

Multiple Choice Identify the letter of the choice that best completes the statement or answers the question.

Knowledge

25

- a 1. Which statement about isotopes of the same element is correct?
- They have the same number of protons but different numbers of neutrons.
 - They have the same number of electrons but different numbers of protons.
 - They have the same number of neutrons but different numbers of protons.
 - They have the same number of neutrons but different numbers of electrons.
 - They have the same number of protons but different numbers of electrons.
- e 2. What happens to Na when it becomes Na^+ ?
- Na loses a neutron.
 - Na gains a proton.
 - Na loses a proton.
 - Na gains an electron.
 - Na loses an electron.
- c 3. Which pair of elements is most likely to form an ionic bond?
- hydrogen and oxygen
 - carbon and hydrogen
 - potassium and chlorine
 - nitrogen and hydrogen
 - hydrogen and iodine
- b 4. Which statement about polar molecules is correct?
- They are either positively or negatively charged.
 - They have a partial positive and partial negative charge.
 - They have no charge.
 - They cannot exist because molecules cannot be polar.
 - They are neutral.
- d 5. Which of the following is the essential characteristic of a polar molecule?
- contains double or triple bonds
 - is formed at extremely low temperatures
 - contains ions as part of the structure
 - has an asymmetrical distribution of electrical charge
 - contains the element oxygen
- b 6. Which three of the following are characteristics of hydrogen bonds?
- They are responsible for the surface tension properties of water.
 - They are responsible for the relatively high boiling point of water.
 - They are stronger than ionic bonds.
 - They are present in all substances.
 - They are weaker than covalent bonds.
- III, IV and V
 - I, II and V
 - I, III and IV
 - II, III and IV
 - I, III, and IV
- a 7. Which of the following is a characteristic of ionic bonds?
- They are stronger than covalent bonds.
 - They are present in all substances.
 - They are responsible for the low boiling points of substances.
 - They are weaker than covalent bonds.

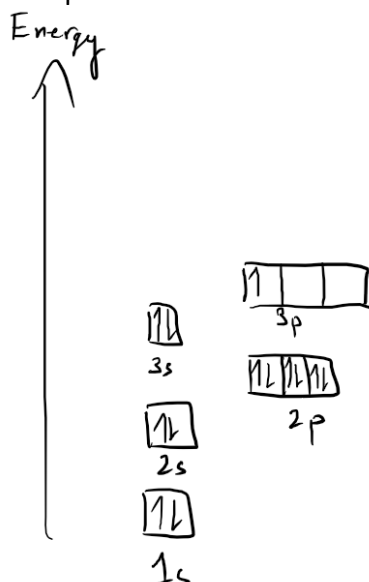
Fill in the Blank. Fill in the blank with the appropriate word in the space provided. (1 mark each)

- As electrons move farther from the nucleus, their ____potential____ energy increases.
- The electrons in the outermost *s* and *p* orbitals are called ____valence____ electrons.
- ____Electronegativity____ is a measure of an atom's ability to *attract a shared electron pair* when it is participating in a covalent bond with another atom.

Short answer.

- Draw the electron configuration for Al. (2 marks)

Al: $3s^2 3p^1$



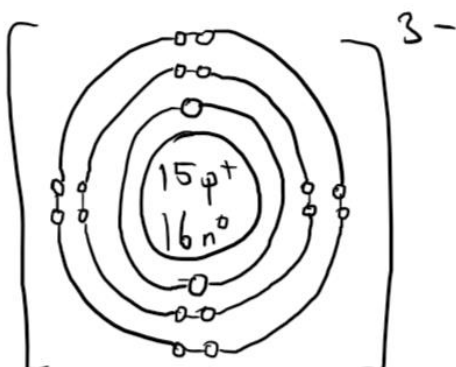
Electron Energy Level Diagram

- For the following element

31
15 P

- What is the atomic mass? (1 mark)
- What is the atomic number? (1 mark)
- How many neutrons does this atom contain? (1 mark)
- Draw the Bohr-Rutherford diagram of the **ion**. (3 marks)

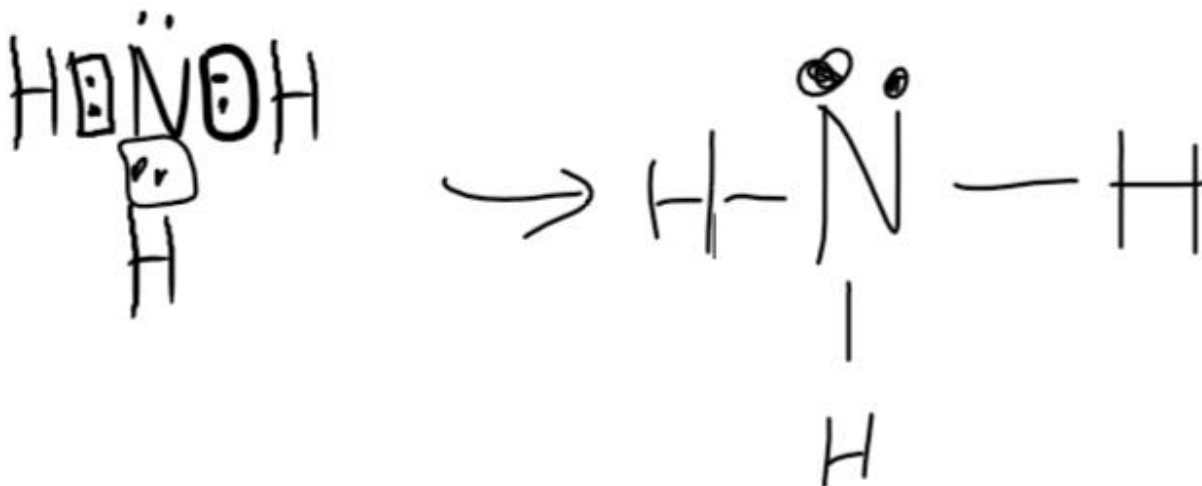
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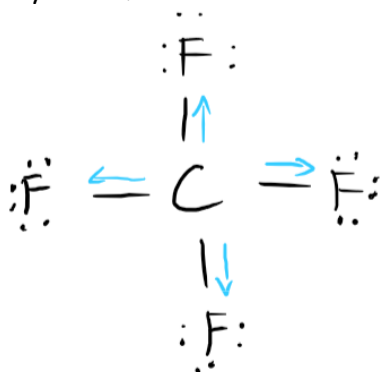
e) Draw the Lewis diagram of the atom. (2 marks)



3. Draw the Lewis diagram to show the bonds formed when the elements N (atomic number 7) and H (atomic number 1) form a molecule. (3 marks)



4. Why is CF_4 considered to be a nonpolar molecule? (2 marks)



CF_4 is considered to be a nonpolar molecule because the C-F bonds are evenly distributed and cancel out in its tetrahedral shape. While the bonds are polar covalent bonds, they cancel out, leaving the molecule nonpolar and with no net dipole.