

Chapter 9 Practice Questions

- 1) Which of the statements about light is FALSE?
 - A) Light travels through space at a speed of 3.00×10^8 m/s.
 - B) A packet of light energy is called a photon.
 - C) A characteristic feature of light that determines its color is its wavelength.
 - D) Light travels much faster than sound.
 - E) All of the above statements are true.

- 2) The distance between adjacent wave crests is called:
 - A) frequency.
 - B) trough.
 - C) nu.
 - D) wavelength.
 - E) none of the above

- 3) The number of cycles of a wave that passes a stationary point in one second is called its:
 - A) frequency.
 - B) crest.
 - C) trough.
 - D) wavelength.
 - E) none of the above

- 4) Which among the following statements is TRUE?
 - A) The wavelength of light is inversely related to its energy.
 - B) As the wavelength increases, the frequency also increases.
 - C) Red light has a shorter wavelength than violet light.
 - D) As the energy increases, the frequency of radiation decreases.
 - E) none of the above

- 5) How are wavelength and frequency of light related?
 - A) Wavelength increases as the frequency decreases.
 - B) Wavelength is independent of frequency.
 - C) Wavelength is double the frequency.
 - D) Wavelength is one-half of the frequency.
 - E) Wavelength increases as frequency increases.

- 6) Which color of the visible spectrum has the shortest wavelength (400 nm)?
 - A) violet
 - B) green
 - C) red
 - D) orange
 - E) yellow

- 7) What is the correct order of the electromagnetic spectrum from shortest wavelength to longest?
 - A) Gamma Rays→X-rays→Visible Light→Ultraviolet Radiation→Infrared Radiation→Microwaves→Radio Waves
 - B) Gamma Rays→X-rays→Ultraviolet Radiation→Visible Light→Infrared Radiation→Microwaves→Radio Waves
 - C) Visible Light→Infrared Radiation→Microwaves→Radio Waves→Gamma Rays→X-rays→Ultraviolet Radiation
 - D) Gamma Rays→X-rays→Infrared Radiation→Visible Light→Ultraviolet Radiation→Microwaves→Radio Waves
 - E) Radio Waves→X-rays→Ultraviolet Radiation→Visible Light→Infrared Radiation→Microwaves→Gamma Rays

- 8) Which of the following statements about the quantum-mechanical model is FALSE?
- A) Orbitals are specific paths electrons follow.
 - B) Electrons do not behave as particles.
 - C) Orbitals are a probability map of finding electrons.
 - D) Electron paths cannot be described exactly.
 - E) All of the above are correct statements.
- 9) The subshell letter:
- A) specifies the maximum number of electrons.
 - B) specifies the principal quantum number of the orbital.
 - C) specifies the principal shell of the orbital.
 - D) specifies the 3-D shape of the orbital.
 - E) none of the above
- 10) How many subshells are there in the $n = 2$ principal shell?
- A) 1
 - B) 2
 - C) 3
 - D) 4
 - E) not enough information
- 11) The $n = \underline{\hspace{2cm}}$ principal shell is the lowest that may contain a d-subshell.
- A) 1
 - B) 2
 - C) 3
 - D) 4
 - E) not enough information
- 12) The "d" subshell can hold a maximum of $\underline{\hspace{2cm}}$ electrons.
- A) 10
 - B) 5
 - C) 6
 - D) 2
 - E) none of the above
- 13) How many electrons are unpaired in the orbitals of carbon?
- A) 2
 - B) 4
 - C) 12
 - D) 6
 - E) none of the above
- 14) An accepted abbreviation format is to write an electron configuration that includes a noble gas symbol in brackets. If you were writing an electron configuration for a bromine atom, which elemental symbol would you place in the bracket?
- A) Xe B) Ne C) Ar D) He E) Kr

- 15) What is the electron configuration for Kr?
- $1s^2 2s^2 2p^6 3s^2 3p^4 3d^{10} 4s^2 4p^6$
 - $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$
 - $1s^2 2s^2 2p^6 3s^2 3p^2 4s^2 3d^{10} 4p^6$
 - $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2 4p^6$
 - none of the above
- 16) Which one of the following is the correct orbital diagram for nitrogen?
- $\uparrow\downarrow \uparrow\downarrow \uparrow \uparrow \uparrow$
 - $\uparrow\downarrow \uparrow\downarrow \uparrow \downarrow \uparrow$
 - $\uparrow\downarrow \uparrow\downarrow \uparrow \uparrow \uparrow$
 - $\uparrow\downarrow \uparrow\downarrow \uparrow \uparrow \uparrow$
 - none of the above
- 17) How many core electrons are in a chlorine atom?
- 10
 - 7
 - 1
 - 17
 - none of the above
- 18) How many valence electrons are in a chlorine atom?
- 1
 - 7
 - 17
 - 10
 - none of the above
- 19) Chlorine and bromine have very similar chemical properties. This is best explained by the fact that both elements:
- have equal number of protons and electrons.
 - are in period 3 of the Periodic Table.
 - have the same number of valence electrons.
 - are gases.
 - none of the above
- 20) Which one of the following species has the electron configuration of $1s^2 2s^2 2p^6$?
- Na^+
 - O^{2-}
 - F^-
- 1 and 3 only
 - 1 and 2 only
 - 2 and 3 only
 - All of 1, 2, and 3
 - Neither 1, 2, or 3

21) The size of an atom generally increases:

- A) down a group and from right to left across a period.
- B) up a group and diagonally across the Periodic Table.
- C) up a group and from left to right across a period.
- D) up a group and from right to left across a period.
- E) down a group and from left to right across a period.

22) Which of the following elements has the lowest ionization energy?

- A) F B) He C) Rb D) C E) Na

23) Which of the following atoms has the greatest metallic character?

- A) Ti B) Au C) Cs D) Be E) Cu

Answer Key

Testname: PRACTICEQ_CH09

- 1) E
- 2) D
- 3) A
- 4) A
- 5) A
- 6) A
- 7) B
- 8) A
- 9) D
- 10) B
- 11) C
- 12) A
- 13) A
- 14) C
- 15) B
- 16) C
- 17) A
- 18) B
- 19) C
- 20) D
- 21) A
- 22) C
- 23) C