

**KEY**

Exam A.P. Chemistry Practice test chapters 6-7

Name \_\_\_\_\_

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

1) Of the following, \_\_\_\_\_ radiation has the shortest wavelength. 1) \_\_\_\_\_  
A) infrared  
B) microwave  
C) ultraviolet  
D) radio  
E) X-ray

2) Of the following transitions in the Bohr hydrogen atom, the \_\_\_\_\_ transition results in the emission of the lowest-energy photon. 2) \_\_\_\_\_  
A)  $n=1 \rightarrow n=4$   
B)  $n=6 \rightarrow n=3$   
C)  $n=3 \rightarrow n=6$   
D)  $n=6 \rightarrow n=1$   
E)  $n=1 \rightarrow n=6$

3) What is the wavelength of light (nm) that has a frequency of  $6.44 \times 10^{13} \text{ s}^{-1}$ ? 3) \_\_\_\_\_  
A)  $4.66 \times 10^{-8}$   
B) 6490  
C) 932  
D)  $6.49 \times 10^{-8}$   
E) 4660

$$\frac{3 \times 10^8 \text{ m/s}}{6.44 \times 10^{13} \text{ s}^{-1}} = 4.65 \times 10^{-6} \text{ m} \times \frac{10^9 \text{ nm}}{1 \text{ m}} =$$

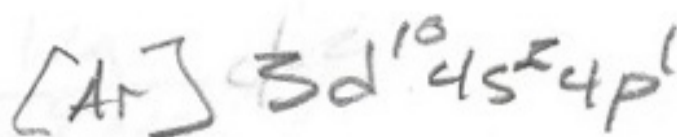
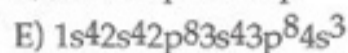
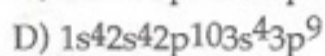
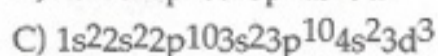
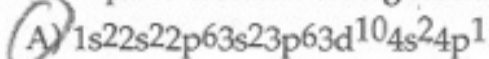
4) The energy of a photon that has a wavelength of  $8.33 \times 10^{-6} \text{ m}$  is \_\_\_\_\_ J. 4) \_\_\_\_\_  
A)  $4.5 \times 10^{-25}$   
B)  $3.60 \times 10^{13}$   
C)  $2.39 \times 10^{-20}$   
D)  $2.7 \times 10^9$   
E)  $2.20 \times 10^{-26}$

$$E = \frac{hc}{\lambda} = \frac{(6.626 \times 10^{-34} \text{ J}\cdot\text{s})(3 \times 10^8 \text{ m/s})}{8.33 \times 10^{-6} \text{ m}} =$$

5) Which one of the following represents an acceptable set of quantum numbers for an electron in an atom? (arranged as  $n, l, m_l$ , and  $m_s$ ) 5) \_\_\_\_\_  
A) 3, 3, 3, 1/2  
B) 3, 3, 3, -1/2  
C) 1, 0, 0, 1/2  
D) 2, 2, -1, -1/2  
E) 5, 4, -5, 1/2

\_\_\_\_\_ 1s

6) The complete electron configuration of gallium, element 31, is \_\_\_\_\_ 6) \_\_\_\_\_



7) In a ground-state silver atoms, the \_\_\_\_\_ subshell is partially filled. 7) \_\_\_\_\_

A) 4d

B) 3d

C) 3s

D) 4s

E) 4p

8) The atomic radius of main-group elements generally increases down a group because \_\_\_\_\_ 8) \_\_\_\_\_

A) effective nuclear charge decreases down a group

B) effective nuclear charge zigzags down a group

C) the principal quantum number of the valence orbitals increases

D) effective nuclear charge increases down a group

E) both effective nuclear charge increases down a group and the principal quantum number of the valence orbitals increases

9) Which one of the following atoms has the largest radius? 9) \_\_\_\_\_

A) F

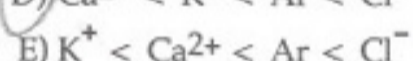
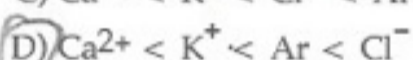
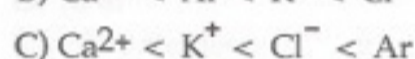
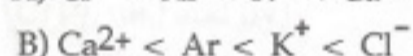
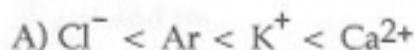
B) Ne

C) O

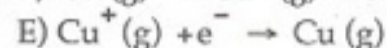
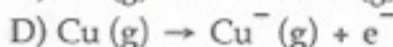
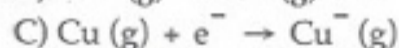
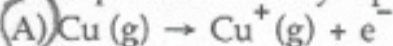
D) S

E) Cl

10) Which isoelectronic series is correctly arranged in order of increasing radius? 10) \_\_\_\_\_



11) Which equation correctly represents the first ionization of copper? 11) \_\_\_\_\_



12) Alkaline earth metals \_\_\_\_\_ 12) \_\_\_\_\_

A) form monoanions

B) form halides with the formula MX

C) exist as triatomic molecules

D) form basic oxides

E) have the smallest atomic radius in a given period

$= \frac{hc}{\lambda} = \frac{6.626 \times 10^{-34} \text{ J}\cdot\text{s}}{13.2 \times 10^{-9} \text{ m}}$

13) The energy of a photon that has a wavelength of 13.2 nm is \_\_\_\_\_ J. 13) \_\_\_\_\_

- A)  $9.55 \times 10^{-25}$
- B)  $4.42 \times 10^{-23}$
- C)  $1.99 \times 10^{-25}$
- D)  $1.51 \times 10^{-17}$
- E)  $1.62 \times 10^{-17}$

$13.2 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}}$   
 $3s \uparrow$

14) Which one of the following configurations depicts an excited carbon atom? 14) \_\_\_\_\_

- A)  $1s^2 2s^2 2p^3$
- B)  $1s^2 2s^2 2p^1$
- C)  $1s^2 2s^2 2p^1 3s^1$
- D)  $1s^2 2s^2 3s^1$
- E)  $1s^2 2s^2 2p^2$

$2s^2 2p^1$   
 $1s^2$

15) Consider the general valence electron configuration of  $ns^2 np^5$  and the following statements: 15) \_\_\_\_\_

- (i) Elements with this electron configuration are expected to form -1 anions.
- (ii) Elements with this electron configuration are expected to have large positive electron affinities.
- (iii) Elements with this electron configuration are nonmetals.
- (iv) Elements with this electron configuration form acidic oxides.

- Which statements are true?
- A) (i), (ii), and (iii)
  - B) (ii) and (iii)
  - C) (i), (iii), and (iv)
  - D) (i) and (ii)
  - E) All statements are true.



$$3) \quad \frac{c}{\nu} = \lambda \quad \frac{3 \times 10^8 \text{ m/s}}{6.44 \times 10^{13} \text{ s}^{-1}} =$$

$$4.65 \times 10^{-6} \text{ m} \times \frac{10^9 \text{ nm}}{1 \text{ m}} =$$

$$4660 \text{ nm}$$

$$4) \quad E = \frac{hc}{\lambda} \quad \frac{(6.626 \times 10^{-34} \text{ Js})(3 \times 10^8 \text{ m/s})}{8.33 \times 10^{-6} \text{ m}}$$

$$= 2.39 \times 10^{-20} \text{ J}$$

$$13) \quad E = \frac{hc}{\lambda} \quad \frac{(6.626 \times 10^{-34} \text{ Js})(3 \times 10^8 \text{ m/s})}{13.2 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}}}$$

$$= 1.57 \times 10^{-17} \text{ J}$$

