

## CH 431 Symmetry Homework 1

GIVE THE POINT GROUPS FOR THE FOLLOWING.

1) CS

2) SF<sub>6</sub>

3) CO<sub>2</sub>

4) RNH<sub>2</sub>

5) Me<sub>3</sub>N

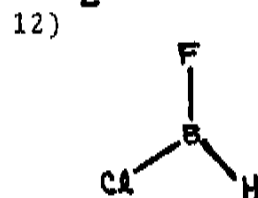
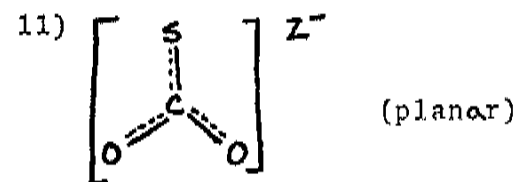
6) benzene

7) a cube

8) CH<sub>4</sub>

9) HCN (linear)

10) NO<sub>3</sub><sup>-</sup> (planar)

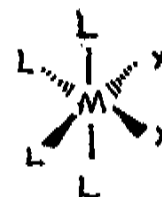


13) CD<sub>2</sub>H<sub>2</sub> (assume sp<sup>3</sup> carbon)

14)

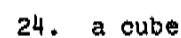
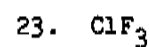
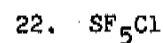
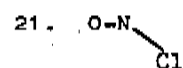
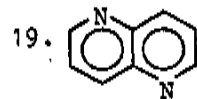
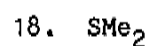
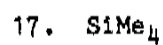
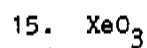
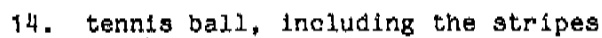
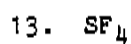
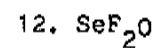
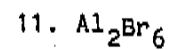
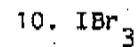
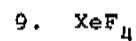
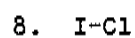
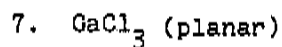
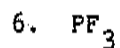
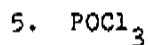
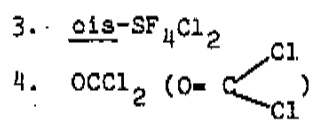
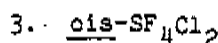
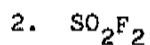
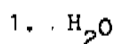


15)



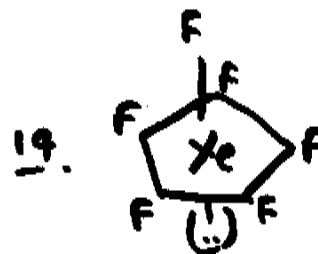
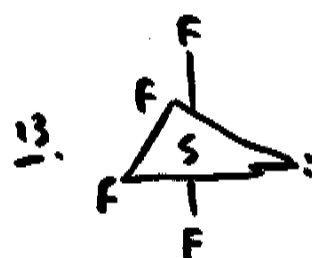
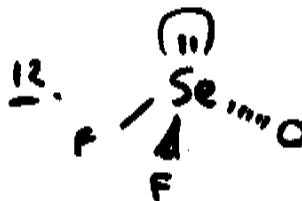
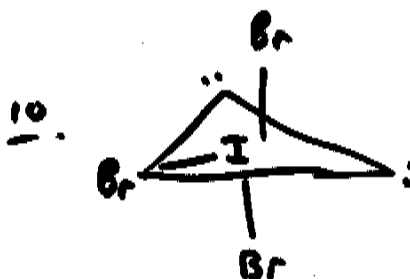
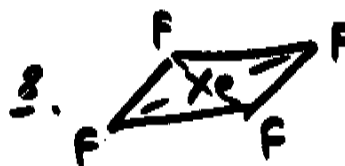
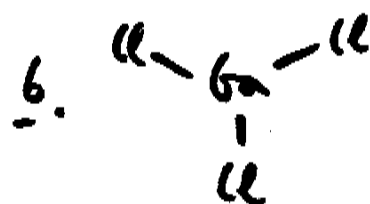
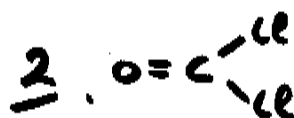
## CH 431 Symmetry Homework 2

Give the point groups for the following compounds.



## CH 431 Symmetry Homework 3

1.  $\text{CO}_2$
2.  $\text{OCCl}_2$  (not linear)
3.  $\text{ONCl}$
4.  $\text{OPCl}_3$  (same as  $\text{PF}_3$ )
5.  $\text{SOCl}_2$
6.  $\text{GaCl}_3$  (planar)
7.  $\text{I-Cl}$
8.  $\text{XeF}_4$
9.  $\text{SeF}_6$
10.  $\text{IBr}_3$
11.  $\text{Al}_2\text{Br}_6$
12.  $\text{OSeF}_2$
13.  $\text{SF}_4$
14.  $\text{XeF}_6$
15. Our old friend - tennis ball with the stripe



## CH 431 Symmetry Homework 4

Give the point group symmetry for the following molecules: (answers overpage)

- |                                                  |                              |
|--------------------------------------------------|------------------------------|
| 1. $\text{H}_2\text{O}$                          | 14. $\text{I-Cl}$            |
| 2. Benzene                                       | 15. $\text{GaCl}_3$          |
| 3. $\text{CCl}_4$                                | 16. $\text{POCl}_3$          |
| 4. $\text{NH}_3$                                 | 17. $\text{O=NCI}$           |
| 5. $\text{H}_2\text{S}$                          | 18. $\text{OCCl}_2$          |
| 6. Ferrocene ( $\text{Cp}_2\text{Fe}$ ) eclipsed | 19. $\text{HCN}$             |
| 7. $\text{SF}_6$                                 | 20. $\text{NO}_3^-$          |
| 8. $\text{IBr}_3$                                | 21. $\text{BFHCl}$           |
| 9. $\text{Al}_2\text{Br}_6$                      | 22. $\text{XeO}_3$           |
| 10. $\text{SeF}_2\text{O}$                       | 23. $\text{PF}_2\text{Cl}_3$ |
| 11. $\text{XeF}_6$                               | 24. $\text{PFCl}_4$          |
| 12. $\text{SF}_4$                                | 25. $\text{BrF}_5$           |
| 13. A tennis ball - including the stripe         |                              |