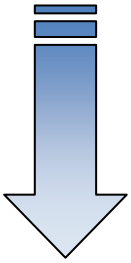
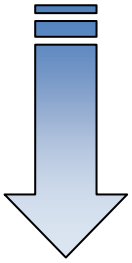
Problem-solving Examples 10 (More than One Central Atom)

Write a Lewis structure for methanol, CH_4O (used as a gasoline alternative in car engines)

Solution





Step 1 (skeleton structure)

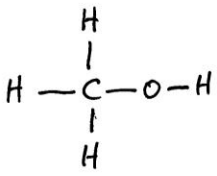
- H atoms can have only one bond, so C and O must be adjacent to each other.
- C can have 4 bonds:

  ie. $-\overset{|}{\underset{|}{C}}-$; $-\overset{|}{C}=$; $=C=O$; $-C\equiv$

- O can have 2 bonds

  ie $-O-$; $O=$

- The skeleton structure will be



Step 2 : No. of valence e's $= [4 \times H(1e^-)] + [1 \times C(4e^-)] + [1 \times O(6e^-)]$

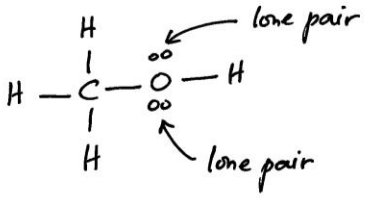
$= (4 + 4 + 6)e^-$

$= 14e^-$

Step 3 : Balance e's $= 14 - 5(2e^-) = (14 - 10)e^- = 4e^-$

(5 single bonds.)

Step 4 : C atom already octet ($8e^-$); H atom shares two electrons with C. So the remaining four electrons form two lone pairs on O atom.



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