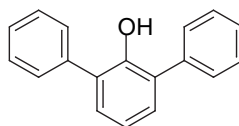
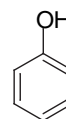
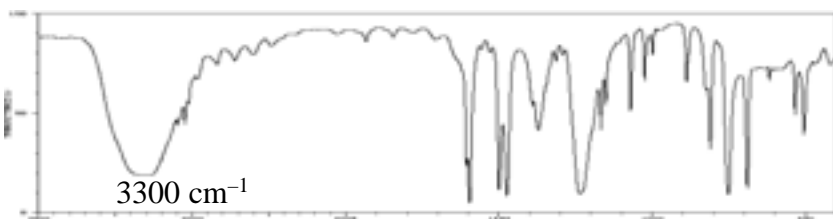
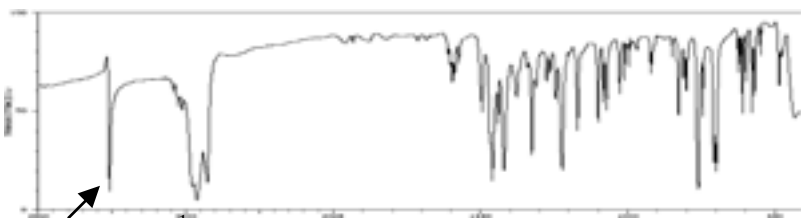


1. Match each compound with its IR spectrum.

For A, steric hinderance prevents H-bonding. Thus, the OH stretch is sharp.

**A****B****B**

3093	42	2606	77	1631	77	1236	9	826	68
3047	43	2487	81	1500	11	1168	41	812	31
3023	52	1934	81	1475	8	1153	52	753	9
2963	64	1846	84	1391	52	1072	49	690	12
2847	72	1606	22	1373	39	1024	64	618	64
2837	72	1598	4	1315	72	999	77	535	47
2723	74	1567	79	1293	77	888	64	607	38

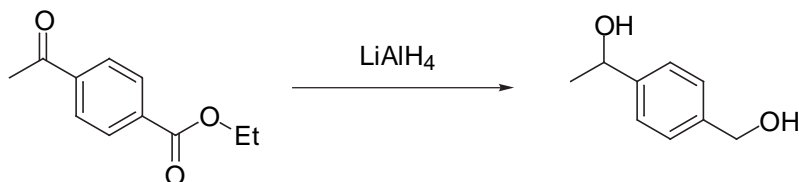
A

3620 cm⁻¹
SHARP!

3619	9	2856	19	1378	66	1083	62	707	23
3084	57	1596	62	1327	26	1072	47	700	18
3054	50	1495	47	1312	58	1027	57	611	46
3026	47	1467	32	1245	63	828	48	680	47
2955	11	1460	14	1222	19	801	58	570	55
2925	4	1441	42	1171	38	761	10	487	60
2869	21	1421	19	1101	43	746	44	434	44

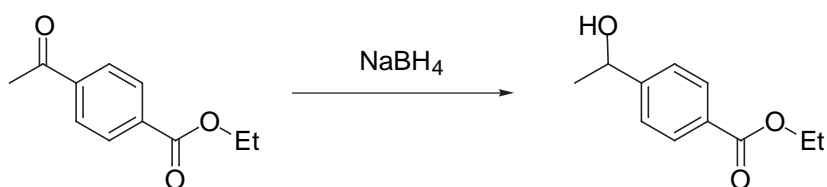
The syntheses in problems 2-4 all give racemic products

2)



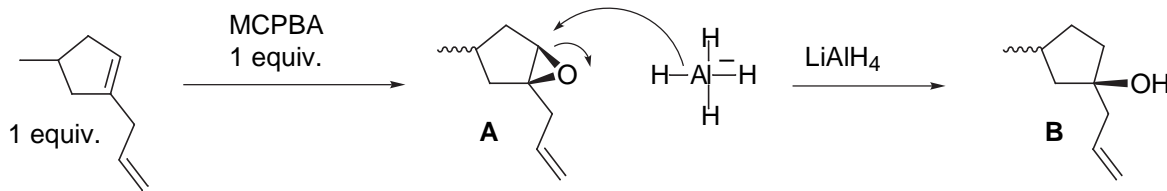
LiAlH₄ is a strong reducing agent, and reduces both esters and ketones

3)



NaBH₄ only reduces the ketone

4)



epoxidation is selective for the more substituted alkene

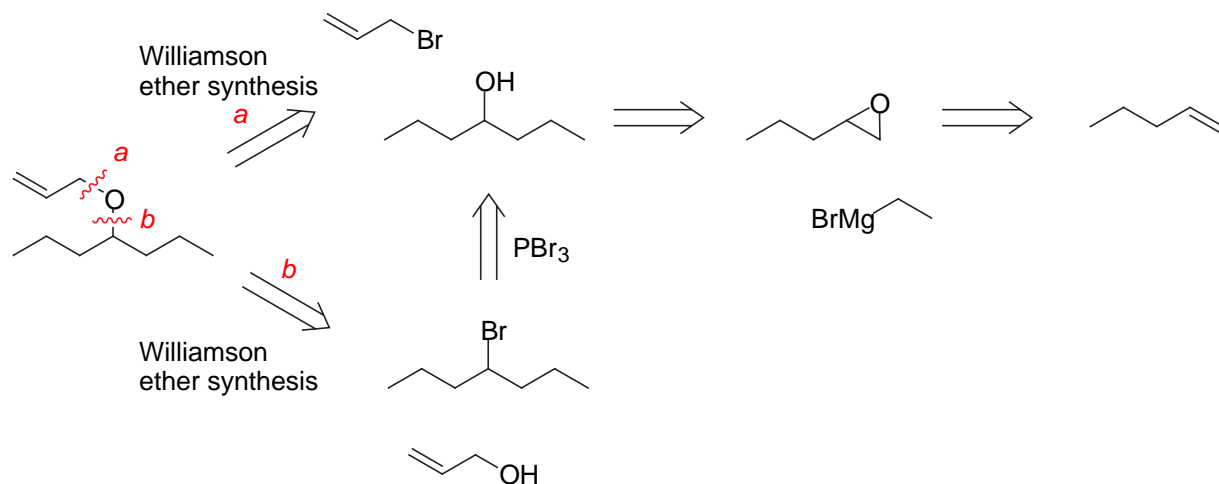
reduction at the more sterically accessible center

5) Propose a multistep synthesis



Retrosynthesis: this is your scratch work! We find that there is more than one possibility

(This type of arrow \Rightarrow refers to a "backwards" transformation)



Points about the above retrosynthesis

- Path *a* is better than *b* because it is shorter, and because it uses an allylic bromide rather than a secondary bromide (we expect a better yield with the more reactive allylic bromide in an $\text{S}_{\text{N}}2$ reaction).
- We worked our way back to a 5 carbon intermediate epoxide, because we knew that this could be constructed from our starting alkene.

The forward synthesis: (this is your formal answer!)

