Name :

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# ”Nobel-prize physics in …”

Short Test 6

1. The Lorentz velocity transformation form can be:

a. $v_k = \dfrac{v' + u}{1 + \dfrac{v'}{c}}$ b. $v_k = \dfrac{v' + u}{1 + \dfrac{v'}{c^2}}$ c. $v_k = \dfrac{v' + u}{1 + \dfrac{v'u}{c^2}}$ d. $v'_{k'} = \dfrac{v + u}{1 + \dfrac{vu}{c^2}}$ e. none of them

2. The length contraction of a moving object can be described by:

a. no contraction b. $\ell_k = \ell_o \sqrt{1 - \left(\dfrac{v}{c}\right)^2}$ c. $\ell_k = \dfrac{\ell_o}{\sqrt{1 + \left(\dfrac{v}{c}\right)^2}}$ d. $\ell = \ell_o \sqrt{\dfrac{1 - \dfrac{v_r}{c}}{1 + \dfrac{v_r}{c}}}$ e. none of them

3. You are driving on a freeway at a relativistic speed of ***u***. Straight ahead of you, a technician standing on the ground turns on a searchlight and a beam of light moves exactly vertically upward, as seen by the technician. As you observe the beam of light, you measure the magnitude of the vertical component of its velocity as:

a. equal to ***c*** b. greater than ***c*** c. less than ***c*** d. the horizontal component is ***u*** (take care!!!) e. none of them

4. The time dilation can be given by:

a. $\Delta t' = \dfrac{\Delta t}{\sqrt{1 - \left(\dfrac{u}{c}\right)^2}}$ b. $\Delta t = \dfrac{\Delta t'}{1 + \dfrac{v'}{c^2}}$ c. $\Delta t = \dfrac{\Delta t'}{1 - \dfrac{v'u}{c^2}}$ d. $\Delta t = \dfrac{\Delta t'}{\sqrt{1 - \left(\dfrac{u}{c}\right)^2}}$ e. none of them

5. Imagine a motorcycle moving with a speed 0.80c past a stationary observer. If the rider tosses a ball in the forward direction with a speed of 0.70c relative to himself, what is the speed of the ball relative to the stationary observer?

a. 0.84 c b. 0.10 c c. 0.92 c d. 0.96 c e. none of them