

1. How many significant figures are in the measured quantity below?

0.03080

- a) 2
b) 3
c) 4
d) 5
e) 6
2. A student determined the mass of a sample contained in a beaker by subtracting the mass of the beaker alone (53.82 g) from the mass of the beaker containing the sample (55.652 g). How many significant figures should be reported for the mass of the sample?

- a) 1
b) 2
c) 3
d) 4
e) 5

3. Perform the calculation below. How should the result of this calculation be expressed, taking into account the appropriate use of significant figures?

$$\frac{17.925 - 5.32}{4.9273}$$

- a) 2.6
b) 2.56
c) 2.558
d) 2.5582
e) 2.55820
4. When the following calculation is performed, how many significant figures should the answer have?

$$\frac{4.32 \times 10^{-7} + 8.98 \times 10^{-7}}{4.227 \times 10^{-5} - 2.7 \times 10^{-7}}$$

- a) 1
b) 2
c) 3
d) 4
e) 5
5. Perform the calculation below. How should the result of this calculation be expressed, taking into account the appropriate use of significant figures?

$$7.8 \times 10^{-7} + 8.69 \times 10^{-6} + 9.923 \times 10^{-5}$$

- a) 1.1×10^{-4}
b) 1.09×10^{-4}
c) 1.087×10^{-4}
d) 1.0870×10^{-4}
e) 1.08700×10^{-4}
6. Perform the calculation below. How should the result of this calculation be expressed, taking into account the appropriate use of significant figures?

$$8.67 \times 10^{-5} + 9.7325 \times 10^{-4} + 2.742 \times 10^{-6}$$

- a) 1.06×10^{-3}
b) 1.063×10^{-3}
c) 1.0627×10^{-3}
d) 1.06269×10^{-3}
e) 1.062692×10^{-3}

7. What is the SI unit of mass?
- kg
 - g
 - N
 - amu
 - lb
8. Convert 0.755 dL to μL .
- $7.55 \times 10^4 \mu\text{L}$
 - $7.55 \times 10^5 \mu\text{L}$
 - $7.55 \times 10^6 \mu\text{L}$
 - $7.55 \times 10^{-5} \mu\text{L}$
 - $7.55 \times 10^{-6} \mu\text{L}$
9. Convert 4.25 mL to μL .
- $4.25 \times 10^{-4} \mu\text{L}$
 - $4.25 \times 10^{-3} \mu\text{L}$
 - $4.25 \times 10^2 \mu\text{L}$
 - $4.25 \times 10^3 \mu\text{L}$
 - $4.25 \times 10^4 \mu\text{L}$
10. A small hole in the wing of the space shuttle requires a 27.2 cm^2 patch. What is the patch's area in square inches?
- 0.237 in^2
 - 4.22 in^2
 - 10.7 in^2
 - 17.5 in^2
 - 69.1 in^2
11. Pure gold has a density of 18.9 g/cm^3 . Express this density in units of lb/ft^3 .
- $1.18 \times 10^6 \text{ lb/ft}^3$
 - $1.27 \times 10^3 \text{ lb/ft}^3$
 - 1.27 lb/ft^3
 - 819 lb/ft^3
 - $1.18 \times 10^3 \text{ lb/ft}^3$
12. The density of ethanol is 0.789 g/mL . Express the value in units of lbs/ft^3 .
- 5.30 lbs/ft^3
 - 49.3 lbs/ft^3
 - 53.0 lbs/ft^3
 - 279 lbs/ft^3
 - 82.2 lbs/ft^3
13. Convert 70.0 mi/hr to m/s . ($1 \text{ mi} = 1.6093 \text{ km}$)
- 29.2 m/s
 - 31.3 m/s
 - 37.6 m/s
 - 157 m/s
 - 406 m/s
14. A certain liquid has a density of 2.67 g/mL . What volume (in L) would 1340 g of this liquid occupy?
- $2.00 \times 10^{-3} \text{ L}$
 - 50.2 L
 - 3.58 L
 - 35.8 L
 - 0.502 L

15. An empty Erlenmeyer flask weighs 144.5 g. When completely filled with water (density = 1.00 g/cm³), the flask and its contents weigh 219.4 g. The water is removed, and the flask is completely filled with chloroform (density = 1.48 g/cm³). What is the total mass of the flask and its contents when the flask is filled with chloroform?
- 358 g
 - 325 g
 - 255 g
 - 198 g
 - 111 g
16. The density of magnesium is 1.74 g/cm³. What is the volume of 275 g of this metal?
- 395 cm³
 - 479 cm³
 - 158 cm³
 - 522 cm³
 - 633 cm³
17. Ernest Rutherford and his coworkers performed an experiment that led to the downfall of the “plum-pudding” model of the atom. This experiment involved measuring:
- the scattering of alpha particles by a thin gold foil.
 - the rate of fall of charged oil drops.
 - the effects of magnetic and electric fields on the cathode rays in a cathode ray tube.
18. An element’s most stable ion forms an ionic compound with chlorine, having the formula XCl₃. If the ion of element X has a mass number of 27 and has 10 electrons, how many neutrons does it have?
- 12
 - 10
 - 17
 - 14
 - 13
19. How many protons, neutrons, and electrons are present in ⁵⁶Fe²⁺?
- | | <u>protons</u> | <u>neutrons</u> | <u>electrons</u> |
|----|----------------|-----------------|------------------|
| a) | 26 | 30 | 28 |
| b) | 26 | 56 | 28 |
| c) | 26 | 56 | 24 |
| d) | 26 | 30 | 24 |
| e) | 56 | 26 | 28 |
20. Which of the following symbol/name combinations is incorrect?
- Au, gold
 - K, potassium
 - Na, natrium
 - Cu, copper
 - Pb, lead
21. Which of the elements below is an alkaline earth metal?
- K
 - Mg
 - Fe
 - Al
 - Si
22. Which of the compounds listed below is/are ionic?
- Cu(NO₃)₂
 - PCl₃
 - HBr
 - (NH₄)₂SO₃
- I only
 - I and IV
 - I, III, and IV
 - I and III
 - II, III, and IV

23. What is the formula for aluminum bisulfite?
- AlHSO_3
 - $\text{Al}_2(\text{HSO}_3)_3$
 - $\text{Al}(\text{HSO}_3)_3$
 - $\text{Al}_2(\text{SO}_3)_3$
 - $\text{Al}_3(\text{SO}_3)_2$
24. The correct name for FePO_4 is
- iron(I) phosphate
 - iron(II) phosphide
 - iron(II) phosphite
 - iron(III) phosphate
 - iron(III) perphosphate
25. What is the correct name of PbO_2 ?
- monolead dioxide
 - lead dioxide
 - lead(II) dioxide
 - lead(II) oxide
 - lead(IV) oxide
26. Which of the compounds below has the correct formula written next to it?
- mercury(I) chloride, HgCl
 - ammonium periodate NH_4IO_4
 - hydrosulfuric acid, H_2S
 - iron(III) oxide, Fe_3O_2
 - magnesium bicarbonate, MgHCO_3
- I and V
 - II and III
 - II only
 - II, III, and IV
 - I, II, IV, and V
27. Which of the following formula/name combinations is incorrect?
- BaPO_4 barium phosphate
 - MnO_2 manganese(IV) oxide
 - Hg_2Cl_2 mercury(I) chloride
 - K_2CO_3 potassium carbonate
 - CuCl copper(I) chloride
28. Which of the following acids is incorrectly named?
- H_2SO_4 sulfuric acid
 - HClO_3 chlorous acid
 - HNO_2 nitrous acid
 - HCl hydrochloric acid
 - H_3PO_3 phosphorous acid
29. Which of the substances below exists as stable diatomic molecules?
- Al
 - B
 - C
 - S
 - I

30. The average atomic mass of carbon is 12.011. Assuming that you were able to pick up only one carbon atom, the chance that you would randomly choose one with a mass of 12.011 amu is
- 1.1%
 - 12%
 - 12.011%
 - greater than 50%
 - 0%
31. Boron has two naturally occurring isotopes, boron-10 with a mass of 10.0129 amu and boron-11 with a mass of 11.00931 amu. The average atomic mass of boron is 10.811. What is the percent abundance of the boron-10 isotope?
- 22.7%
 - 26.3%
 - 14.1%
 - 73.7%
 - 19.9%
32. Copper has two naturally occurring isotopes, ^{63}Cu (isotopic mass 62.9396 amu) and ^{65}Cu (isotopic mass 64.9278 amu). If copper has an atomic mass of 63.546 amu, what is the fractional abundance of ^{63}Cu ?
- 0.577
 - 0.695
 - 0.423
 - 0.723
 - 0.305
33. How many copper atoms are in 25.0 g of copper?
- 1.51×10^{25}
 - 9.57×10^{26}
 - 1.25×10^{24}
 - 2.37×10^{24}
 - 2.37×10^{23}
34. What is the mass of 3.33×10^{20} iron atoms?
- 1.86×10^{22}
 - 5.53×10^{-4} g
 - 3.09×10^{-2} g
 - 7.29 g
 - 3.09×10^{44} g

Answer Key:

- | | | | | | | |
|------|-------|-------|-------|-------|-------|-------|
| 1. c | 6. c | 11. e | 16. c | 21. b | 26. b | 31. e |
| 2. c | 7. a | 12. b | 17. a | 22. b | 27. a | 32. b |
| 3. c | 8. a | 13. b | 18. d | 23. c | 28. b | 33. e |
| 4. d | 9. d | 14. e | 19. d | 24. d | 29. e | 34. c |
| 5. d | 10. b | 15. c | 20. c | 25. e | 30. e | |