

(8 pts. ea.) Predict the likely organic products for the following substitution reactions. The likely mechanism is indicated under the reaction arrow. Remember to specify the stereochemistry of the products using wedge (▴) and dashed (▾) bonds where appropriate.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

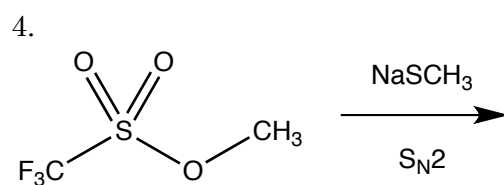
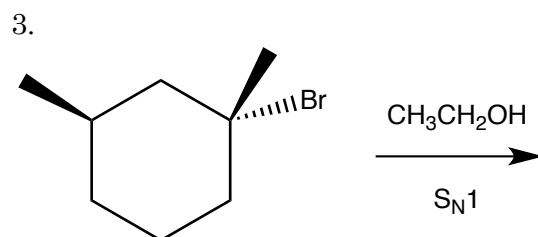
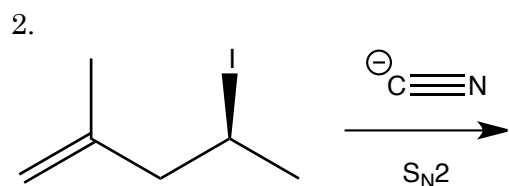
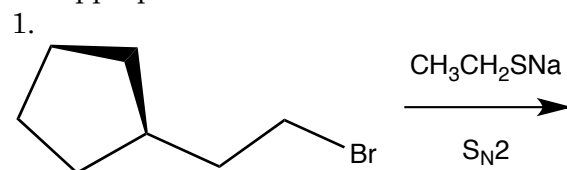
10. _____

11. _____

12. _____

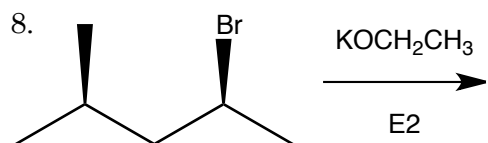
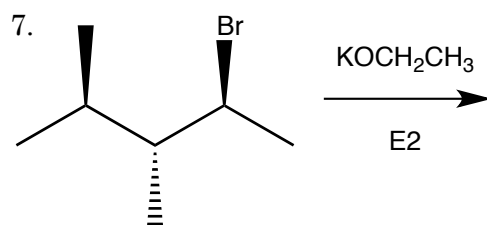
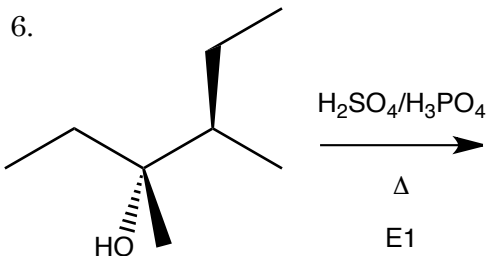
13. _____

14. _____

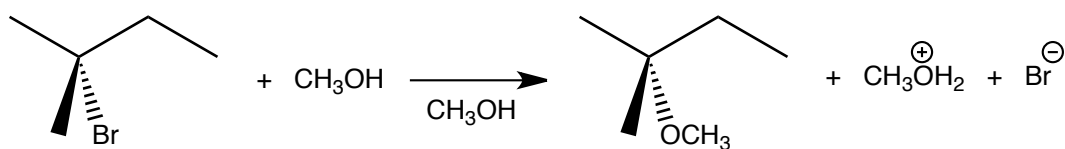


5. (8 pts.) Briefly explain how protic solvents interfere with nucleophiles.

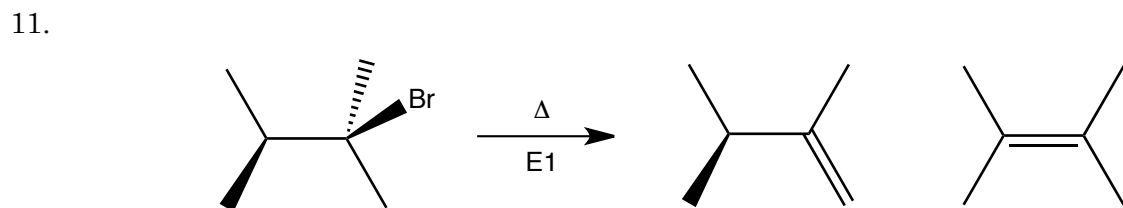
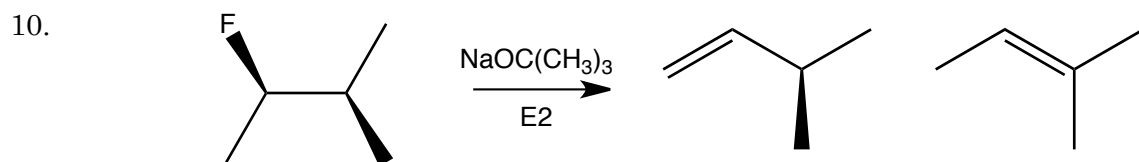
(8 pts. ea.) Predict all likely organic products for the following elimination reactions. The likely mechanism appears under the reaction arrow. Remember to specify the stereochemistry of the products using wedge (\blacktriangle) and dashed (\cdots) bonds where appropriate.



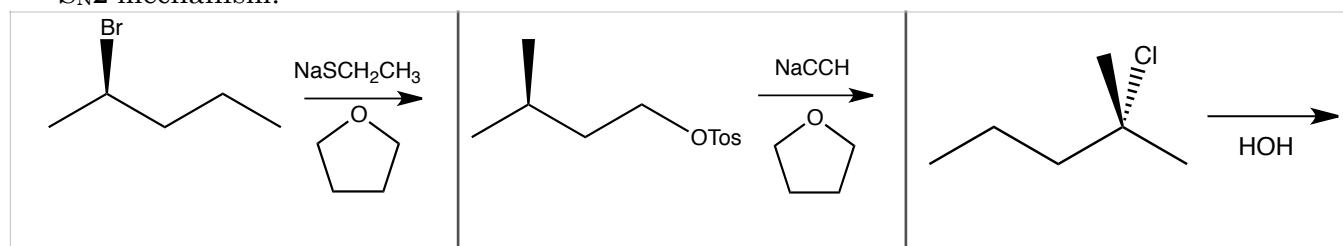
9. (10 pts.) Draw a mechanism for the following reaction. Remember to draw all intermediates and include electron movement arrows.



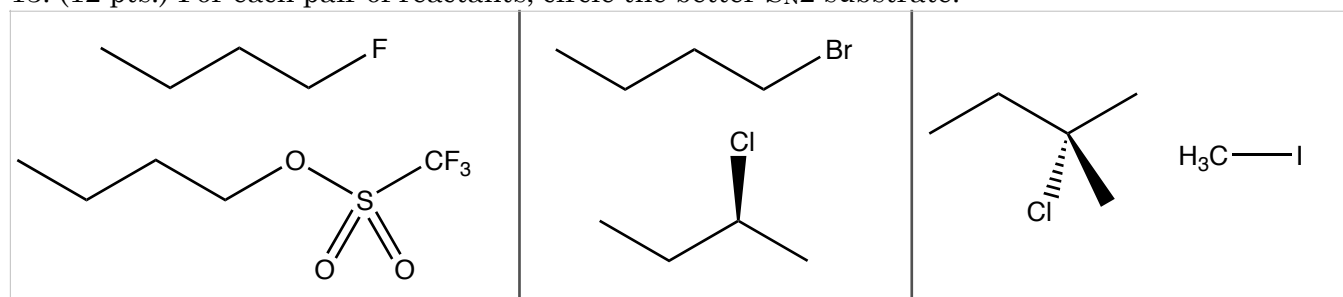
(8 pts. ea.) For the following elimination reactions circle the major product.



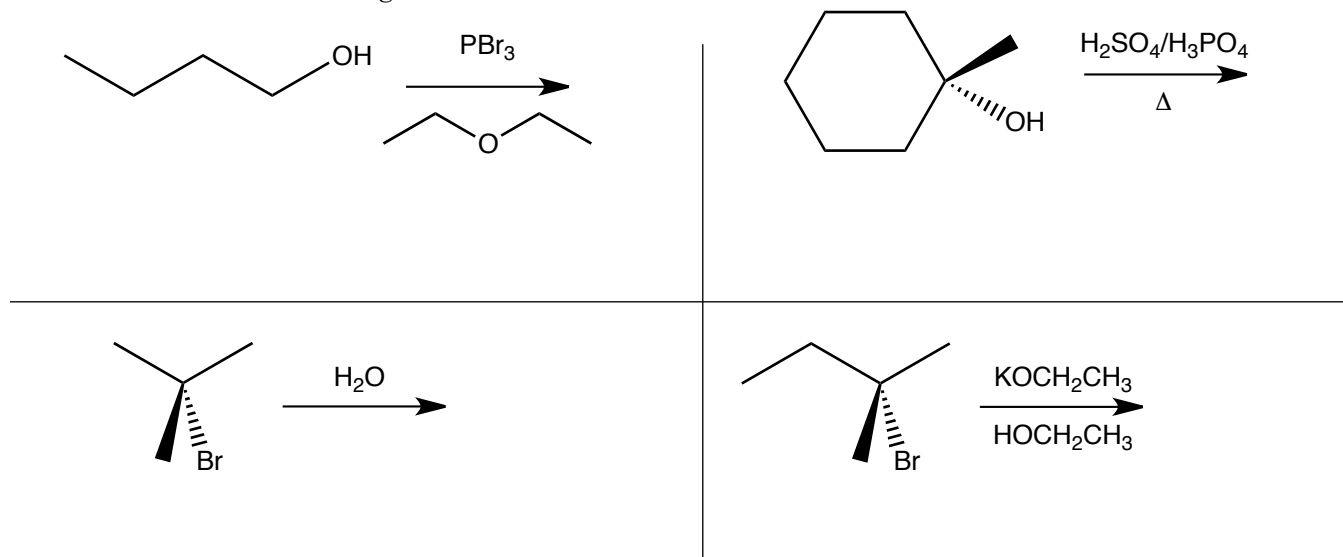
12. (12 pts.) Determine whether the following reactions are more likely to proceed by an S_N1 or an S_N2 mechanism.



13. (12 pts.) For each pair of reactants, circle the better S_N2 substrate.

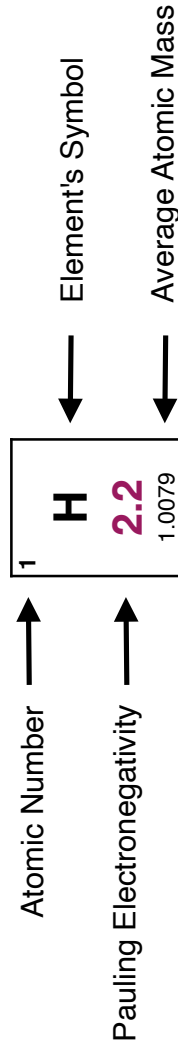


14. (12 pts.) Predict the most likely reaction mechanism (S_N1 , S_N2 , E1, or E2) for the reactions done under the following conditions.



Some Electronegativities of Elements of Interest to Organic Chemists¹

1	H 2.2 1.0079								2	He 4.0026						
3	Li 0.98 6.941	4	Be 1.57 9.012		5	B 2.04 10.811	6	C 2.55 12.011	7	N 3.04 14.007	8	O 3.44 15.999	9	F 3.98 18.998	10	Ne 20.1797
11	Na 0.93 22.989	12	Mg 1.31 24.305		13	Al 1.61 26.981	14	Si 1.90 28.086	15	P 2.19 30.974	16	S 2.58 32.065	17	Cl 3.16 35.453	18	Ar 39.948
19	K 0.82 39.098	20	Ca 1.00 40.078										35	Br 2.96 79.904	36	Kr 83.798
													53	I 2.66 126.90		



¹ Electronegativity values obtained from <https://en.wikipedia.org/wiki/Electronegativity> on September 28, 2023