneous in another frame.
   b. Two events occurring simultaneously in one reference frame may not necessarily be simultaneous in another frame.
   c. Two events occurring simultaneously in one reference frame are always simultaneous to an observer's reference frame.
   d. Two events occurring simultaneously in different reference frames are always simultaneous to the observer's reference frame.

3. Which of the following **BEST** describes time dilation?
   a. An observer who is at rest (relative to the moving object) would see the moving object to be shorter in length.
   b. When an object is moving very fast it experiences time more slowly than when it is at rest.
   c. There is a tremendous amount of energy in mass.
   d. The speed of light is regarded as the fastest speed ever recorded.

4. Which of the following **BEST** describes length contraction?
   a. Length is absolute regardless of the reference frame.
   b. Length may change under one reference frame.
   c. Length may change depending on the environment.
   d. Length varies from one reference frame to another.

5. Which of the following **BEST** describes the cosmic speed limit?
   a. Infinite amount of energy is needed for an object to reach the speed of light.
   b. Infinite amount of force is needed for an object to reach the speed of light.
   c. Infinite amount of mass is needed for an object to reach the speed of light.
   d. Infinite amount of speed is needed for an object to reach the speed of light.

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6. At the age of 20, Donna joined a space exploration at the speed of .8c. According to those manning the control station on Earth, the trip took 20 years. Identify her age upon her return to Earth.

a. 32 b. 45 c. 51 d. 56

7. Determine the perceived length of a 5m ship traveling at .637c.

a. 1.25m b. 2.95m c. 3.85m d. 4.35m

8. Determine the energy equivalent of an object with a mass of 27kg.

a. 2.11 x10e18 J b. 2.23x10e16 J c. 2.43x10e18 J d. 2.53x10e19 J

9. At the age of 23, Danny joined a space expedition at the speed of .6c. According to those manning the control station on Earth, the trip took 25 years. How long was the trip according to the clock on board the spaceship?

a. 33 b. 35 c. 43 d. 20

10. Determine the energy equivalent of an object with a mass of 1230 kg.

a. 1.11x10e20 J b. 1.36x10e18 J c. 2.25x10e25 J d. 2.45x10e37 J

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