

HW06 - Bonding & Energy Transfer

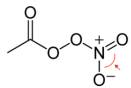
1 5 points

Which of the following has bond angles slightly LESS than 120° ?

- SF₂
- CH₂O
- O₃
- NO₃⁻

2 5 points

Consider the compound peroxyacetyl nitrate, an eye irritant in smog.

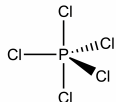


Predict the indicated bond angle.

- 109.5°
- slightly less than 109.5°
- 90°
- 120°
- slightly less than 120°

3 5 points

What is the shape of phosphorus pentachloride?



- trigonal bipyramidal
- trigonal planar
- tetrahedral
- trigonal planar
- octahedral

4 5 points

Referring to the phosphorus pentachloride molecule shown above, what is the bond angle between a chlorine in the axial position and a chlorine in the equatorial position?

- 45°
- 360°
- 109.5°
- 90°
- 180°
- 120°

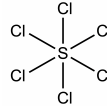
5 5 points

Referring again to phosphorus pentachloride, what are the bond angles between the two axial chlorine atoms?

- 180°
- 120°
- 109.5°
- 90°

6 5 points

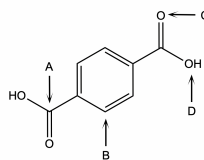
What is the shape of sulfur hexachloride?



- tetrahedral
- hexahedral
- trigonal planar
- trigonal bipyramid
- octahedral

7 6 points

Which labelled bond angles are 120° ?



- A
- D
- C
- B

8 5 points

What is the geometry around the left-most carbon in the molecule CH₂CHCH₃?

- tetrahedral
- linear
- trigonal pyramidal
- trigonal planar

9 5 points

Progesterone, an important hormone, is shown in Figure A. The molecular formula is C₂₁H₃₀O₂. In Figure B, the ketone on the five-carbon ring has been substituted with a hydroxyl group, and this small difference results in another hormone with very different biological effects. What is the chemical formula for the compound in Figure B?

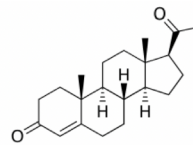


Figure A

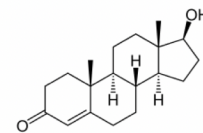


Figure B

- C₁₉H₂₈O₂
- C₂₁H₂₉O₂
- C₁₈H₂₄O₂
- C₂₀H₂₈O₂

10 5 points

What is the shape (molecular geometry) of COCl₂?

- T-shaped
- trigonal planar
- tetrahedral
- trigonal pyramidal

11 5 points

What is the molecular geometry of the nitrite ion, NO_2^- ?

- trigonal planar
- trigonal pyramidal
- bent
- none of these
- linear

12 5 points

A molecule has three bonds and one lone pair. What are the electronic and molecular geometries, respectively?

- tetrahedral, trigonal planar
- tetrahedral, trigonal pyramidal
- tetrahedral, tetrahedral
- trigonal pyramidal, tetrahedral
- trigonal planar, trigonal pyramidal

13 5 points

Determine the molecular geometry of BrF_5 .

- Trigonal pyramidal
- Square pyramidal
- Octahedral
- Trigonal bipyramidal

14 5 points

About what percentage of Earth's dry (no water) atmosphere is able to absorb IR radiation?

- 1%
- Less than 1%
- Only gases in the mesosphere
- IR is absorbed evenly by all atmospheric gases
- Roughly 50%

15 4 points

Select the molecules that are capable of absorbing IR radiation.

- CH_4
- H_2O
- Ne
- O_2
- Ar
- $\text{CF}_3\text{CH}_2\text{CF}_3$
- CO_2

16 5 points

What is the advantage of HFCs over the HCFCs that are used in present day appliances?

- HFCs do not absorb in the IR region
- HFCs are less reactive than HCFCs
- HFCs do not contain ozone-depleting chlorine
- HFCs are inflammable

17 5 points

Which of the following is a concern with long-term use of HFCs?

- They are highly toxic
- They are flammable
- They will result in large-scale depletion of the ozone layer
- They absorb IR radiation, resulting in global warming risks

18 5 points

Which of the following contribute significantly to the hole in the ozone layer?

- All of these are correct
- Automobile exhaust
- Chlorofluorocarbons
- Deforestation

19 5 points

The ozone layer is found in the...

- Mesosphere
- Biosphere
- Stratosphere
- Troposphere

20 5 points

The depletion of the ozone layer is catalyzed by chlorine. Which of the following best relates stratospheric chlorine to ozone levels?

- As chlorine levels increase, ozone levels decrease
- As chlorine levels increase, the amount of ozone depletion cannot be predicted
- As chlorine levels increase, ozone levels increase