

Practice Problems Exam 1

$$h = 6.626 \times 10^{-34} \text{ Js}$$

$$\text{Avogadro's number} = 6.022 \times 10^{23} \quad c = 3.00 \times 10^8 \text{ m/s}$$

- An ionic bond is best described as:
 - the sharing of electrons.
 - the transfer of electrons from one atom to another.
 - the attraction that holds the atoms together in a polyatomic ion.
 - the attraction between 2 nonmetal atoms.
 - the attraction between 2 metal atoms.
- Which of the following is an atomic element?
 - Br
 - H
 - N
 - O
 - Mg
- The statement, "In a chemical reaction, matter is neither created nor destroyed." is called
 - The Law of Conservation of Mass
 - Dalton's Atomic Theory
 - The Scientific Method
 - The Law of Multiple Proportions
 - The Law of Definite Proportions
- Choose the pure substance from the list below.
 - sea water
 - sugar
 - air
 - lemonade
 - milk
- A substance composed of 2 or more elements in a fixed, definite proportion is considered
 - a homogeneous mixture.
 - a heterogeneous mixture.
 - a compound.
 - a solution.
 - an alloy.
- Which of the following are examples of physical change?
 - dew forms on a blade of grass
 - a halloween light stick glows after shaking
 - an egg solidifies during cooking
 - a hydrogen balloon explodes when contacted with a flame
 - None of the above are physical changes.

7. Determine the mass of an object that has a volume of 88.6 mL and a density of 9.77 g/mL.
8. Determine the number of protons, neutrons and electrons in the following:
 ${}_{29}^{65}\text{X}$
9. What species is represented by the following information?
 $p^+ = 12$ $n^0 = 14$ $e^- = 10$
- Si^{4+}
 - Mg
 - Ne
 - Si
 - Mg^{2+}
10. Predict the charge that a calcium ion would have.
11. Silver has an atomic mass of 107.868 amu. The Ag-109 isotope (108.905 amu) is 48.16%. What is the amu of the other isotope?
12. How many Li atoms are contained in 97.9 g of Li?
13. How many significant figures are in 3.408×10^4 m?
14. Calculate the energy of a photon of electromagnetic radiation for 628.5 nm
15. Determine the energy of 1.20 mole of photons with a wavelength of 510 nm.
16. No two electrons can have the same four quantum number is known as
- Pauli exclusion principle
 - Hund's rule
 - Aufbau principle
 - Heisenberg uncertainty principle
17. Give a set of quantum number that could represent the last electron added to an atom of phosphorous
18. Draw the electron configuration of Ca^{2+} .

19. Complete this sentence: Atoms emit visible and ultraviolet light

- A. as electrons jump from lower energy levels to higher levels.
- B. as the atoms condense from a gas to a liquid.
- C. as electrons jump from higher energy levels to lower levels.
- D. as they are heated and the solid melts to form a liquid.
- E. as the electrons move about the atom within an orbit.

20. What is the maximum number of electrons in an atom that can have the following set of quantum numbers?

$$n = 4 \quad l = 3 \quad m_l = -2 \quad m_s = +1/2$$

- A. 0
- B. 1
- C. 2
- D. 6
- E. 10

21. Place the following elements in order of increasing atomic radius.

P Ba Cl

- A. Ba < P < Cl
- B. P < Cl < Ba
- C. Cl < P < Ba
- D. Cl < Ba < P
- E. Ba < Cl < P

22. Place the following types of electromagnetic radiation in order of increasing frequency.

visible light microwaves X-rays

- A. microwaves < visible light < X-rays
- B. X-rays < visible light < microwaves
- C. microwaves < X-rays < visible light
- D. X-rays < microwaves < visible light
- E. visible light < X-rays < microwaves

23. How many different values of l are possible in the third principal level?

- A. 1
- B. 2
- C. 3
- D. 0
- E. 4

24. How many electrons can be held in the $n = 2$ energy level?

25. Which of these compounds is most likely to be ionic?

A. KF

B. CCl₄

C. CS₂

D. CO₂

E. ICl

Answers

1. B
2. E
3. A
4. B
5. C
6. A
7. 866 g
8. $p^+ = 29$ $n^{\circ} = 36$ $e^- = 29$
9. E
10. 2^+
11. 106.905 amu
12. 8.49×10^{24} Li atoms
13. 4
14. 3.163×10^{-19} J
15. 282 kJ
16. A
17. $n = 3, l = 1, m_l = 1$ or 0 or $-1, m_s = \pm \frac{1}{2}$
18. $1s^2 2s^2 2p^6 3s^2 3p^6$
19. C
20. B
21. C
22. A
23. C
24. 8
25. A
26. E