

Matter and Change & Scientific Measurement

Directions: Perform the prescribed operations, giving your answers the correct number of significant figures. Be sure to include units.

1. $22\text{ g} + 14.3\text{ g} + 97.03\text{ g} =$ _____
2. $71.6\text{ mL} + 45.32\text{ mL} - 8\text{ mL} =$ _____
3. $3.14159 \times 4.0\text{ cm} =$ _____
4. $27.2\text{ g} \div 2.0\text{ cm} =$ _____
5. $25.4\text{ dm} \times 2.00 =$ _____
6. $100.0\text{ g} \times 1.00 \div 28.6^\circ\text{C}$ _____

Directions: Round the following numbers to the indicated number of significant figures.

7. 1.034 (to 2 sig fig) _____
8. 40.06 (to 3 sig fig) _____
9. 0.0000624 (to 2 sig fig) _____
10. 1.549 (to 2 sig fig) _____
11. 739.51 (to 3 sig fig) _____
12. 82.000 (to 1 sig fig) _____

Directions: Perform the operations, rounding answers to the correct number of sig figs.

13. $44\text{ g} + 13.4\text{ g} + 87.40\text{ g} =$ _____
14. $21.6\text{ mL} + 43.57\text{ mL} - 1\text{ mL} =$ _____
15. $6.79\text{ cm} \times 13.5\text{ cm} =$ _____
16. $25.1\text{ g} \div 5.9\text{ cm}^3 =$ _____
18. $\pi \cdot 2.817\text{ cm}^3$ _____
19. $2.00 \times 10^2\text{ g} \div 28.6^\circ\text{C}$ _____

Directions: Tell if each item is always true (AT), sometimes true (ST) or never true (NT).

20. _____ Qualitative measurements give results in a definite form, usually as numbers.
21. _____ If the mass of an object is measured on the same balance by three different people and each determines the mass to be 2.3 g, the balance is very accurate.
22. _____ Zeros at the end of a measurement and to the left of the decimal point are not significant.

23. _____ Significant figures include all the digits that can be accurately known plus an estimated digit.
24. _____ An answer to a calculation done with scientific measurements cannot be more precise than the least precise measurement.
25. _____ The SI unit of mass measurement is the gram.

Directions: Give the number of significant figures in the following measurements.

- | | | | |
|---------------|-------|------------------------------|-------|
| 26. 1505 kg | _____ | 29. 3.85×10^{-3} dm | _____ |
| 27. 17.30 cm | _____ | 30. 1500 s | _____ |
| 28. 0.0037 mm | _____ | 31. 250.00 mL | _____ |

Directions: Perform the following operations. Then give the answers in scientific notation.

- | | |
|---|-------|
| 32. $37.2 \text{ mL} + 18.0 \text{ mL} + 380 \text{ mL}$ | _____ |
| 33. $0.57 \text{ cm} \times 0.86 \text{ cm} \times 17.1 \text{ cm}$ | _____ |
| 34. $(8.13 \times 10^4) \div (3.8 \times 10^2)$ | _____ |
| 35. $(1.04 \times 10^{-5}) \times (4.33 \times 10^{-3})$ | _____ |
| 36. $71.3 \text{ kg} + 0.08 \text{ kg}$ | _____ |

Directions: Identify each property as physical or chemical.

- | | | | |
|------------------------|-------|------------------|-------|
| 37. melting point | _____ | 41. density | _____ |
| 38. resistance to acid | _____ | 42. conductivity | _____ |
| 39. luster | _____ | 43. flammability | _____ |
| 40. mass | _____ | 44. rustproof | _____ |

Directions: Answer the following questions in the space provided.

45. The melting point of lead is 327°C . What is this temperature in Fahrenheit? In Kelvin?
46. Hydrogen boils at 19.9 K. Express this temperature in Celsius and Fahrenheit.
47. When 400 grams of wood are burned, 30 grams of ash remain. What happened to the missing 370 grams of matter?
48. Some car batteries give off a potentially explosive mixture of gases. What kind of change is taking place in the battery? How do you know this?
49. If 16 grams of methane gas combines with 64 grams of oxygen to form 44 grams of carbon dioxide plus some water, what mass of water is produced? Show work. How do you know this?