

## Answer on Question # 44844 - Chemistry – Inorganic Chemistry

The molecule having non-zero dipole moment is-

A)H<sub>2</sub>O<sub>2</sub> B)CH<sub>4</sub> C)C<sub>2</sub>H<sub>6</sub> D)BF<sub>3</sub> E)B<sub>2</sub>H<sub>6</sub>

Which of the following has zero dipole moment?

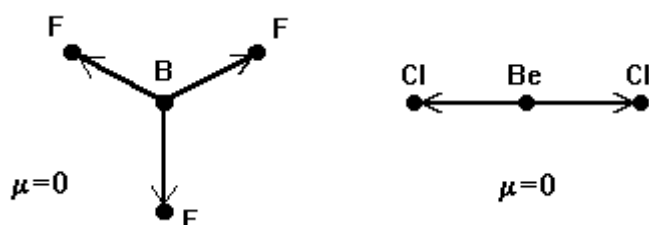
A)H<sub>2</sub>O B)PCl<sub>3</sub> C)SiF<sub>4</sub> D)CFCl<sub>3</sub>

How I choose the correct option of the above type of questions easily within one minute in competitive exam? Please sir tell me the short way of thinking.

### Answer:

In order to choose the correct answer to these types of questions need to learn the types of hybridization of the central atoms of the molecules. It's not exactly easy to do so I would advise you to memorize some of the most popular molecules.

The dipole moment is a quantitative measure of the polarity of the molecule. For polyatomic molecules, the dipole moment is the vector sum of the dipole moments of the chemical bonds. Therefore, if the molecule is symmetrical, it may be nonpolar, even if each of its links has a significant dipole moment. For example, in a planar molecule BF<sub>3</sub> or linear molecule BeCl<sub>2</sub> sum of dipole moments of bonds equal to zero:



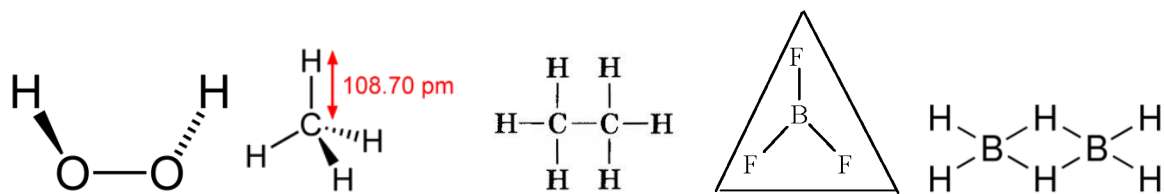
Similarly, the zero dipole moment are tetrahedral molecules CH<sub>4</sub> and CBr<sub>4</sub>. However, symmetry breaking, for example in the molecule BF<sub>2</sub>Cl, causes the dipole moment is different from zero.

Consider the first question.

The molecule having non-zero dipole moment is-

A) H<sub>2</sub>O<sub>2</sub> B) CH<sub>4</sub> C) C<sub>2</sub>H<sub>6</sub> D) BF<sub>3</sub> E) B<sub>2</sub>H<sub>6</sub>

Need to be represented as a molecule will look in the space, and then draw a conclusion about its dipole moment.



As we can see, all the molecules are composed of two types of atoms.

If it is possible to hold two or more lines of symmetry so this molecule is non-polar or zero dipole moment.

Of these molecules, we can make only a line of symmetry in the molecule of hydrogen peroxide. Accordingly answer A.