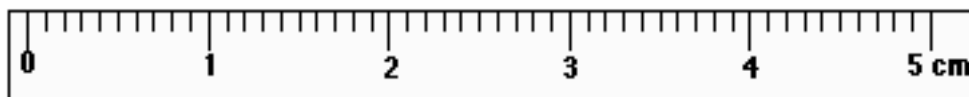


Practice Questions

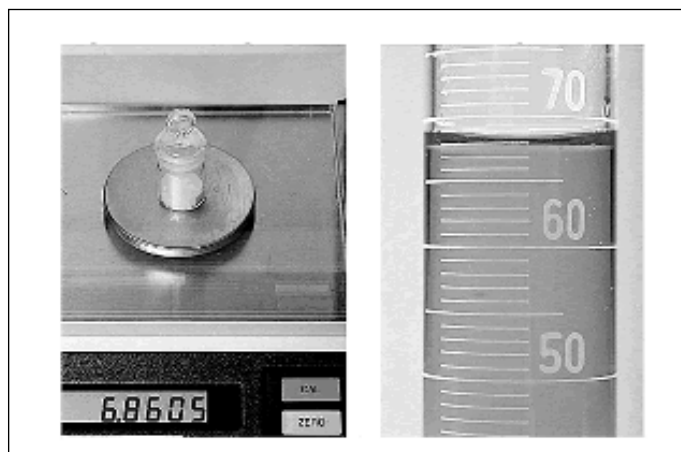
EXAM 1

1. What is the term for the systematic investigation of matter and energy, and developing experiments and theories to test and explain observations?
 - (a) alchemy
 - (b) science
 - (c) chemistry
 - (d) physics
 - (e) none of the above
2. Which set of measurements are all consistent with the metric ruler shown below?



- (a) 1.5 cm, 1.55 cm, 2.35 cm
 - (b) 2.400 cm, 3.40 cm, 4.75 cm
 - (c) 1.7 cm, 1 cm, 2.40 cm
 - (d) 4.50 cm, 1.500 cm, 3.45 cm
 - (e) 1.50 cm, 1.55 cm, 2.35 cm
3. Which statement about the measurement of mass is true?
 - a) Mass is measured using a balance and is not affected by gravity.
 - b) Both the mass and weight are the same on the moon and on earth.
 - c) Mass is measured using a graduated cylinder and is not affected by gravity.
 - d) Mass is the force exerted by gravity on an object and is measured using a balance.
 4. Three liquid samples labeled (A), (B) and (C) were measured using different volumetric tools, which unfortunately were not calibrated using the same unit of volume. There were three different units: cm^3 , gallons, and milliliters (mL). (1 gal = 3.785 L; 1000 mL = 1 L; 1 mL = 1 cm^3)
(A) $6.11 \times 10^3 \text{ cm}^3$ (B) 1.75 gal (C) 6,055 mL
The correct order of increasing volume for the samples is:
 - a) (A) < (B) < (C)
 - b) (C) < (B) < (A)
 - c) (B) < (C) < (A)
 - d) (B) < (A) < (C)

Refer to the images below for questions #4 & #5 .

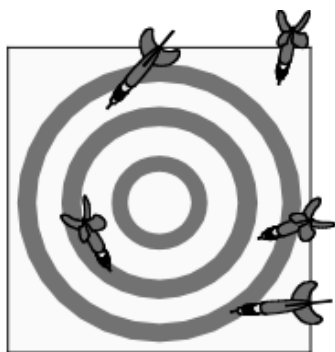


5. An empty weighing bottle weighs has a mass of 4.6205 g. An unknown solid is added and the bottle reweighed as illustrated above. What is the mass of the unknown solid?
- a) 2.24 g
 - b) 2.240 g
 - c) 2.2400 g
 - d) 2.2 g
 - e) none of the above
6. Which value best represents the volume of the liquid in the graduated cylinder in the above illustration?
- a) 72 L
 - b) 72.0 mL
 - c) 68 L
 - d) 68.0 mL
7. If the volume of a sample of sulfuric acid acid from a battery was 6.00 mL and its density is 1.2 g/mL, what would the correct reported mass in grams with the proper number of significant digits?
- a) 5.00 g b) 5.0 g c) 7.2 g d) 7.20 g
8. The melting point of pure aspirin is 135°C. The average melting point and deviation for the respective experimental results of four different student's data are shown below. Which is the best overall result considering both accuracy and precision?
- a) Student #1 (135+/-5.5 °C)
 - b) Student #2 (132+/-3.7 °C)
 - c) Student #3 (134+/-0.8 °C)
 - d) Student #4 (129+/-0.6 °C)

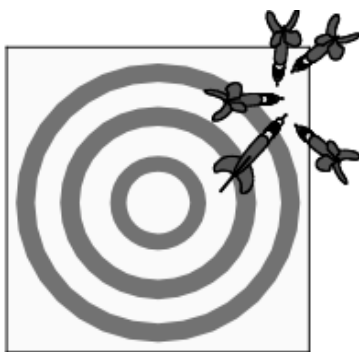
9. Quincey weighed an object, then submerged it in pure water, and measured the water it displaced. Her respective measurements were 6.5 g and 5.0 mL. Her volume was 1.2% less than her research group's average and her mass was 0.5% less than the average. What might the object be? ($1 \text{ kg} = 1000 \text{ g}$; $1 \text{ m}^3 = 10^6 \text{ cm}^3$; $1 \text{ L} = 1000 \text{ cm}^3$)
- Quebracho Wood; $D(\rho) = 1,235 \text{ kg/m}^3$
 - Diamond; $D(\rho) = 3.53 \text{ g/cm}^3$
 - Lead; $D(\rho) = 11.3 \text{ kg/L}$
 - Cannot determine, because Quincey's value was less precise than the group's.
 - Cannot determine, because Quincey's value was less accurate than the group's.
10. Two different cubes were weighed. Both weighed exactly 5.00 kg, and both sank to the bottom of a tank containing 100. L of pure water. The volume of the water + block in the tank increased to 102 L for one block and 101 L for the other. How is this possible?
- One is more dense
 - They are made of the same material
 - They are made of different material
 - More than one of these
 - None of the above
11. Two icebergs of approximately the same overall size were in the path of the R.M.S. Titanic in 1912. The helmsman steered a course nearest to the one that appeared smallest from his view of what was above the ocean's surface. Unfortunately, the ship hit the iceberg beneath the ocean's surface and sank. From this information the relative densities of the icebergs and the seawater can be determined. Which statement below is NOT true.
- Both icebergs are less dense than seawater.
 - The iceberg that the Titanic struck was denser than the other iceberg.
 - The density of the seawater was greater than the both icebergs.
 - The water displaced by the portion of the iceberg beneath the surface was equal to the total volume of the iceberg.
12. Air is made up of nitrogen, oxygen, carbon dioxide, and other gases. Air is a(n)
- heterogeneous mixture.
 - element.
 - compound.
 - pure substance.
 - homogeneous mixture.

13. Which of the following is not solid at 25°C (room temperature) and normal atmospheric pressure?
- a) Iodine (I)
 - b) calcium (Ca)
 - c) silicon (Si)
 - d) bromine (Br)
 - e) boron (B)
14. Gasoline burning is an example of a
- a) physical property
 - b) metaphysical property
 - c) physical change
 - d) chemical change
 - e) gaseous infringement
15. Using atomic notation, indicate the isotope having 26 p+, 32 n, and 26 e⁻.
- a) ${}_{26}^{32}\text{Fe}$
 - b) ${}_{32}^{26}\text{Ge}$
 - c) ${}_{26}^{58}\text{Fe}$
 - d) ${}_{32}^{58}\text{Ge}$
16. Use the Periodic Table to classify nitrogen (N) and germanium (Ge) respectively as metals, or nonmetals, or metalloids:
- a. N and Ge are both metalloids
 - b. N is a metalloid and Ge is a metal
 - c. N is a nonmetal and Ge is a metal
 - d. N is a nonmetal and Ge is a metalloid

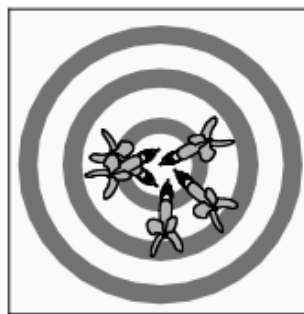
TRUE / FALSE



(a)



(b)



(c)

1. The relative accuracy of the darts is $c > b > a$.
2. The relative precision of the darts is $c > b > a$.
3. Radioactivity is the result of an atom having an unstable nucleus due to an unfavorable ratio of electrons and neutrons.
4. The relative sizes of radioactive particles are: alpha is larger than gamma, which is smaller than beta.
5. The alpha particle is positively charged and is larger than a neutron.
6. A proton has the same atomic mass as a neutron.
7. Elements are pure substances that cannot be broken down by physical or chemical means into two or more simpler substances.
8. Isotopes are atoms of different elements with the same number of neutrons.
9. An electron has an opposite charge than a proton.
10. Unstable isotopes can change spontaneously to other nuclei with different atomic numbers.

Answer remaining questions on the exam.

Match the following key terms.

_____ A nuclear reaction in which small nuclei combine with the release of energy.	A. Accuracy
_____ The number of protons in the nucleus of an atom of a given element.	B. Atomic Mass
_____ The variation between the values in a set of experimental data.	C. Atomic Number
_____ A property that changes as the size of the sample changes.	D. Extensive
_____ An objective measure such as miles per hour.	E. Fission
	F. Fusion
	G. Intensive
	H. Macroscopic
	I. Microscopic
	J. Precision
	K. Qualitative
	L. Quantitative

Liquid nitrogen boils at 77 K. What is the boiling point in °C?
[0 K = -273.15 °C; °C = 5/9(°F -32)]

Answer:

Express 3.62×10^3 g as an ordinary number.

Answer:

How many meters are there in 3.62 km (expressed in scientific notation)?
[1 km = 1000 m]

Answer:

According to the U.S. Mint, all of the typical coins in circulation today (except for the penny and the nickel) are composed of the same mixture of two metals, copper and nickel. If a quarter was analyzed and found to contain 0.742 g of nickel and 5.198 g of copper, what is the percentage of nickel in the quarter? (Clearly show your mathematical work and express your answer to the correct number of significant figures.)

Answer:

A quartzite metamorphic rock, which also contained gold, was found in Benicia. The rock has a mass of 54.36 g. Its volume was found by submerging it in a graduated cylinder filled with water: The cylinder contained 50.0 mL of water before and 60.3 mL after the rock was submerged. Calculate the density of this rock. (Clearly show and label your mathematical work and express your answer to the correct number of significant figures.)

Answer:

The density of quartzite rock is 2.7 g/cm^3 . The density of pure gold is 19.3 g/cm^3 . Clearly show a mathematical formula to calculate the % gold in the rock using the experimental density in your answer and the densities of quartzite and gold.