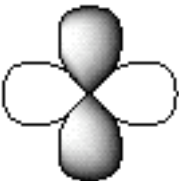


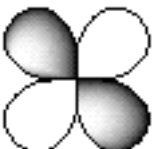


- Complete this sentence: Atoms emit visible and ultraviolet light
 - as electrons jump from higher energy levels to lower levels.
 - as the atoms condense from a gas to a liquid.
 - as electrons jump from lower energy levels to higher levels.
 - as they are heated and the solid melts to form a liquid.
 - as the electrons move about the atom within an orbit.
- Calculate the wavelength of the light emitted by a hydrogen atom during a transition of its electron from the $n = 4$ to the $n = 1$ principal energy level. Recall that for hydrogen $E_n = -2.18 \times 10^{-18} \text{ J}(1/n^2)$
 - 365 nm
 - 97.4 nm
 - 6.8×10^{-18} nm
 - 0.612 nm
 - 82.6 nm
- Rutherford's experiment (actually performed by Geiger and Marsden) with alpha particle scattering by gold foil established that
 - protons are not evenly distributed throughout an atom.
 - protons are 1840 times heavier than electrons.
 - atoms are made of protons, neutrons, and electrons.
 - electrons have a negative charge.
 - electrons have a positive charge.
- What is the energy in joules of one photon of microwave radiation with a wavelength 0.122 m?
 - 4.07×10^{-10} J
 - 2.46×10^9 J
 - 2.70×10^{-43} J
 - 1.63×10^{-24} J
 - 5.43×10^{-33} J
- Which of the following will lead to an increase in the kinetic energies of photoelectrons emitted when light is incident on a metal surface?
 - decrease in the light's frequency
 - increase in the light's wavelength
 - increase both the wavelength and intensity simultaneously
 - increase in the light's intensity
 - decrease in the light's wavelength

6. In an electron microscope, electrons are accelerated to great velocities. Calculate the wavelength of an electron traveling with a velocity of 7.0×10^6 m/s. The mass of an electron is 9.1×10^{-31} kg.
- A. 1.0 m
B. 1.2×10^2 m
C. 1.0×10^{-10} m
D. 8.6×10^{-71} m
E. 1.0×10^{10} m
7. The number of orbitals in a d subshell is
- A. 1 B. 2 C. 3 D. 7 E. 5
8. Which of the following is the electron configuration of an excited state of an iron atom?
- A. $[\text{Ar}]4s^23d^8$ B. $[\text{Ar}]4s^23d^6$ C. $[\text{Ar}]4s^13d^5$ D. $[\text{Ar}]4s^23d^7$ E. $[\text{Ar}]4s^13d^7$
9. For phosphorus atoms, which ionization energy will show an exceptionally large increase over the previous ionization energy?
- A. 6 B. 3 C. 2 D. 5 E. 4
10. Which of the elements listed below has the greatest atomic radius?
- A. S B. Al C. P D. B E. Si
11. Which of the following will have the electron that experiences the greatest effective nuclear charge (assuming they are all in the same shell)?
- A. 
- B. They all experience the same effective nuclear charge.
- C. 
- D. 
- E. 

12. A ground-state atom of manganese has ___ unpaired electrons and is ____.
- A. 5, paramagnetic
B. 0, diamagnetic
C. 2, diamagnetic
D. 3, paramagnetic
E. 7, paramagnetic
13. In quantum mechanics, a boundary surface representation of an orbital indicates
- A. the space occupied by the nucleus.
B. the region in which an electron will not be found.
C. the most probable location of the nucleus.
D. the region inside which there is a high (~90%) probability of finding an electron.
E. the exact location of an electron
14. Which of the following elements has the greatest metallic character?
- A. Se B. As C. Ni D. Si E. Br
15. The distribution of elements on the planet Earth is
- A. not uniform. Denser substances are near the outside, less dense towards the center.
B. uniform and the same as the Universe.
C. not uniform and mostly light elements like H and He.
D. not uniform. Denser substances are near the center, less dense near the outside.
E. uniform and mostly heavy elements.
16. What is the correct formula for potassium sulfide?
- A. KSO_3 B. PS C. KS D. K_2S E. SP_2
17. What is the systematic name for $\text{MnSO}_4 \cdot \text{H}_2\text{O}$?
- A. hydrated magnesium sulfite
B. manganese (I) sulfite hydrate
C. manganese sulfoxide hydrate
D. magnesium sulfate monohydrate
E. manganese (II) sulfate monohydrate
18. "Aqua Regia" is a mixture of hydrochloric acid and nitric acid that is capable of dissolving gold. What are the formulas of its components?
- A. HClO , HNO_4 B. HCl , HNO_3
C. HCl , HNO_2 D. CO , CO_2
E. HClO_4 , HNO_3
19. A 10.00 g sample of a hydrocarbon (that is, a compound that contains carbon and hydrogen only) is burned in oxygen and the carbon dioxide and water produced carefully collected and weighed. The mass of the carbon dioxide was 30.50 grams, and the mass of the water was 14.98 grams. What was the empirical formula of the hydrocarbon?
- A. C_1H_6 B. C_2H_6 C. C_5H_{12} D. C_5H_6 E. C_7H_6

20. What is the molar mass of phosphorus pentachloride?
- A. 177.25 g/mol
B. 208.24 g/mol
C. 30.97 g/mol
D. 566.67 g/mol
E. 190.30 g/mol
21. The percent composition by mass of a compound is 76.0% C, 12.8% H, and 11.2% O. The molar mass of this compound is 284.5 g/mol. What is the **molecular formula** of the compound?
- A. $C_{16}H_{28}O_4$
B. $C_{10}H_6O$
C. $C_9H_{18}O$
D. $C_{18}H_{36}O_2$
E. $C_{20}H_{12}O_2$
22. A tiny speck (2.0×10^{-4} g) of Americium-241 is used in a smoke detector as an alpha particle source. How many atoms are there in this sample? ^{241}Am has a molar mass of 241.0567 g/mol. Assume the sample is isotopically pure.
- A. 5.0×10^{17} atoms
B. 1.2×10^{20} atoms
C. 2.9×10^{22} atoms
D. 2.0×10^{-18} atoms
E. 6.0×10^{23} atoms
23. Water can be separated into its elements according to the following equation by electrolysis (a process of applying an electrical current across two electrodes immersed in the water).
- $$2 \text{H}_2\text{O}(\text{l}) \rightarrow 2 \text{H}_2(\text{g}) + \text{O}_2(\text{g})$$
- If a quantity of 20.0 grams of water is decomposed by this method, how many grams of oxygen gas will be produced?
- A. 35.6 g
B. 8.9 g
C. 18.0 g
D. 17.8 g
E. 16.0 g
24. When balanced with smallest set of whole numbers, the coefficient of O_2 in the following equation is
- $$__ \text{C}_2\text{H}_4 + __ \text{O}_2 \rightarrow __ \text{CO}_2 + __ \text{H}_2\text{O}$$
- A. 3
B. 2
C. 6
D. 1
E. 4
25. The recommended daily intake of sodium, Na, is 1.5 g per day. Most of our sodium intake is in the form of table salt, sodium chloride (NaCl). What is the mass percentage of sodium in table salt?
- A. 58.95%
B. 64.85%
C. 39.34%
D. 2.54%
E. 254%

Answer Key for Test "Chem 105 Exam 2 S07 Form A.mtp", 2/13/08

No. in Q-Bank	No. on Test	Correct Answer
3 118	1	A
3 119	2	B
3 116	3	A
3 117	4	D
3 31	5	E
3 120	6	C
3 121	7	E
3 125	8	E
3 126	9	A
3 127	10	B
3 93	11	D
3 124	12	A
3 62	13	D
3 128	14	C
4 115	15	D
4 117	16	D
4 116	17	E
4 24	18	B
4 95	19	C
4 35	20	B
4 119	21	D
4 31	22	A
4 39	23	D
4 118	24	A
4 120	25	C