

Chapter 1 homework

Physics: The science of energy

Name ANSWERS

Date _____

Write the BEST, correct answer in the blank provided.

1. The search for relationships that explain and predict natural phenomena is 1. Science
2. The products, processes, and services provided by engineers are each referred to as a type of 2. Technology
3. A statement in science that describes the relationship between various phenomena is a or 3. Law
Principle
4. A reasonable explanation of observed, related events is a scientific 4. Theory
5. An imaginary explanation of phenomena not directly observed is a 5. Model
6. A measure of the amount of material in an object is its 6. Mass
7. A property of matter that opposes any change in its state of motion is 7. Inertia
8. The capacity to do work (make changes in matter) is 8. Energy
9. Scientists and engineers often do complementary work which are named correspondingly and 9. Research
Development
10. A civil law restricts behavior to that which is acceptable. A scientific law behavior which is unavoidable. 10. Explains
11. In Physics, scientific laws not only are stated in words but also are usually expressed using a mathematical 11. Formula
12. A useful scientific theory past observations and helps events that have not yet been observed. 12. Explains
Predicts
13. A possible solution to a scientific problem is called a 13. Hypothesis
14. No amount of experimentation can a scientific law absolutely, but ..(number)..experiment(s) can prove it is false. 14. Prove
One
15. Mass can be measured using the property ofin an inertial balance. The time required for the mass to experience a single vibration in this balance is called the 15. Inertia
Period
16.is described with the measurable properties of mass and inertia. 16. Matter
17. The density of matter can be expressed using the equation 17. $D=m/V$

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|--|--|
| 18. Energy of position isenergy, while energy of motion isenergy. | 18. <u>Potential</u>
<u>Kinetic</u> |
| 19. For each problem in gravitational potential energy, an arbitrary must be specified. | 19. <u>Reference point</u> |
| 20. The equivalence between heat and mechanical energy provides strong evidence that heat is a form of | 20. <u>Energy</u> |
| 21. An object's mass, when considered stationary, is called; when considered moving, is called | 21. <u>Rest mass</u>
<u>Relativistic mass</u> |
| 22. Einstein's equation means thatand are different aspects of the same quantity. | 22. <u>Energy</u>
<u>Mass</u> |
| 23. Physics is ascience that is concerned with the relationship between matter and energy. | 23. <u>Physical</u> |
| 24. The division of physics which studies motion is | 24. <u>Mechanics</u> |
| 25. The division of physics which studies sound and light is | 25. <u>Wave phenomenon</u> |

Formulate five scientific hypotheses for the following observation.

26. A ball moves along a straight path, stops, and moves in the reverse direction along the same path.

- 1.
- 2.
- 3.
- 4.
- 5.

List the divisions of physics.

27. Mechanics
28. Waves
29. Electricity & magnetism
30. Nuclear

In the parenthesis at the right , write the letter of the energy change that BEST relates to the numbered object.

- | | | |
|---|-------------------------------------|-------|
| a. Potential to kinetic mechanical energy | 31. A burning match | (c) |
| b. Kinetic mechanical to sound energy | 32. I-pod headphones | (i) |
| c. Chemical to heat energy | 33. Television screen | (f) |
| d. Heat to chemical energy | 34. Nuclear-powered submarine | (g) |
| e. Sound to electric energy | 35. Bowling ball rolling down alley | (b) |
| f. Electric to light energy | 36. Battery for a calculator | (j) |
| g. Nuclear to kinetic mechanical energy | 37. Hammer falling to a nail | (a) |
| h. Light to electric energy | 38. Solar-powered calculator | (h) |
| i. Electric to sound energy | 39. Microphone | (e) |
| j. Chemical to electric energy | 40. Television antenna | (h) |

Answer each of the following in the space provided. When appropriate, use complete sentences.

41. What equation equates mass and energy? $E = mc^2$

42. Explain what this relationship means.

Energy and mass are related. One can be turned into the other.

43. Scientists follow a process or method to reach their goal, development of a scientific law. What sequences are required within this method to reach the goal?

Scientists observe a problem, then form a hypothesis. To test the hypothesis, scientists design an experiment. The experiment must be controlled in order to collect both qualitative and quantitative data. Only the independent and dependent variables should change in the experiment. Once the data is organized and analyzed, scientists come to a conclusion about the veracity of the hypothesis. Once the hypothesis is verified, other related hypotheses can be tested. This repetition allows similar hypotheses to be grouped into broader statements called theories. When a theory is universal in nature or has mathematical relationships, it is called a law.

44. Science is limited in its ability to answer questions or arrive at valid answers. List six limitations on science or the scientist.

- | | |
|------------------------|------------------|
| 1. Universal negatives | 4. Sinners |
| 2. Moral | 5. Prejudice |
| 3. Value | 6. Final answers |

PROBLEM: Show your work in completing the following.

45. The mass density of lead is 11.4 g/cm^3 . What is the mass of 725 cm^3 of lead?

45. $\frac{8270 \text{ g}}{11.4 \text{ g/cm}^3}$

What is the specific gravity of lead?