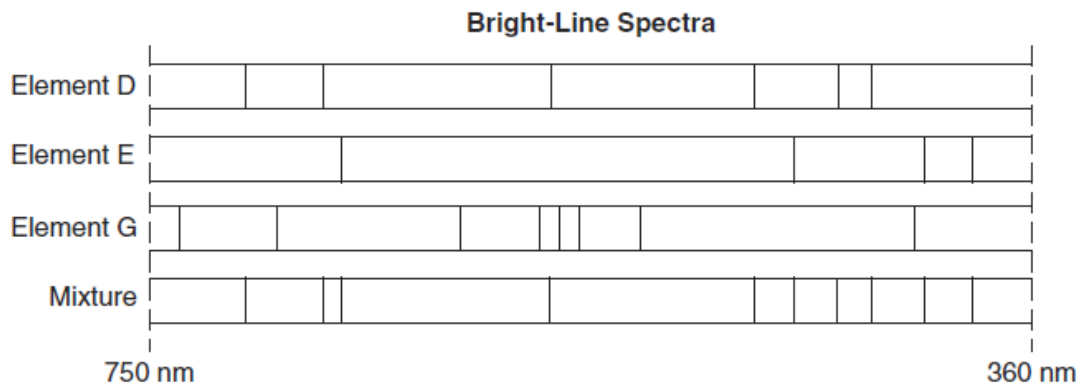


4.07 Excited State (Bohr) and Emission Spectra

- An electron in a sodium atom gains enough energy to move from the second shell to the third shell. The sodium atom becomes
 - a positive ion
 - a negative ion
 - an atom in an excited state
 - an atom in the ground state
- A bromine atom in an excited state could have an electron configuration of
 - 2-8-18-6
 - 2-8-18-7
 - 2-8-17-7
 - 2-8-17-8
- Which electron configuration represents the electrons of an atom in an excited state?
 - 2-1
 - 2-7-4
 - 2-8-7
 - 2-4
- Which statement describes how an atom in the ground state becomes excited?
 - The atom absorbs energy, and one or more electrons move to a higher electron shell.
 - The atom absorbs energy, and one or more electrons move to a lower electron shell.
 - The atom releases energy, and one or more electrons move to a higher electron shell.
 - The atom releases energy, and one or more electrons move to a lower electron shell.
- Which electron configuration represents an atom in an excited state?
 - 2-7
 - 2-6-2
 - 2-8-1
 - 2-8-8-2
- Which electron configuration could represent a strontium atom in an excited state?
 - 2-8-18-7-1
 - 2-8-18-7-3
 - 2-8-18-8-1
 - 2-8-18-8-2
- Compared to an atom of hydrogen in the ground state, an atom of hydrogen in the excited state has
 - absorbed energy
 - released energy
 - neither released nor absorbed energy
- Which is the electron configuration of an element with a completely filled third principal energy level?
 - 2-8-2
 - 2-8-8
 - 2-8-16-2
 - 2-8-18-2
- An atom with the electron configuration of 2-8-13-2 has an incomplete
 - 2p sublevel
 - second principal energy level
 - third principal energy level
 - 4s sublevel
- Which electron configuration is possible for a nitrogen atom in the excited state?
 - 2-5
 - 2-4-1
 - 2-6
 - 2-4
- Which electron configuration represents an atom in an excited state?
 - 2-8-2
 - 2-8-1
 - 2-8
 - 2-7-2
- As an electron moves from its ground state to an excited state, the potential energy of the atom
 - decreases
 - increases
 - remains the same
- Which electron configuration represents an atom of magnesium in an excited state?
 - 2-7-3
 - 2-7-6
 - 2-8-2
 - 2-8-5
- The atoms in a sample of an element are in excited states. A bright-line spectrum is produced when these atoms
 - absorb energy
 - absorb positrons
 - emit energy
 - emit positrons

-
15. Given the bright-line spectra of three elements and the spectrum of a mixture formed from at least two of these elements:



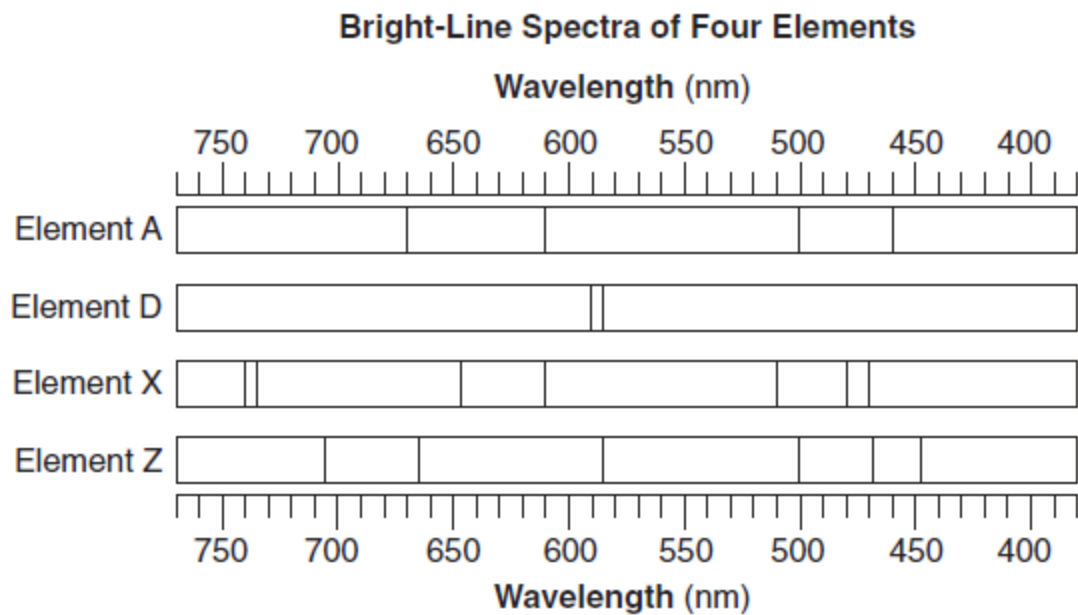
Which elements are present in this mixture?

- A) *E* and *D*, only B) *E* and *G*, only C) *D* and *G*, only D) *D*, *E*, and *G*
-

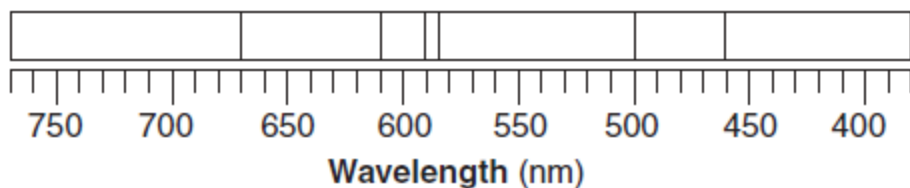
16. A specific amount of energy is emitted when excited electrons in an atom in a sample of an element return to the ground state. This emitted energy can be used to determine the

- A) mass of the sample
B) volume of the sample
C) identity of the element
D) number of moles of the element
-

17. The bright-line spectra produced by four elements are represented in the diagram below.



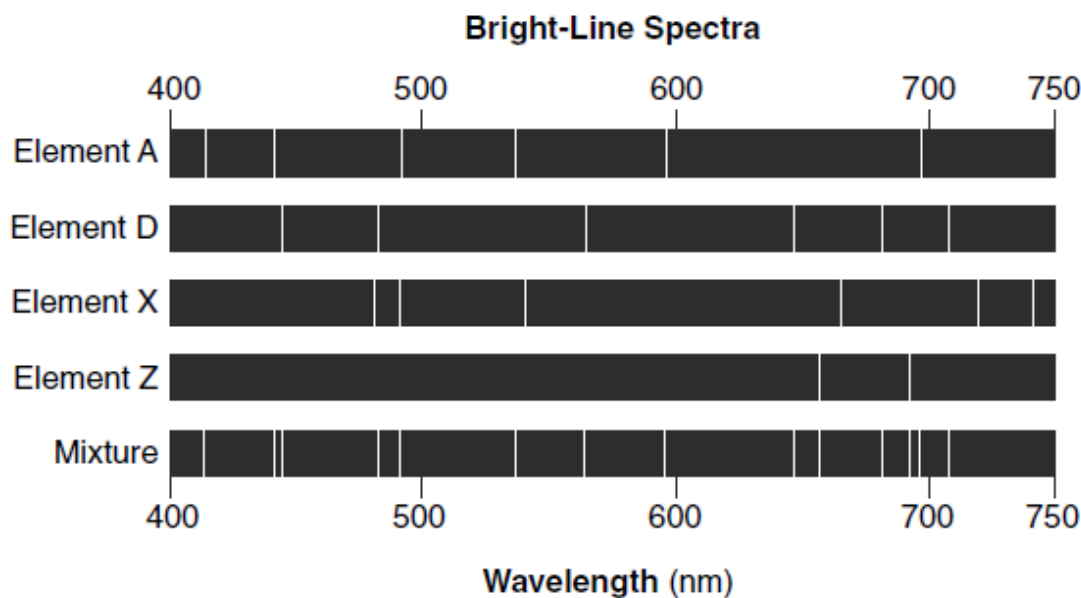
Given the bright-line spectrum of a mixture formed from two of these elements:



Which elements are present in this mixture?

- A) *A* and *D* B) *A* and *X* C) *Z* and *D* D) *Z* and *X*

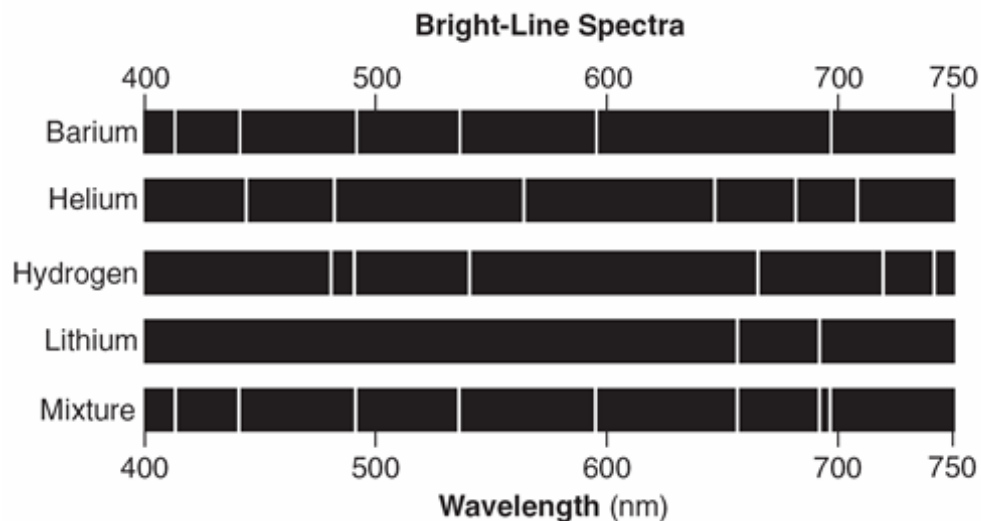
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18. The diagram below represents the bright-line spectra of four elements and a bright-line spectrum produced by a mixture of three of these elements.



Which element is *not* present in the mixture?

- A) *A* B) *D* C) *X* D) *Z*
-
19. During a flame test, a lithium salt produces a characteristic red flame. This red color is produced when electrons in excited lithium atoms
- A) are lost by the atoms
 - B) are gained by the atoms
 - C) return to lower energy states within the atoms
 - D) move to higher energy states within the atoms
20. What must occur when an electron in an atom returns from a higher energy state to a lower energy state?
- A) A specific amount of energy is released.
 - B) A random amount of energy is released.
 - C) The atom undergoes transmutation.
 - D) The atom spontaneously decays.
-

21. The diagram below represents the bright-line spectra of four elements and a bright-line spectrum produced by a mixture of two of these elements.



Which two elements are in this mixture?

- A) barium and hydrogen B) barium and lithium
C) helium and hydrogen D) helium and lithium
-
22. An atom of oxygen is in an excited state. When an electron in this atom moves from the third shell to the second shell, energy is
- A) emitted by the nucleus
B) emitted by the electron
C) absorbed by the nucleus
D) absorbed by the electron
23. As an electron in an atom moves from the ground state to the excited state, the electron
- A) gains energy as it moves to a higher energy level
B) gains energy as it moves to a lower energy level
C) loses energy as it moves to a higher energy level
D) loses energy as it moves to a lower energy level
24. Which electron transition represents a gain of energy?
- A) from 2nd to 3rd shell
B) from 2nd to 1st shell
C) from 3rd to 2nd shell
D) from 3rd to 1st shell
25. Which principal energy level change by the electron of a hydrogen atom will cause the greatest amount of energy to be absorbed?
- A) $n = 2$ to $n = 4$ B) $n = 2$ to $n = 5$
C) $n = 4$ to $n = 2$ D) $n = 5$ to $n = 2$