

Name _____

Chemistry

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Review Take Home Quiz

1. _____ If 87.5 percent of a sample of pure ^{131}I decays in 24 days, what is the half-life of ^{131}I ?
(A) 6 days (B) 8 days (C) 12 days (D) 14 days (E) 21 days
2. _____ The proper scientific notation for 565,000,000,000 is —
(A) 0.565×10^9 (B) 5.65×10^{11} (C) 56.5×10^{11} (D) 565×10^{12}
3. _____ The electron configuration: $1s^2 2s^2 2p^6 3s^2 3p^6$ corresponds to the electron configuration of:
(A) S^{2-} (B) Ca^{2+} (C) Cl^- (D) K^+ (E) all of these
4. _____ Experiments performed to reveal the structure of atoms led scientists to conclude that an atom's
(A) positive charge is evenly distributed throughout its volume
(B) negative charge is mainly concentrated in its nucleus
(C) mass is evenly distributed throughout its volume
(D) volume is mainly unoccupied
(E) positive and negative charges are concentrated in the nucleus
5. _____ Which of the following represents the ground state electron configuration for the Mn^{3+} ion?
(A) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4$ (B) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$ (C) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$
(D) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$ (E) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^1$
6. _____ Which of the following has the largest value for the second ionization energy?
(A) sodium (B) chlorine (C) sulfur (D) aluminum (E) magnesium
7. _____ What is the maximum number of electrons that occupy the $n = 3$ level?
(A) 6 (B) 8 (C) 10 (D) 18 (E) 32
8. _____ Some bottles of colorless liquids were being labeled when the technicians accidentally mixed them up and lost track of their contents. A 15.0 mL sample withdrawn from one bottle weighed 22.3 g. Which of the following is the correct identity of the unknown liquid?
(A) acetone, $d=0.792 \text{ g/mL}$ (B) benzene, 0.899 g/mL
(C) chloroform, $d=1.489 \text{ g/mL}$ (D) carbon tetrachloride, $d=1.595 \text{ g/mL}$
9. _____ The graphite in a mechanical pencil has a size of 0.7 millimeters. What is this value in meters?
(A) 7×10^3 (B) 7×10^{-3} (C) 7×10^{-2} (D) 7×10^{-4}
10. _____ Which set of quantum numbers (n, l, m_l, m_s) is **NOT** permitted by the rules of quantum mechanics?
(A) 1, 0, 0, $+\frac{1}{2}$ (B) 2, 1, -1, $-\frac{1}{2}$ (C) 3, 3, 1, $-\frac{1}{2}$ (D) 4, 3, 2, $+\frac{1}{2}$ (E) 4, 1, -1, $+\frac{1}{2}$
11. _____ What is the oxidation number of phosphorus in magnesium phosphate?
(A) +3 (B) -3 (C) +4 (D) -5 (E) +5
12. _____ $^{235}_{92}\text{U} + {}^1_0\text{n} \rightarrow ^{141}_{55}\text{Cs} + 3 {}^1_0\text{n} + \text{X}$
Neutron bombardment of uranium can induce the following reaction represented above. Nuclide X is which of the following?
(A) $^{92}_{35}\text{Br}$ (B) $^{94}_{35}\text{Br}$ (C) $^{91}_{37}\text{Rb}$ (D) $^{92}_{37}\text{Rb}$ (E) $^{94}_{37}\text{Rb}$
13. _____ How many unpaired electrons are in an iron atom in its ground state?
(A) 6 (B) 5 (C) 4 (D) 2 (E) 0
14. _____ Which of the following has the largest electron affinity?
(A) sodium (B) chlorine (C) sulfur (D) aluminum (E) magnesium
15. _____ Which of the following contains an element with a +1 oxidation number?
(A) Cu_2O (B) PbCl_4 (C) AlP (D) CuO (E) TiN

16. _____ Which liquid is most volatile at 25°C?
 (A) butane, C₄H₁₀ (B) glycerol, C₃H₅(OH)₃ (C) octane, C₈H₁₈
 (D) propanol, C₃H₇OH (E) nonane, C₁₀H₂₂
17. _____ In which of the following are the elements listed in order of increasing Electronegativity?
 (A) Ba, Zn, C, Cl (B) N, O, S, Cl (C) N, P, As, Sb
 (D) K, Ba, Si, Ga (E) Li, K, Na, Ca
18. _____ Sublimation is an example of an:
 (A) exothermic chemical change (B) endothermic physical change
 (C) endothermic chemical change (D) exothermic physical change
19. _____ An electron in an atom will emit energy (light) when it moves from energy level:
 (A) 2s to 2p (B) 1s to 2s (C) 2p to 3s (D) 2p to 1s (E) 3d to 4f
20. _____ I. NO II. SF₂ III. PF₄⁺
 Which species have one or more atoms that violate the octet rule?
 (A) I and II only (B) III only (C) I only (D) I, II & III (E) I and III only
21. _____ Which of the following solids can conduct electricity at room temperature?
 I. Ag II. Ag₂O III. AgOH
 (A) I only (B) I and II only (C) I and III only (D) II and III only (E) I, II, and III
22. _____ Which of following is true for ionic compounds but false for metals?
 (A) They are malleable. (B) Their solid form can conduct electricity.
 (C) They have free moving electrons. (D) They are arranged in a crystalline structure.
 (E) Their valence electrons are attached to only one atom.
23. _____ Which of the following would likely have the highest melting point?
 (A) MnCl₇ (B) MnCl₆ (C) MnCl₄ (D) MnCl₃ (E) MnCl₂
24. _____ The bonding in carbon monosulfide consists of:
 (A) 1 sigma bond and 2 pi bonds (B) 2 sigma bonds and 1 pi bond
 (C) 3 sigma bonds (D) 3 pi bonds (E) 1 sigma and 1 pi bond
25. _____ Which ionic compound has the **lowest** melting point?
 (A) KCl (B) K₂O (C) CaO (D) CaCl₂ (E) CaF₂
26. _____ What is the oxidation number of vanadium in V(CrO₄)₂?
 (A) -2 (B) +2 (C) +1 (D) +6 (E) +4
27. _____ Many reactions are taken to completion by heating the reaction mixture in a test tube. Each of the following would be a safe practice *except* –
 (A) heating the test tube gently to prevent the solution from boiling over
 (B) pointing the test tube away from others so that no one is injured
 (C) placing a stopper in a test tube to prevent gas from escaping
 (D) holding the test tube with test tube clamps to avoid touching hot objects
- Use these answers for questions 28-30.
 (A) CBr₄ (B) CO₂ (C) CaO (D) NO (E) SO₂
28. _____ In which of the choices is there polar double bonding in a non-polar molecule?
29. _____ Which of the molecules has four sp³ hybrid bonds?
30. _____ Which substance would have the greatest melting point?