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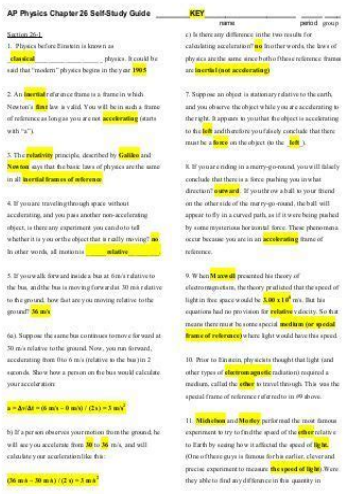

AP Physics Chapter 26 Self-Study Guide KEY

name period group

Section 26-1

1. Physics before Einstein is known as classical physics. It could be said that "modern" physics begins in the year 1905

2. An inertial reference frame is a frame in which Newton's first law is valid. You will be in such a frame of reference as long as you are not accelerating (starts with "a").

3. The relativity principle, described by Galileo and Newton, says that the basic laws of physics are the same in all inertial frames of reference.

4. If you are traveling through space without accelerating, and you pass another non-accelerating object, is there any experiment you can do to tell whether it is you or the object that is really moving? no In other words, all motion is relative

5. If you walk forward inside a bus at 6 m/s relative to the bus, and the bus is moving forward at 30 m/s relative to the ground, how fast are you moving relative to the ground? 36 m/s

6a). Suppose the same bus continues to move forward at 30 m/s relative to the ground. Now, you run forward, accelerating from this 6 m/s (relative to the bus) in 2 seconds. Show how a person on the bus would calculate your acceleration

$a = \Delta v/\Delta t = (6\ m/s - 0\ m/s) / (2s) = 3\ m/s^2$

b) If a person observes your motion from the ground, he will see you accelerate from 30 to 36 m/s, and will calculate your acceleration like this:

$(36\ m/s - 30\ m/s) / (2\ s) = 3\ m/s^2$

c) Is there any difference in the two results for calculating acceleration? no In other words, the laws of physics are the same since both of these reference frames are inertial (not accelerating)

7. Suppose an object is stationary relative to the earth, and you observe the object while you are accelerating to the right. It appears to you that the object is accelerating to the left and therefore you falsely conclude that there must be a force on the object (to the left).

8. If you are riding in a merry-go-round, you will falsely conclude that there is a force pushing you in what direction? outward. If you throw a ball to your friend on the other side of the merry-go-round, the ball will appear to fly in a curved path, as if it were being pushed by some mysterious horizontal force. These phenomena occur because you are in an accelerating frame of reference.

9. When Maxwell presented his theory of electromagnetism, the theory predicted that the speed of light in free space would be 3.00×10^8 m/s. But his equations had no provision for relative velocity. So that means there must be some special medium (or special frame of reference) where light would have this speed.

10. Prior to Einstein, physicists thought that light (and other types of electromagnetic radiation) required a medium, called the ether to travel through. This was the special frame of reference referred to in #9 above.

11. Michelson and Morley performed the most famous experiment to try to find the speed of the ether relative to Earth by seeing how it affected the speed of light. (One of these guys is famous for his earlier, cleverand precise experiment to measure the speed of light). Were they able to find any difference in this quantity in

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