

Question:

Which of the following subjects or phenomena correspond to the area or branch of physics listed below?

- I. Springs and pendulums**
- II. Particles moving at high speeds and nuclear energy**
- III. Falling and spinning objects**

- a. I Mechanics, II Relativity, III Thermodynamics
- b. I Electromagnetism, II Quantum Mechanics, III Optics
- c. I Mechanics, II Vibrations-Waves, III Relativity
- d. I Vibrations-Waves, II Relativity, III Mechanics
- e. I Mechanics, II Thermodynamics, III Vibrations-Waves

Answer:

d.

Question:

Which of the following statements concerning standard or base units is correct?

- I. Base units for mechanics include length, mass and time.
 - II. Each base unit is defined by a laboratory process.
 - III. Base units are what physical quantities are measured "in".
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- a. I only
 - b. II only
 - c. III only
 - d. II and III
 - e. I, II and III

Answer:

c.

Question:

Which of the following statements concerning the *SI System* are correct?

- I. The three base or fundamental units for mechanics are currently defined by a laboratory process.
- II. The *SI* is based on the *Metric System*.
- III. The variety of *SI* prefixes are used to accommodate extremes in size and scale..

- a. I only
- b. II only
- c. I and II
- d. I and III
- e. II and III

Answer:

e.

Question:

Which of the following statements concerning *Size and Scale* and *Orders of Magnitude* are correct?

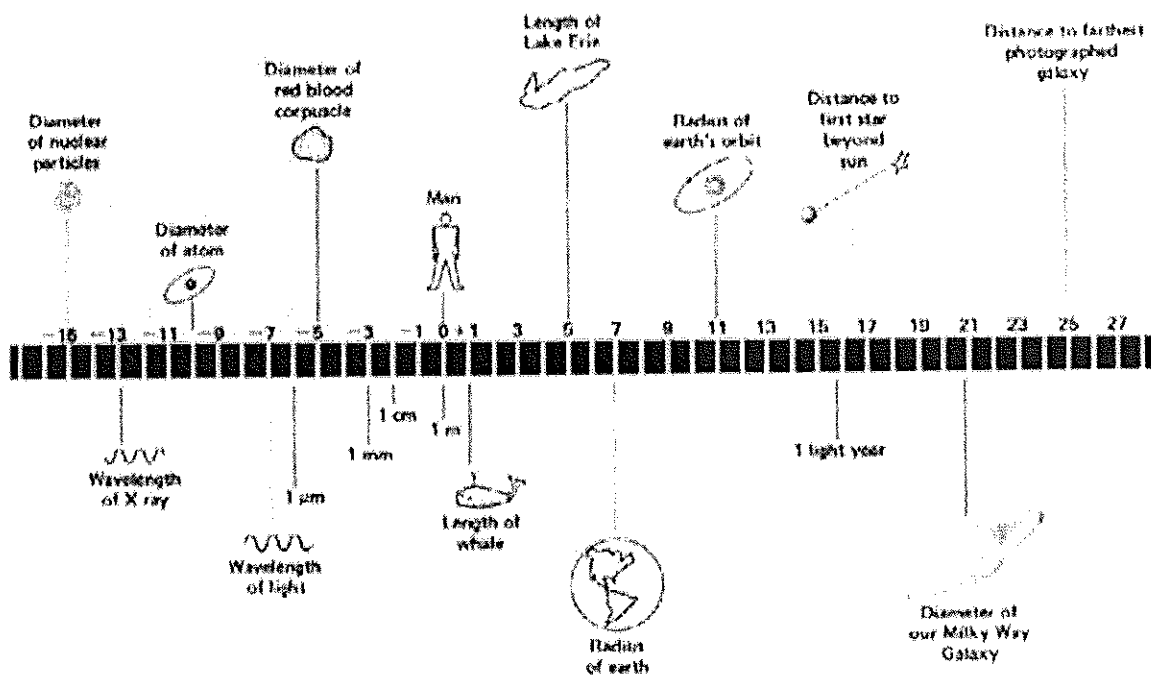
- I. Each time we increase or decrease the order of magnitude when scaling the physical dimensions of the universe we are increasing or decreasing size by a factor of 10.
 - II. If the size of a quantity is given as 7.41×10^{-9} , its estimated size as an order of magnitude is -10.
 - III. Scale refers to the relative size comparison between two quantities.
- a. I only
 - b. II only
 - c. I and II
 - d. I and III
 - e. II and III

Answer:

d.

Question:

Use the chart below to answer the following questions.



- How many times smaller is the diameter of an atom compared to the diameter of the Milky Way Galaxy?
- How many X-Ray wavelengths would fit end-to-end across the radius of the Earth's orbit?

Express the answers in both words and as an order of magnitude.

Answer:

a. 10^{31} (ten million trillion trillion)

b. $10^{11} / 10^{-13} = 10^{11-(-13)} = 10^{24}$ (trillion trillion)

Question:

Which of the following two prefixes would be the best choices for expressing:

1. the thickness of a human hair?
2. the time it takes for a mountain to erode?

Use the table of prefixes to help answer the focus question.

- a. **Pm** and **as**
- b. **fm** and **μ s**
- c. **μ m** and **Ts**
- d. **fm** and **Ms**
- e. **none of the above**

Answer:

- e.

Question:

Which of the following unit conversion factors are correct?

- I. There are 10^{-9} seconds in a *giga*-second.
 - II. There are 10^{12} watts in a *tera*-watt.
 - III. There are 10^{-15} *peta*-grams in a gram.
-
- a. I only
 - b. II only
 - c. I and II
 - d. I and III
 - e. II and III

Answer:

e.

Question:

An *idealized model*

- I. is a simplified version of a physical system whose complexity is too difficult to analyze completely.
- II. overlooks certain real features of the system being studied.
- III. possesses a certain limited validity in its ability for prediction.

- a. I only
- b. II only
- c. I and III
- d. II and III
- e. I, II and III

Answer:

e.

Question:

Which of the following statements concerning physical *models* are correct?

- I. Physical models help to describe or explain the structure or workings of a complex system.
 - II. In the development of physical models, the physicist must make well-thought judgments as to which features of a phenomenon are relevant and which can be disregarded.
 - III. Physical models can help build hypothesis by simplifying a situation that will help to focus on what is to be tested.
-
- a. I only
 - b. II only
 - c. I and II
 - d. II and III
 - e. I, II and III

Answer:

e.

Question:

Which lists the correct terms for the following definitions or explanations?

- I. A pattern, plan, representation, or description designed to show the structure or workings of an object or concepts.
 - II. A set of particles or interacting components considered to be a distinct physical entity for the purpose of study.
 - III. A test of only one factor by using a comparison of an unchanging group of quantities.
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- a. Controlled experiment, physical system, hypothesis
 - b. Hypothesis, controlled experiment, physical model
 - c. Physical model, physical system, scientific method
 - d. Scientific method, physical system, controlled experiment
 - e. None of the above

Answer:

e.

Question:

Which of the following statements is correct?

- I. **Physics equations precisely describe relationships and the behavior of natural phenomena.**
- II. **In physics, a trend is also a pattern or relationship.**
- III. **Compared to graphs, tables make trends easier to observe.**

- a. I only
- b. II only
- c. III only
- d. I and II only
- e. I, II and III

Answer:

- a. d

Question:

Which of the following statements is true of *any* valid physical equation?

- a. Both sides must have the same dimensions.
- b. Both sides must have the same variables.
- c. Both sides contain only variables.
- d. Both sides contain only numbers.
- e. None of the above

Answer:

- a.

Question:

Which of the following statements concerning physics equations is correct?

- I. **Physics equations are only valid if they are able to make correct predictions regarding the physical phenomena they describe.**
 - II. **An equation in physics is a compact statement of a physical model used to describe and predict the behavior of a physical phenomenon.**
 - III. **Physics equations describe precise relationships between physical quantities.**
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- a. I only
 - b. II only
 - c. I and II
 - d. II and III
 - e. I, II and III

Answer:

e.

Question:

Which of the following statements concerning graphing techniques is correct?

- I. When constructing a best-fit curve, it is best practice to connect data points using straight lines.
 - II. Best-fit curves function to mitigate error produced in an experiment.
 - III. When finding the slope of a linear function graph curve, it is best practice to choose coordinates of actual data points for slope formula values.
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- a. I only
 - b. II only
 - c. III only
 - d. II and III
 - e. I, II and III

Answer:

b.