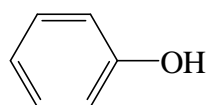




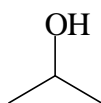
Problem Sheet 4

1. Name the functional group(s) in each of the following compounds, including classification into primary, secondary or tertiary where appropriate.

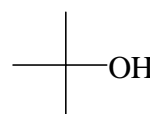
(a)



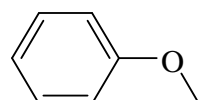
(b)



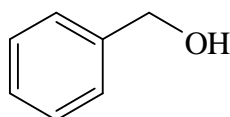
(c)



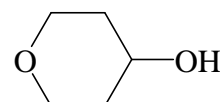
(d)



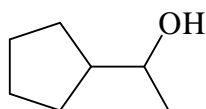
(e)



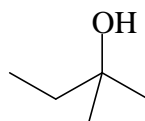
(f)



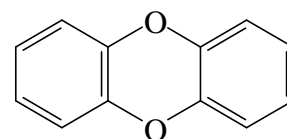
(g)



(h)

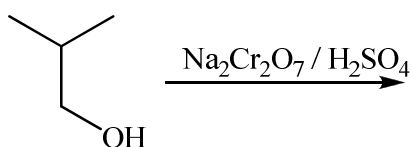


(i)

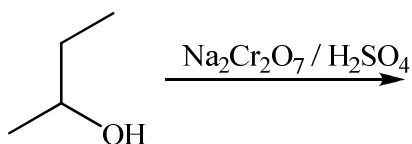


2. Draw the major products of the following reactions. Write "NR" if there is no reaction.

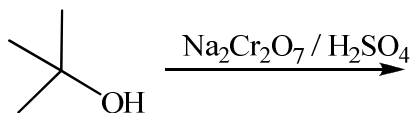
a.



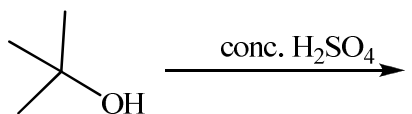
b.



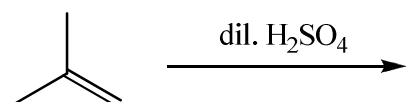
c.



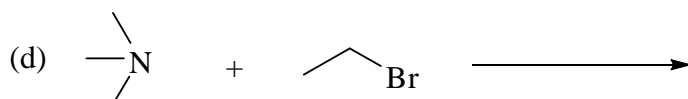
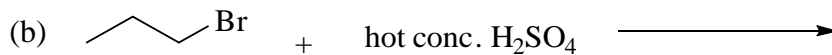
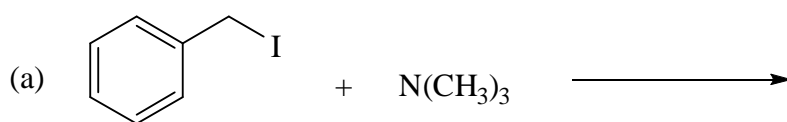
d.



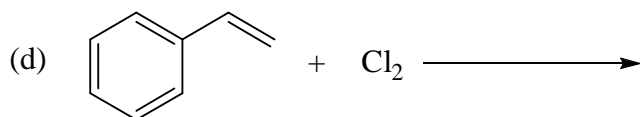
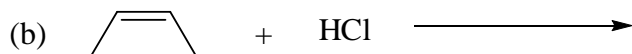
e.



3. Draw the constitutional formula of the major organic product formed in the following reactions. If there is no reaction, write "NR".



4. Draw the structure of the major organic product formed in the following reactions.



5. Give the reagents required to carry out the following multistep, chemical conversions. Draw constitutional formulas for any intermediate compounds.

