Multiple Choice

1.1 Physics: Definitions and Applications 39.

Modern physics could best be described as the combination of which theories?

a. quantum mechanics and Einstein's theory of relativity
b. quantum mechanics and classical physics
c. Newton's laws of motion and classical physics
d. Newton's laws of motion and Einstein's theory of relativity

40.

Which of the following could be studied accurately using classical physics?

a. the strength of gravity within a black hole
b. the motion of a plane through the sky
c. the collisions of subatomic particles
d. the effect of gravity on the passage of time

41.

Which of the following best describes why knowledge of physics is necessary to understand all other sciences?

a. Physics explains how energy passes from one object to another.
b. Physics explains how gravity works.
c. Physics explains the motion of objects that can be seen with the naked eye.
d. Physics explains the fundamental aspects of the universe.

42.

What does radiation therapy, used to treat cancer patients, have to do with physics?

a. Understanding how cells reproduce is mainly about physics.
b. Predictions of the side effects from the radiation therapy are based on physics.
c. The devices used for generating some kinds of radiation are based on principles of physics.
d. Predictions of the life expectancy of patients receiving radiation therapy are based on physics.

1.2 The Scientific Methods 43.

The free-electron model of metals explains some of the important behaviors of metals by assuming the metal's electrons move freely through the metal without repelling one another. In what sense is the free-electron theory based on a model?

a. Its use requires constructing replicas of the metal wire in the lab.

b. It involves analyzing an imaginary system simpler than the real wire it resembles.
c. It examines a model, or ideal, behavior that other metals should imitate.
d. It attempts to examine the metal in a very realistic, or model, way.

44.

A scientist wishes to study the motion of about 1,000 molecules of gas in a container by modeling them as tiny billiard balls bouncing randomly off one another. Which of the following is needed to calculate and store data on their detailed motion?

a. a group of hypotheses that cannot be practically tested in real life
b. a computer that can store and perform calculations on large data sets
c. a large amount of experimental results on the molecules and their motion
d. a collection of hypotheses that have not yet been tested regarding the molecules

45.

When a large body of experimental evidence supports a hypothesis, what may the hypothesis eventually be considered?

a. observation
b. insight
c. conclusion
d. law

46.

While watching some ants outside of your house, you notice that the worker ants gather in a specific area on your lawn. Which of the following is a testable hypothesis that attempts to explain why the ants gather in that specific area on the lawn.

a. The worker thought it was a nice location.
b. because ants may have to find a spot for the queen to lay eggs
c. because there may be some food particles lying there
d. because the worker ants are supposed to group together at a place.

1.3 The Language of Physics: Physical Quantities and Units 47.

Which of the following would describe a length that is 2.0 \times 10^{-3} of a meter?

a. 2.0 kilometers
b. 2.0 megameters
c. 2.0 millimeters
d. 2.0 micrometers

48.

Suppose that a bathroom scale reads a person's mass as 65 kg with a 3 percent uncertainty. What is the uncertainty in their mass in kilograms?

a. a. 2 kg
b. b. 98 kg
c. c. 5 kg
d. d. 0

49.

Which of the following best describes a variable?

a. a trend that shows an exponential relationship
b. something whose value can change over multiple measurements
c. a measure of how much a plot line changes along the y-axis
d. something that remains constant over multiple measurements

50.

A high school track coach has just purchased a new stopwatch that has an uncertainty of ± 0.05 s . Runners on the team regularly clock 100-m sprints in 12.49 s to 15.01 s . At the school's last track meet, the first-place sprinter came in at 12.04 s and the second-place sprinter came in at 12.07 s . Will the coach's new stopwatch be helpful in timing the sprint team? Why or why not?

a. No, the uncertainty in the stopwatch is too large to effectively differentiate between the sprint times.
b. No, the uncertainty in the stopwatch is too small to effectively differentiate between the sprint times.
c. Yes, the uncertainty in the stopwatch is too large to effectively differentiate between the sprint times.
d. Yes, the uncertainty in the stopwatch is too small to effectively differentiate between the sprint times.