CHEM 110 Chapter 6 Practice Test Questions

1) The wavelength of light that has a frequency of $1.20 \times 10^{13} s^{-1}$ is _____ m.
A) 25.0
B) 2.50×10^{-5}
C) 0.0400
D) 12.0
E) 2.5

2) The energy of a photon of light is _____ proportional to its frequency and _____ proportional to its wavelength.
A) directly, directly
B) inversely, inversely
C) inversely, directly
D) directly, inversely
E) indirectly, not

3) What is the frequency of light (s^{-1}) that has a wavelength of 3.12×10^{-3} cm _____?
A) 3.69
B) 2.44×10^{16}
C) 9.62×10^{12}
D) 4.10×10^{-17}
E) 1.04×10^{-13}

4) The frequency of a photon that has an energy of $3.7 \times 10^{-18} J$ is _____ s^{-1}.
A) 5.6×10^{15}
B) 1.8×10^{-16}
C) 2.5×10^{-15}
D) 5.4×10^{-8}
E) 2.5×10^{15}

5) The energy of a photon that has a frequency of $8.21 \times 10^{15} s^{-1}$ is _____ J.
A) 8.08×10^{-50}
B) 1.99×10^{-25}
C) 5.44×10^{-18}
D) 1.24×10^{49}
E) 1.26×10^{-19}

6) Of the following, _____ radiation has the longest wavelength and _____ radiation has the greatest energy.

gamma   ultraviolet   visible

A) ultraviolet, gamma

B) visible, ultraviolet
C) gamma, gamma
D) visible, gamma
E) gamma, visible

7) What color of visible light has the highest energy?
A) violet
B) blue
C) red
D) green
E) yellow

8) Of the following transitions in the Bohr hydrogen atom, the _____ transition results in the emission of the highest-energy photon.
A) n = 1 → n = 6
B) n = 6 → n = 1
C) n = 6 → n = 3
D) n = 3 → n = 6
E) n = 1 → n = 4

9) Using Bohr's equation for the energy levels of the electron in the hydrogen atom, determine the energy (J) of an electron in the n = 4 level. _____ .

A) -1.36 × 10^{-19}

B) -5.45 × 10^{-19}

C) -7.34 × 10^{18}

D) -1.84 × 10^{-29}

E) +1.84 × 10^{-29}

10) The frequency of electromagnetic radiation required to promote an electron from n = 2 to n = 4 in a Bohr hydrogen atom is _____ Hz.

A) 4.1 × 10^{-19}

B) 6.2 × 10^{14}

C) 5.4 × 10^{-19}

D) 8.2 × 10^{14}

E) 4.1 × 10^{19}

11) When the electron in a hydrogen atom moves from n = 8 to n = 2 light with a wavelength of _____ nm is emitted.
A) 657
B) 93.8
C) 411
D) 487
E) 389

12) What is the de Broglie wavelength (m) of a 2.0 kg object moving at a speed of 50 m/s _____?
A) 6.6×10^{-36}
B) 1.5×10^{35}
C) 5.3×10^{-33}
D) 2.6×10^{-35}
E) 3.8×10^{34}

13) At what speed (m/s) must a 3.0 mg object be moving in order to have a de Broglie wavelength of 5.4×10^{-29} m?
A) 1.6×10^{-28}
B) 3.9×10^{-4}
C) 2.0×10^{12}
D) 4.1
E) 6.3

14) There are _____ orbitals in the third shell.
A) 25
B) 4
C) 9
D) 16
E) 1

15) The n = 1 shell contains _____ p orbitals. All the other shells contain _____ p orbitals.
A) 3, 6
B) 0, 3
C) 6, 2
D) 3, 3
E) 0, 6

16) The principal quantum number of the first d subshell is _____.
A) 1
B) 2
C) 3
D) 4
E) 0

17) _____-orbitals are spherically symmetrical.
A) s
B) p
C) d
D) f
E) g

18) The 4d subshell in the ground state of atomic xenon contains _____ electrons.
A) 2
B) 6
C) 8
D) 10
E) 36

19) The ground state electron configuration for Zn is _____.
A) $[Kr]4s^2 3d^{10}$

B) $[Ar]4s^2 3d^{10}$

C) $[Ar]4s^1 3d^{10}$

D) $[Ar]3s^2 3d^{10}$

E) $[Kr]3s^2 3d^{10}$

20) There are _____ unpaired electrons in a ground state fluorine atom.
A) 0
B) 1
C) 2
D) 3
E) 4

21) Which is the correct ground-state electron configuration for silver _____ ?
A) $[Kr]5s^2 4d^9$

B) $[Kr]5s^1 4d^{10}$

C) $[Kr]5s^2 4d^{10}$

D) $[Xe]5s^2 4d^9$

E) $[Xe]5s^1 4d^{10}$

22) All of the _____ have a valence shell electron configuration ns^1.
A) noble gases
B) halogens
C) chalcogens
D) alkali metals
E) alkaline earth metals

23) Elements in group _____ have a np^6 electron configuration in the outer shell.
A) 4A
B) 6A
C) 7A
D) 8A
E) 5A

24) The largest principal quantum number in the ground state electron configuration of barium is _____.
A) 1
B) 2
C) 4
D) 5
E) 6

25) The photoelectric effect is _____.
A) the total reflection of light by metals giving them their typical luster
B) the production of current by silicon solar cells when exposed to sunlight
C) the ejection of electrons by a metal when struck with light of sufficient energy
D) the darkening of photographic film when exposed to an electric field
E) a relativistic effect

26) According to the Heisenberg Uncertainty Principle, it is impossible to know precisely both the position and the _____ of an electron.
A) mass
B) color
C) momentum
D) shape
E) velocity