

1. Basic molecular geometries: Insert pictures of molecules CO₂, BCl₃, SO₂, CH₄, NH₃, H₂O, PCl₅, SF₄, ClF₃, SF₆, BrF₅, XeF₄ in the table.

steric number (hybridization and bond angle)	lone pairs		
	0	1	2
2 (sp 180°)	(linear)		
3 (sp ² 120°)	(trigonal planar)	(bent)	
4 (sp ³ ~109.5°)	(tetrahedral)	(trigonal pyramidal)	(bent)
5 (dsp ³ 90°/120°)	(trigonal bipyramidal)	(seesaw)	(t-shaped)
6 (d ² sp ³ 90°)	(octahedral)	(square pyramidal)	(square planar)

VSEPR stands for _____.

- VSEPR predicts the trend lp-lp > lp-bp > bp-bp for repulsions where lp=lone pair/bp=bond pair.
- For steric number > 4, d orbitals are involved so the number of electrons can exceed the octet rule in hypervalent molecules.

2. Atomic orbitals: Insert pictures of atomic orbitals of an H atom for the orbitals in the table.

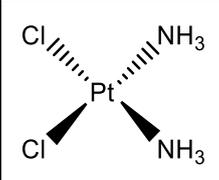
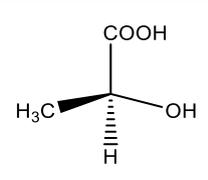
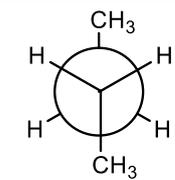
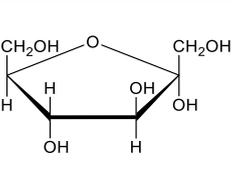
s (sharp)	p (principle)	d (diffuse)
		(circle d _{z²})

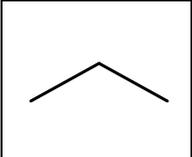
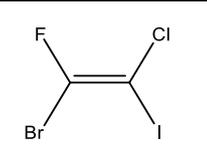
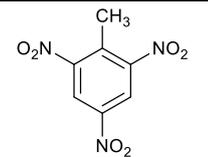
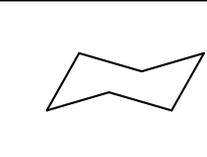
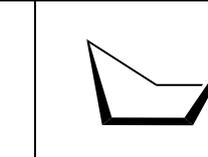
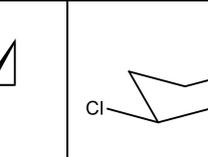
3. **Molecular orbitals:** Insert pictures of molecular orbitals in the table. (HOMO for base, LUMO for acid and both for the product)

Lewis base is _____	Product is BNH_6	Lewis acid is _____
HOMO stands for _____		LUMO stands for _____

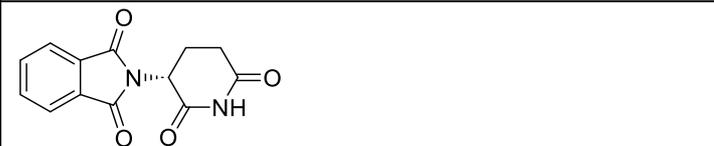
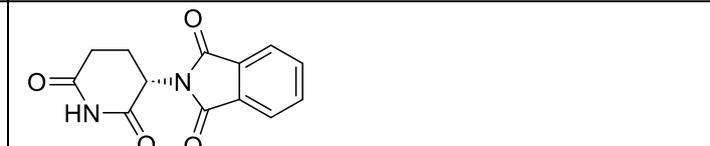
- For more information see the link <https://www.youtube.com/watch?v=l3Oq0rAejiU&t=590s>

4. **Matching 3D structures with skeletal structures:** Give one letter alphabet that corresponds to the structures in the table.

Wedge-and-dash projection	Fischer projection	Newman projection	Haworth projection
			

Bond-line structures					
					

BONUS: Write the name and properties of the compounds below.

Enantiomers are _____.