Name ______________________________ Class ______________ Date _____________

Assessment

Chapter Test B

The Science of Physics

MULTIPLE CHOICE

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

______ **1.** A hiker uses a compass to navigate through the woods. Identify the area of physics that this involves.

a. thermodynamics **c.** electromagnetism
b. relativity **d.** quantum mechanics

______ **2.** According to the scientific method, how does a physicist formulate and objectively test hypotheses?

a. by defending an opinion **c.** by experiments
b. by interpreting graphs **d.** by stating conclusions

______ **3.** Diagrams are *not* designed to

a. show relationships between concepts.
b. show setups of experiments.
c. measure an event or a situation.
d. label parts of a model.

______ **4.** The most appropriate SI unit for measuring the length of an automobile is the

a. micron. **c.** meter.
b. kilometer. **d.** nanometer.

______ **5.** The radius of Earth is 6 370 000 m. Express this measurement in km in scientific notation with the correct number of significant digits.

a. 6.37×10^6 km **c.** 637×10^3 km
b. 6.37×10^3 km **d.** 63.7×10^4 km

______ **6.** Three values were obtained for the mass of a metal bar: 8.83 g; 8.84 g; 8.82 g. The known mass is 10.68 g. The values are

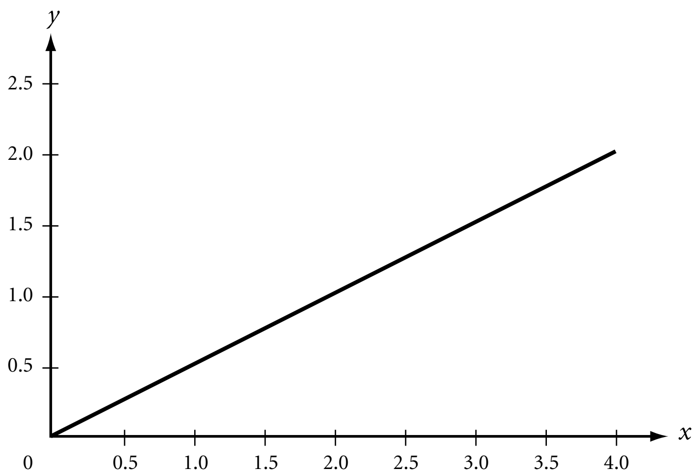
a. accurate. **c.** both accurate and precise.
b. precise. **d.** neither accurate nor precise.

______ **7.** Calculate the following, and express the answer in scientific notation with the correct number of significant figures: $10.5 \times 8.8 \times 3.14$

a. 2.9×10^2 **c.** 2.90×10^2
b. 290.136 **d.** 290

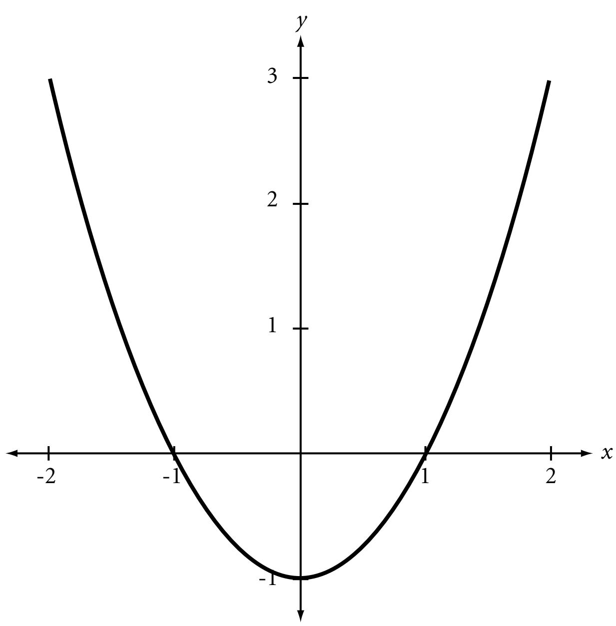
______ **8.** Calculate the following, and express the answer in scientific notation with the correct number of significant figures: $(0.82 + 0.042)(4.4 \times 10^3)$

a. 3.8×10^3
b. 3.78×10^3
c. 3.784×10^3
d. 3784



______ **9.** Which of the following equations best describes the graph above?

a. $y = 2x$
b. $y = x$
c. $y = x^2$
d. $y = \frac{1}{2}x$



______ **10.** Which of the following equations best describes the graph above?

a. $y = x^2 + 1$
b. $y = x^2 - 1$
c. $y = -x^2 + 1$
d. $y = -x^2 - 1$

______**11.** Which expression has the same dimensions as an expression yielding a value for acceleration (m/s^2)? (Δv has units of m/s.)

a. $\Delta v/(\Delta t)^2$
b. $\Delta v/(\Delta x)^2$
c. $(\Delta v)^2/\Delta \mathrm{t}$
d. $(\Delta v)^2/\Delta x$

______**12.** If the change in position Δx is related to velocity v (with units of m/s) in the equation $\Delta x = Av$, the constant A has which dimension?

a. m/s^2
b. m
c. s
d. m^2

______**13.** The sun is composed mostly of hydrogen. The mass of the sun is 2.0×10^{30} kg, and the mass of a hydrogen atom is 1.67×10^{-27} kg. Estimate the number of atoms in the sun.

a. 10^3
b. 10^{57}
c. 10^{30}
d. 10^{75}

SHORT ANSWER

14. If unexpected results are obtained and confirmed through repeated experiments, why must a model or hypothesis be abandoned or revised?

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15. How can only seven basic units serve to express almost any measured quantity?

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16. Convert 1 μm to meters using scientific notation.

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17. Why do calculators often exaggerate the precision of a final result?

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18. How many significant figures does 0.050 200 mg have?

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PROBLEM

19. The radius of Earth is 6.37×10^6 m. The average Earth-sun distance is 1.496×10^{11} m. How many Earths would fit between Earth and the sun if they are separated by their average distance? Use an order-of-magnitude calculation to estimate this number. Then, determine an exact answer and express it in scientific notation with the correct number of significant digits.

	Trial 1	Trial 2	Trial 3	Trial 4
0.0 s	20.5° C	21.3° C	20.8° C	21.0° C
5.0 s	21.0° C	22.9° C	21.4° C	21.7° C
10.0 s	21.6° C	24.1° C	22.0° C	22.3° C
15.0 s	22.2° C	26.8° C	22.7° C	22.8° C
20.0 s	23.0° C	28.2° C	23.2° C	23.3° C

20. Four trials of a chemical reaction were completed, and the change in temperature ΔT was measured every five seconds. Based on the data in the table above, answer the following questions. Are there any unexpected or unusual results? Explain your answer. What is the general relationship between temperature and time? Disregarding any trial(s) with unexpected results, express this relationship in the form of a general equation.