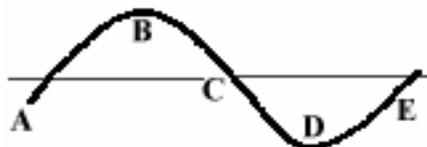


10. What position on the standing wave shown below corresponds to a crest?



- a) A b) B c) C d) D e) E
11. How many orbitals make up the **4d** subshell?
- a) 0 b) 1 c) 3 d) 5 e) 7
12. The value of l that is related to the following orbital is:



- a) 0 b) 1 c) 2 d) 3 e) 4
13. The correct electron configuration for nitrogen is
- a) $1s^2 2s^2 2p^6 3s^2 3p^2$
 b) $1s^2 2s^2 2p^6 2d^4$
 c) $1s^2 2s^2 2p^3$
 d) $1s^2 2s^2 3s^2 4s^1$
 e) $1s^2 1p^5$
14. The electron configuration of the indicated atom in the ground state is correctly written for which atom?

- a) Ga $[\text{Ar}] 3d^{12} 4s^2$
 b) Ni $[\text{Ar}] 3d^{10}$
 c) Ni $[\text{Ar}] 3s^2 3p^8$
 d) Cu $[\text{Ar}] 3d^{10} 4s^1$

15. Which of the following sets of quantum numbers is possible for a **3d** electron?
- a) $n=3, l=3, m_l=-2, m_s=+\frac{1}{2}$
 b) $n=2, l=1, m_l=+1, m_s=-\frac{1}{2}$
 c) $n=3, l=1, m_l=0, m_s=-\frac{1}{2}$
 d) $n=3, l=2, m_l=-2, m_s=+\frac{1}{2}$
 e) $n=4, l=1, m_l=+1, m_s=+\frac{1}{2}$

16. In what section of the periodic table is the **4f** subshell being filled?
- a) period 4
 b) transition elements Y to Cd
 c) noble gases
 d) group IA
 e) lanthanides

17. Which one of the following elements has 3 electrons in a **p** subshell?
- a) Sb b) Na c) Sc d) V e) Nd

18. Which of the following distributions of electrons is correct for three electrons in p-subshell?
- a) $\uparrow \quad \uparrow \quad \uparrow$
 b) $\uparrow\downarrow \quad \uparrow \quad \underline{\quad}$
 c) $\uparrow \quad \uparrow \quad \downarrow$
 d) $\uparrow \quad \uparrow\downarrow \quad \underline{\quad}$
 e) $\uparrow\uparrow \quad \uparrow \quad \underline{\quad}$

19. Which of the following particles would be most paramagnetic?
- a) P
 b) Ga
 c) Br
 d) Cl
 e) Na^+

29. **Explain** your answer to question 22.

Which one of the following isoelectronic species has the smallest radius?

- a) Mg^{2+}
- b) Na^+
- c) Ne
- d) F^-
- e) O^{2-}

30. **Explain** your answer to question 25.

The successive ionization energies for one of the period three elements is listed below. Which element is referred to?

E_1	577.4 kJ/mol
E_2	1,816 kJ/mol
E_3	2,744 kJ/mol
E_4	11,580 kJ/mol
E_5	15,030 kJ/mol

- a) Na b) Mg c) Al d) Si e) P