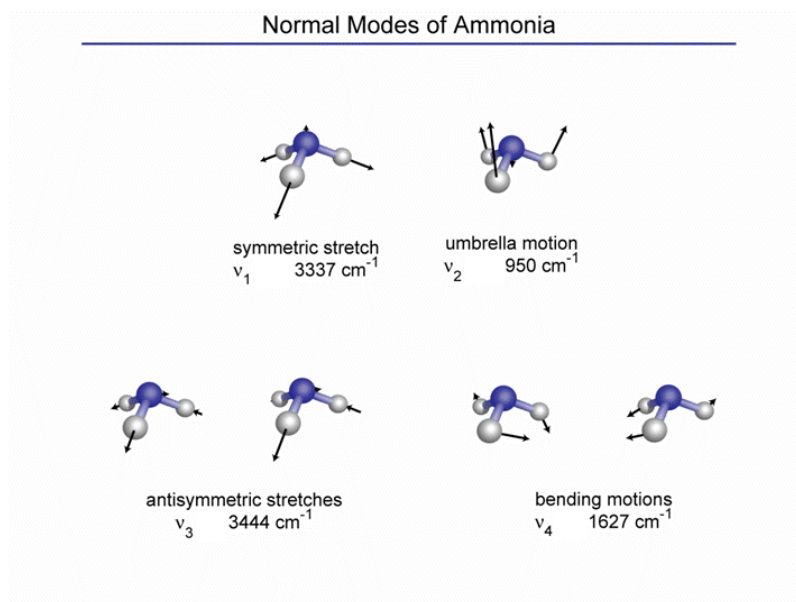
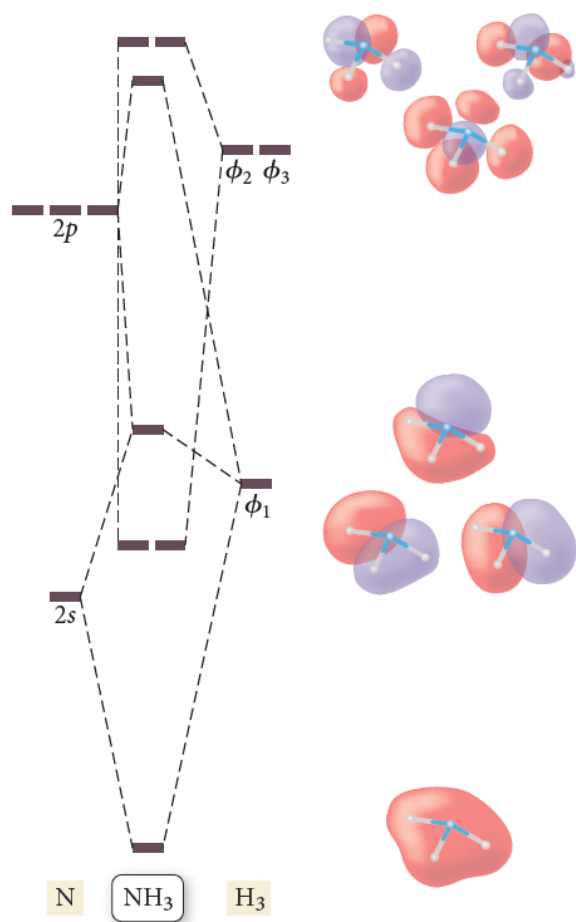


## Quiz 10.2 – Applications of Symmetry and Group Theory

Name: \_\_\_\_\_

## Irreducible Representations

Consider the ammonia molecule, which belongs to the  $C_{3v}$  symmetry point group. Below are figures showing the molecular orbitals and normal modes of ammonia. Assign each feature to the correct irreducible representation of the  $C_{3v}$  point group.



Which (if any) of the vibrational modes are “silent” in IR or Raman spectra

Is the HOMO-LUMO transition allowed by symmetry? If so, what direction of light polarization can induce the transition?