

Pre-AP Chemistry

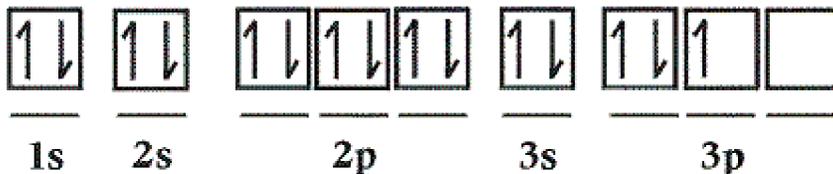
Midterm Review 2016

Part 2

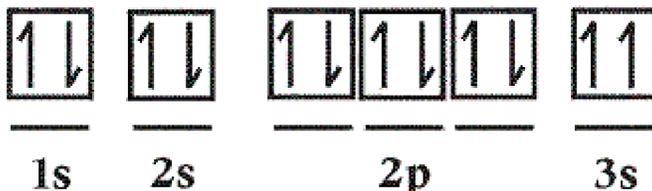
Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Which is the correct electron configuration for the element Molybdenum (Mo)?
- a. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^6$ c. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^5$
 b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^{10} 4p^6 5s^2 5d^4$ d. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$

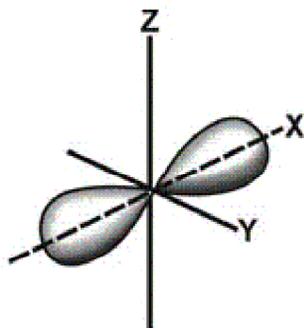


- _____ 2. Which rule for the filling of orbitals by electrons in the element Phosphorous is being violated in the orbital diagram shown?
- a. Planck's Law d. Hund's Rule
 b. Aufbau e. Pauli Principle
 c. Avagadro
- _____ 3. What is the frequency of a light wave with a wavelength of 680 nm?
- a. 2.04×10^9 Hz c. 4.41×10^{14} Hz
 b. 2.27×10^{-15} Hz d. 2.04 s

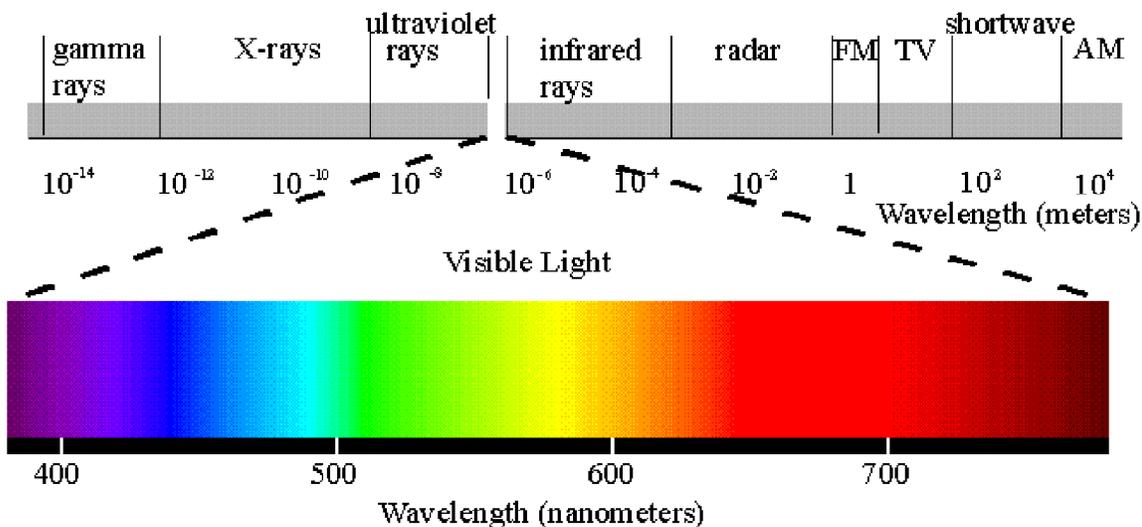


- _____ 4. Which rule for the filling of orbitals by electrons in the element Magnesium is being violated?
- a. Aufbau d. Avagadro
 b. Pauli Principle e. Hund's Rule
 c. Planck's Law

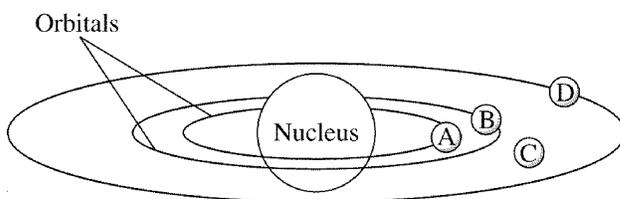
- ___ 10. "Orbitals of equal energy are each occupied by one electron before any is occupied by a second electron, and all electrons in singly occupied orbitals must have the same spin" is a statement of
- the quantum effect.
 - the Pauli exclusion principle.
 - Hund's rule.
 - the Aufbau principle.
- ___ 11. An orbital that could never exist according to the quantum description of the atom is
- 8s.
 - 3f.
 - 6d.
 - 3d.
- ___ 12. Which type of orbital is shown?



- p
 - d
 - f
 - s
- ___ 13. What are quanta of light called?
- solitons
 - muons
 - photons
 - excitons
 - charms
- ___ 14. A photon is emitted from an atom with an energy of 4.25×10^{-19} J. What is the wavelength of the photon?
- 2.73×10^{-4} m
 - 6.42×10^{14} m
 - 1.28×10^{-10} m
 - 467 nm
- ___ 15. Which is the correct number of valence electrons in the element Sulfur (S)?
- 16
 - 4
 - 6
 - 2
- ___ 16. What is the maximum number of d orbitals in a principal energy level?
- 2
 - 1
 - 3
 - 5
 - 10

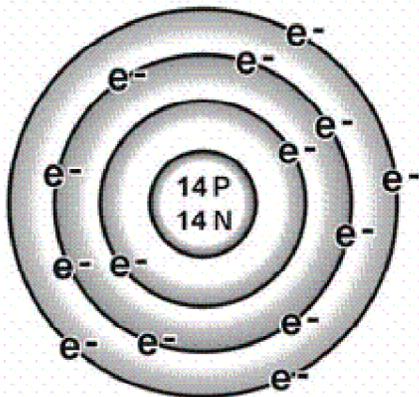


- ___ 17. Which type of wave has a wavelength of approximately 10^{-12} meters?
- ultraviolet light
 - AM radio
 - Gamma rays
 - microwaves
- ___ 18. What is the amount of energy carried by a photon that has a frequency of 5.71×10^{14} Hz?
- 525 nm
 - 8.62×10^{47} J/s
 - 3.78×10^{-19} J
 - 1.14×10^{-8} J
- ___ 19. Emission of light from an atom occurs when the electron ____.
- moves within its atomic orbital
 - jumps from a lower to a higher energy level
 - drops from a higher to a lower energy level
 - falls into the nucleus
- ___ 20. Visible light, X rays, infrared radiation, and radio waves all have the same
- energy.
 - wavelength.
 - frequency.
 - speed.



- ___ 21. According to Bohr, electrons cannot reside at ___ in the figure above.
- point A
 - point B
 - point C
 - point D

- _____ 22. In the figure above, which point represents the location of electrons with the greatest amount of potential energy?
- A
 - D
 - C
 - B
- _____ 23. The principal quantum number indicates what property of an electron?
- position
 - energy level
 - spin
 - speed
 - electron cloud shape
- _____ 24. A line spectrum is produced when an electron moves from one energy level
- to a higher energy level.
 - to another position in the same sublevel.
 - to a lower energy level.
 - into the nucleus.
- _____ 25. How many unpaired electrons are there in a sulfur atom (atomic number 16)?
- 3
 - 1
 - 4
 - 0
 - 2
- _____ 26. A spherical electron cloud surrounding an atomic nucleus would best represent
- | | |
|---|---|
| a. a combination of p_x and p_y orbitals. | c. an s orbital. |
| b. a p_x orbital. | d. a combination of an s and a p_x orbital. |
- _____ 27. The lowest energy state of an atom is called the _____.
- ground state
 - independent state
 - dependent state
 - configurational state
 - excited state



28. What is the correct electron configuration for the above model of an atom?

a.

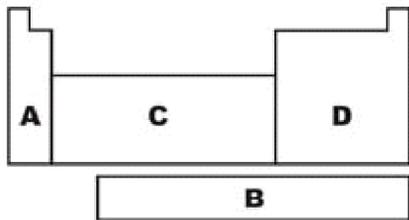
b.

c.

d.

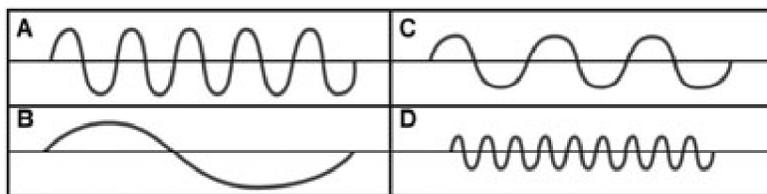
29. How does the speed of visible light compare with the speed of gamma rays, when both speeds are measured in a vacuum?

- The speed of visible light is greater.
- The speed of gamma rays is greater.
- The speeds are the same.
- No definite statement can be made on this question.



___ 30. Which region is referred to as the p-block on the diagram?

- a. C
- b. D
- c. A
- d. B



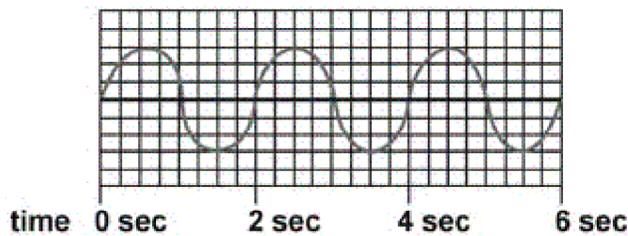
___ 31. Which diagram shows a wave with the highest frequency?

- a. A
- b. C
- c. B
- d. D

___ 32. Which is a transition element with five d-block electrons in energy level 4?

- a. Manganese (Mn)
- b. Niobium (Nb)
- c. Rhenium (Re)
- d. Technicium (Tc)

___ 33. Which is the frequency of the wave shown?



- a. 2 Hz
- b. 2 sec
- c. 3λ
- d. 0.5 Hz

- _____ 34. The quantum mechanical model of the atom _____.
- has many analogies in the visible world
 - was proposed by Niels Bohr
 - is concerned with the probability of finding an electron in a certain position
 - defines the exact path of an electron around the nucleus
- _____ 35. To which group do fluorine and chlorine belong?
- halogens
 - transition elements
 - alkaline-earth metals
 - actinides
- _____ 36. Which statement is true according to Dalton's theory?
- Atoms of the same element differ in electric charge.
 - Atoms can be subdivided into smaller particles.
 - Atoms of different elements can join to form larger atoms.
 - Atoms of the same element are exactly alike.
- _____ 37. Which of the following is the formula for hydrochloric acid?
- HClO
 - HCl
 - HClO₄
 - HClO₂
 - HClO₃
- _____ 38. Which of the following is the formula for perchloric acid?
- HClO
 - HClO₄
 - HClO₂
 - HClO₃
 - HCl
- _____ 39. Which of the following is NOT a property of an ionic compound?
- brittleness
 - molten compound conducts electricity
 - low boiling point
 - hardness
- _____ 40. Which of the following is NOT an example of a molecular formula?
- B
 - H₂O
 - NH₃
 - O₂
- _____ 41. Which formula does NOT represent a molecule?
- CO₂ (carbon dioxide)
 - H₂O (water)
 - NH₃ (ammonia)
 - NaCl (table salt)
- _____ 42. The electrons available to be lost, gained, or shared when atoms form molecules are called
- d electrons
 - electron clouds
 - ions
 - valence electrons
- _____ 43. What is the formula for the compound formed by lead(II) ions and chromate ions?
- PbCrO₄
 - Pb₂CrO₄
 - Pb(CrO₄)₂
 - Pb₂(CrO₄)₃
- _____ 44. Atoms are _____ when they are combined.
- not bound together
 - more stable
 - less stable
 - at a high potential energy

Name: _____

ID: A

- _____ 45. Which of the following is the formula of a binary acid?
a. CH_3COOH c. H_2SO_4
b. HBr d. NaOH
- _____ 46. Name the compound N_2O_4 .
a. sodium tetroxide c. binitrogen oxide
b. nitrous oxide d. dinitrogen tetroxide
- _____ 47. Name the compound N_2O_5 .
a. dinitrogen pentoxide c. nitric oxide
b. dinickel pentoxide d. neon oxide
- _____ 48. Name the compound SO_3 .
a. sulfur trioxide c. selenium trioxide
b. sodium trioxide d. silver trioxide
- _____ 49. Which of the following is the correct formula for potassium permanganate?
a. KMnO_3 d. $\text{K}(\text{MnO}_3)_2$
b. none of the above e. PMnO_4
c. KMnO_4
- _____ 50. Which of the following is the formula for chlorous acid?
a. HClO_2 d. HClO_4
b. HCl e. HClO_3
c. HClO
- _____ 51. What is the formula for carbon disulfide?
a. SC_2 c. CaS_2
b. CS_2 d. S_2C
- _____ 52. What is the oxidation number of oxygen in most compounds?
a. -8 c. -2
b. 0 d. $+1$
- _____ 53. How many atoms of fluorine are present in a molecule of carbon tetrafluoride, CF_4 ?
a. 1 c. 2
b. 5 d. 4
- _____ 54. What is the formula for the compound formed by calcium ions and chloride ions?
a. CaCl_3 c. CaCl_2
b. Ca_2Cl d. CaCl
- _____ 55. Because metallic bonds permit one plane of ions to slide past another without breaking bonds, metals are
a. poor conductors of electricity. c. malleable.
b. nonreflective. d. brittle.

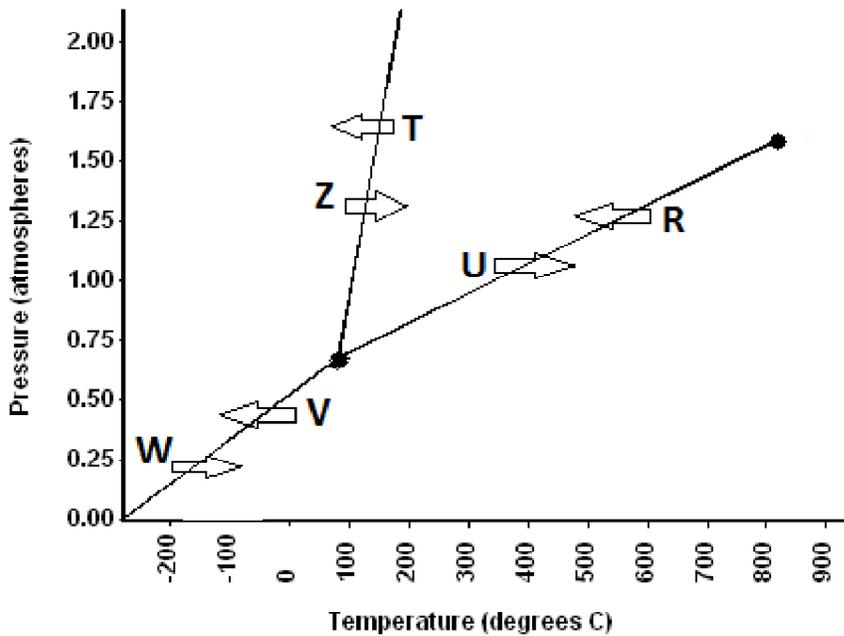
- _____ 56. Ions form when atoms gain or lose _____.
a. protons
b. neutrons
c. mass number
d. atomic number
e. electrons
- _____ 57. In the electron-sea model of a metallic bond,
a. some electrons are valence electrons and some are not.
b. mobile electrons are shared by all the atoms.
c. electrons are stationary.
d. electrons are bonded to particular positive ions.
- _____ 58. Name the compound $\text{Ni}(\text{ClO}_3)_2$.
a. nickel peroxide
b. nickel chlorate
c. nickel chloride
d. nickel chlorite
- _____ 59. What is the formula for diphosphorous pentoxide?
a. P_2O_4
b. P_2O_5
c. PO_5
d. P_2PeO_5
- _____ 60. Which of the following compounds is/are correctly named?
I. Na_2O_2 sodium oxide
II. $(\text{NH}_4)_2\text{CO}_3$ ammonium bicarbonate
III. $\text{Ca}(\text{NO}_2)_2$ calcium nitrite
IV. Fe_2O_3 iron(III) oxide
a. III and IV
b. III only
c. I, II, III and IV
d. II and III
e. I and III
- _____ 61. An ionic compound is not represented by a molecular formula because an ionic compound
a. does not have charged particles.
b. does not contain bonds.
c. lacks molecules.
d. always has a positive charge.
- _____ 62. The ions in an ionic compound are organized into a(n)
a. Lewis structure
b. molecule
c. polyatomic ion
d. crystal
- _____ 63. A chemical bond resulting from the electrostatic attraction between positive and negative ions is called a(n)
a. molecular bond
b. ionic bond
c. charged bond
d. covalent bond
- _____ 64. What is the formula for zinc fluoride?
a. ZnF
b. ZnF_2
c. Zn_2F_3
d. Zn_2F
- _____ 65. Compared with ionic compounds, molecular compounds
a. are harder.
b. have lower melting points.
c. are brittle.
d. have higher boiling points.

Name: _____

ID: A

- _____ 66. Which of the following compounds contains the Mn^{3+} ion?
- a. Mn_3O_2
 - b. Mn_2O_3
 - c. MnO
 - d. MnS
 - e. MnBr_2
- _____ 67. What is the name of the compound that has the chemical formula $\text{CoCl}_2 \cdot 6 \text{H}_2\text{O}$
- a. Cobalt Chloride Hexahydrate
 - b. Cobalt Dichloride Hexadihydrogen Monoxide
 - c. Cobalt (II) Chloride Hexahydroxic Hydride
 - d. Cobalt (II) Chloride Heptahydrate
 - e. Cobalt (II) Chloride Hexahydrate
- _____ 68. What is the formula for tin(IV) chromate?
- a. $\text{Sn}(\text{CrO}_4)_2$
 - b. $\text{Sn}_2(\text{CrO}_4)_2$
 - c. $\text{Sn}_2(\text{CrO}_4)_4$
 - d. $\text{Sn}(\text{CrO}_4)_4$
- _____ 69. What is the formula for aluminum sulfate?
- a. Al_2SO_4
 - b. AlSO_4
 - c. $\text{Al}(\text{SO}_4)_3$
 - d. $\text{Al}_2(\text{SO}_4)_3$
- _____ 70. What is the oxidation number of magnesium in MgO ?
- a. +2
 - b. +1
 - c. -1
 - d. 0

Matching



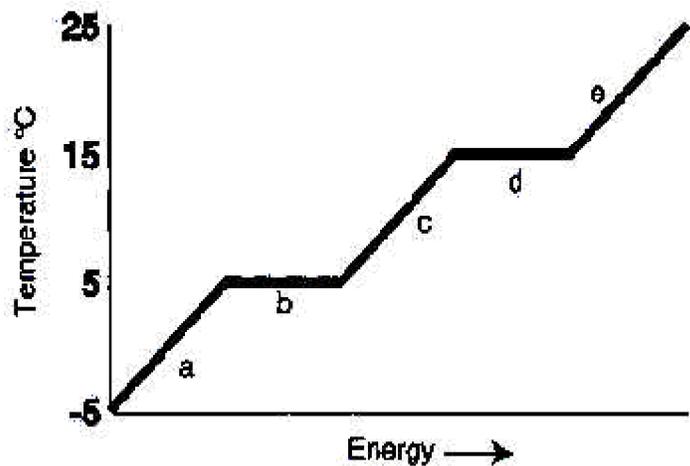
Use the chart above to identify the following phase changes.

- | | |
|------|------|
| a. R | d. W |
| b. T | e. Z |
| c. U | |

- ___ 71. Melting
- ___ 72. Sublimation
- ___ 73. Condensation
- ___ 74. Freezing
- ___ 75. Vaporization

Name: _____

ID: A



- a. -5 °C
- b. 5 °C
- c. 10 °C

- d. 15 °C
- e. 25 °C

___ 76. What temperature does freezing occur at?

___ 77. What temperature does boiling occur at?