10. a) Arrive at the Lewis structure of XeF_4 using the steps given in Unit 3.
   b) Predict the hybridization state of each carbon atom in allene which has the following structure: $CH_2 = C = CH_2$
   c) Calculate the number of normal modes of vibration for the following compounds:
      i) H_2O
      ii) CH_4
      iii) HBr

   Solution:
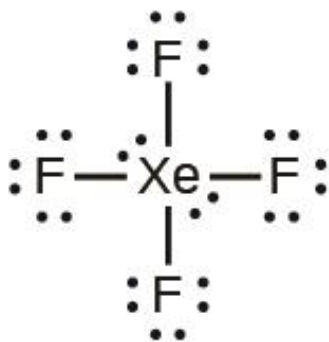
10. a)
   b) $CH_2 = C = CH_2$
      There are 2 sp^2 ($CH_2=$) and 1 sp hybridised C atoms ($=C=$).
   c) i) H_2O – nonlinear molecule
         $3N - 6 = 3 \times 3 - 6 = 3$
         N – number of atoms
      ii) CH_4 – nonlinear molecule
         $3N - 6 = 3 \times 5 - 6 = 9$
         N – number of atoms
      iii) HBr – linear molecule
         $3N - 5 = 3 \times 2 - 5 = 1$
         N – number of atoms

   Answer provided by AssignmentExpert.com