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

1) Which of the following is a quantized property of an electron?
A) nuclear charge  B) charge to mass ratio  C) number  D) energy

2) What is the term for the shorthand description of the arrangement of electrons by sublevels according to increasing energy?
A) electron configuration  B) atomic notation  C) atomic number  D) continuous spectrum  E) none of the above

3) Which feature of Bohr's atomic model is no longer accepted as true by today's scientists?
A) Electrons have only certain, allowed energy values.  B) Most of an atom's mass is located within the nucleus.  C) Electrons orbit the nucleus in fixed circular paths.  D) Each principal quantum level can hold a maximum of 2n² electrons.

4) What is the maximum number of electrons that the d subshell can hold?
A) 6  B) 10  C) 32  D) 5

5) Which of the following is a representation for a p orbital?
A)  
B)  
C)  
D)  

6) According to the Pauli exclusion principle, any orbital can hold at most ________ electrons.
A) 8  B) 10  C) 6  D) 18  E) 2

7) Which statement is NOT true about "p" orbitals?
A) These orbitals are shaped like dumbbells.  B) A subshell contains three "p" orbitals.  C) A 3p orbital has a higher energy than a 2p orbital.  D) All three of these statements are true.  E) none of the above

8) "When filling orbitals of equal energy, electrons fill them singly first with parallel spins." This is known as:

9) At maximum, an f subshell can hold ________ electrons, a d subshell can hold ________ electrons and a p subshell can hold ________ electrons.
A) 10, 14, 6  B) 14, 10, 6  C) 2, 12, 21  D) 18, 8, 2

10) Which of the following subshell notations for electron occupancy is an impossibility?
A) 2p²  B) 4p⁵  C) 5s³  D) 4f¹¹

11) After the 5s subshell of an atom is filled with electrons, the next electron added will enter the ________.
A) 5f subshell  B) 5p subshell  C) 4d subshell  D) 4p subshell

12) Which of the following has chemical properties most similar to sodium?
A) Mg  B) He  C) Fe  D) K  E) B

13) Given the chemical formulas Na₂O, MgO, and Al₂O₃, predict the formula for radioactive francium oxide, FrO₂.
A) Fr₂O₃  B) FrO  C) Fr₃O₂  D) Fr₂O  E) FrO₂

14) Indicate the missing words in the following statement: The Aufbau principle states that ________ normally occupy the lowest energy subshell available.
A) neutrons  B) protons  C) electrons  D) nucleus

15) Which energy sublevel is being filled by the elements Rb to Sr?
A) 5d  B) 5s  C) 5f  D) 4d  E) 5p

16) The correct electron configuration for manganese is:
A) 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d⁵  B) 1s² 2s² 2p⁶ 3s² 3p⁶ 4s² 3d¹⁰ 4p¹  
C) 1s² 2s² 2p⁶ 3s² 3p⁶  
D) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d⁶
17) What is the core notation for the electron configuration of a potassium atom?
   A) [Ar]  B) [Ar] 4s¹  C) [Ar] 4d¹  
   D) [Kr]  E) [Ar] 4s¹

18) The element with the electron configuration below is:
   1s²2s²2p⁶3s²3p⁶4s²3d¹0⁴p⁶5s²4d¹
   A) Si  B) La  C) Sc  D) Y

19) Which element has the electron configuration [Kr]⁵s²⁴d¹⁰5p²?
   A) Pb  B) Ge  C) Sb  D) Sn

20) What is the core notation for the electron configuration of an iodine atom?
   A) [Kr]  B) [Kr] ⁵s²⁴p⁵  C) [Kr] ⁵s²⁴d¹⁰  D) [Kr] ⁵s²⁴p⁵

21) The number of unpaired electrons present in a magnesium atom is ________.
   A) 1  B) 3  C) 2  D) 0

22) How many unpaired electrons are there in a phosphorous atom?
   A) 1  B) 4  C) 3  D) 2

23) Which of the following pairings is incorrect?
   A) Be – s area of periodic table  B) Xe – p area of periodic table
   C) Au – d area of periodic table  D) Pr – d area of periodic table

24) Which element is represented by the electronic orbital diagram given?

   
   1s  2s  2p  3s  3p

   A) selenium  B) sulfur  C) chlorine  D) phosphorus

25) Which one of the following elements would be in the same group of the periodic table as the element whose configuration is 1s²2s²2p⁶3s²3p⁶4s¹?
   A) 18Ar  B) 15P  C) 3Li  D) 34Se

26) Which orbital diagram is incorrect according to Hund's Rule?

   I.  
   II.  
   III.  
   IV.  

   A) Diagram I  B) Diagram II  C) Diagram IV  D) Diagram III

27) Which energy sublevel is being filled by the elements Ce to Lu?
   A) 4f  B) 6f  C) 6d  D) 5d  E) 5f

28) Blue visible light has a lower energy than red visible light.
   T  F

29) In Bohr's theory, electrons can jump from one energy level to another or from one orbit to another.
   T  F

30) The observed line spectra of electrically excited gas samples tend to support the notion that electron energies are quantized.
   T  F