1. Use the Woodward-Fieser table to estimate the λ_{max} observed in a UV spectra of the following cross-conjugated systems (6 pts)

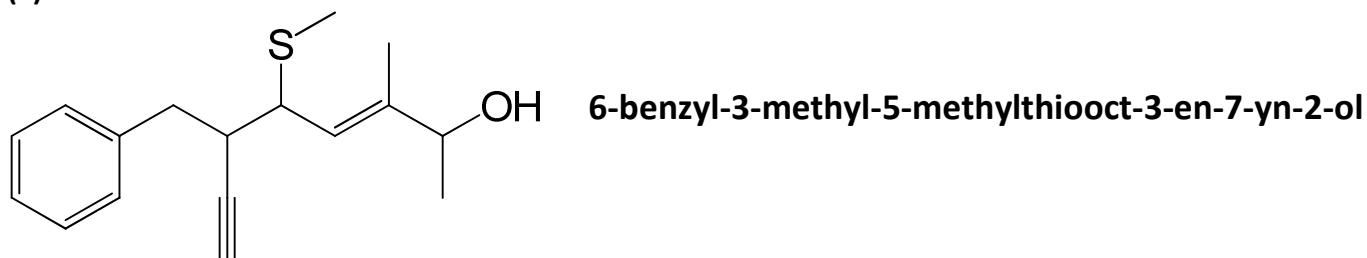| Parent	=	253 nm
Extra conjugated C=C (3 x 30)	=	90 nm
Exocyclic C=C	=	5 nm
Cl (2 x 5)	=	10 nm
SCH₃	=	30 nm
N(Alkyl)₂	=	60 nm
O-Alkyl	=	6 nm
C-Alkyls (5 x 2)	=	10 nm
		_____
		464 nm

Parent	=	253 nm
Extra conjugated C=C (2 x 30)	=	60 nm
Exocyclic C=C (2 x 5)	=	10 nm
SCH₂CH₃	=	30 nm
N(Alkyl)₂	=	60 nm
O-Alkyl	=	6 nm
C-Alkyls (4 x 5)	=	20 nm
		_____
		439 nm

Acyclic	**217 nm**
Heteroannular	**214 nm**
Homoannular	**253 nm**

For each additional conjugated double bond	**+ 30 nm**
For each exocyclic double bond	**+ 5 nm**
For each substituent C-substituent	**+ 5 nm**
Cl	**+ 5 nm**
Br	**+ 5 nm**
O-Alkyl	**+ 6 nm**
OCOCH₃	**+ 0 nm**
N(alkyl)₂	**+ 60 nm**
S-alkyl	**+ 30 nm**
Solvent correction	**+ 0 nm**

2. Name the following compounds (3 x 6 = 18 pts)

(a)

6-benzyl-3-methyl-5-methylthiooct-3-en-7-yn-2-ol

(b)

2-sec-butoxy-5-hydroxy-4-nitrobenzaldehyde

(c)

3-bromo-4-isopropylthio-6-methoxy-2-nitroaniline

(d)

7-methoxy-3-methyl-6-phenylnon-4-en-8-yne-2-thiol
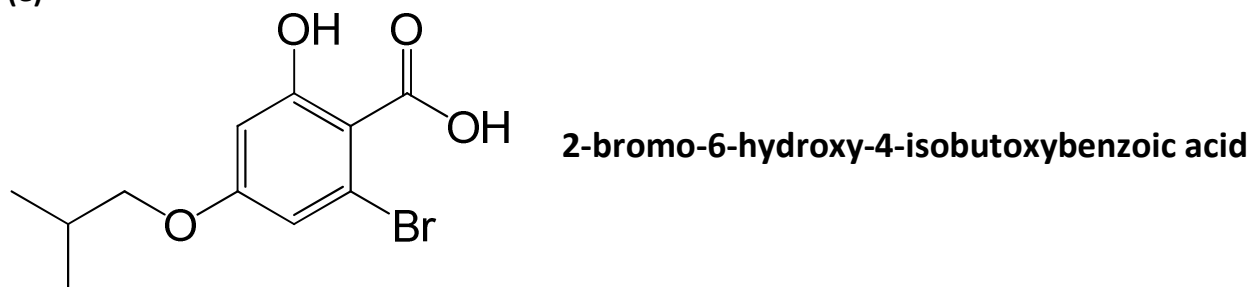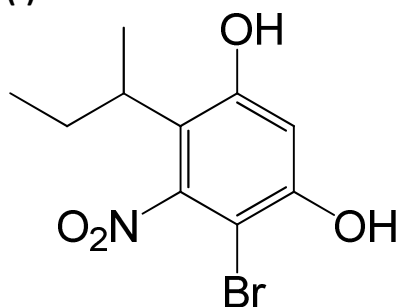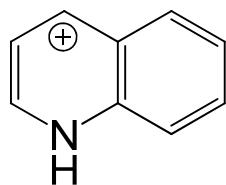
(e)

2-bromo-6-hydroxy-4-isobutoxybenzoic acid
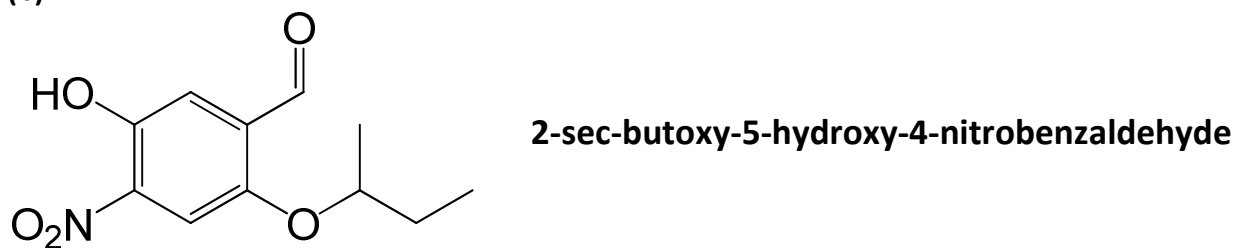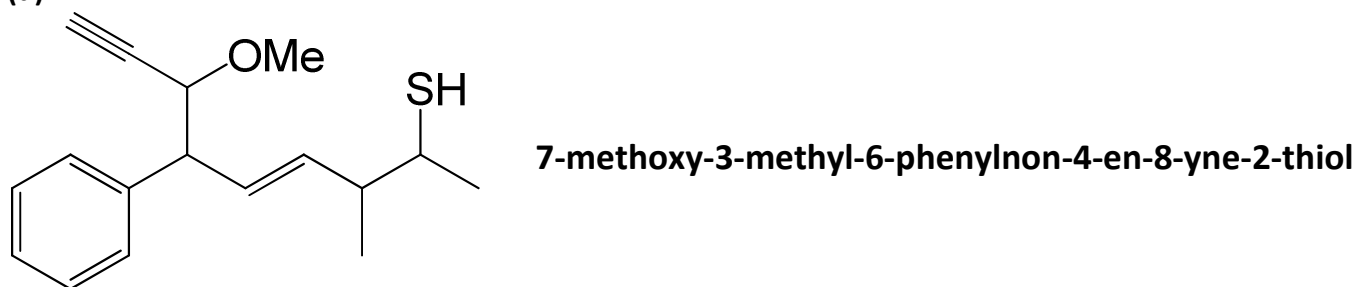
(f)

4-bromo-6-sec-butyl-5-nitrobenzene-1,3-diol

3. Classify the following molecules as aromatic, anti-aromatic or non-aromatic (5 pts)
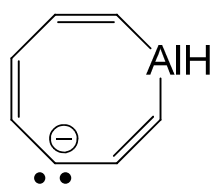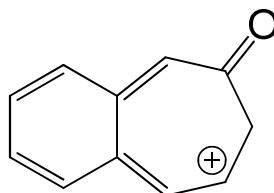
| Aromatic | Antiaromatic | Non-Aromatic | Aromatic | Antiaromatic |
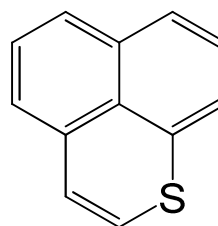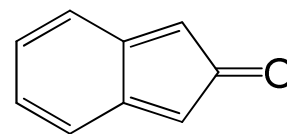
4. Predict the major product(s) expected from the following reaction sequences (3 x 14 = 42 pts)

(a)
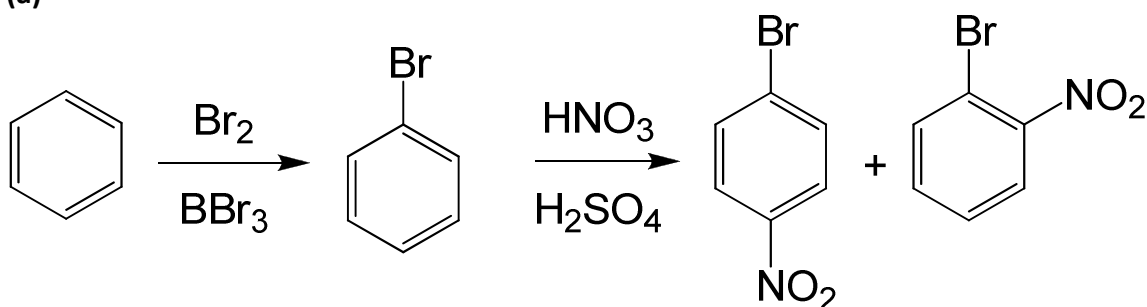
(b)
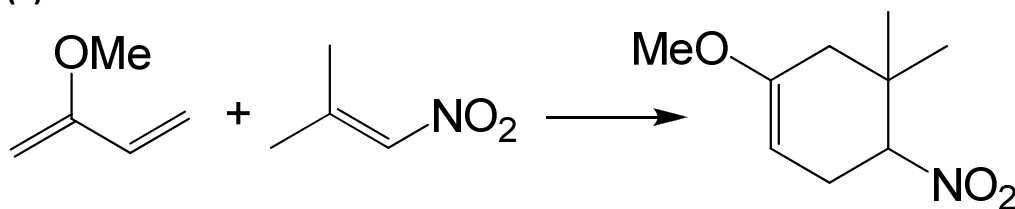
(c)
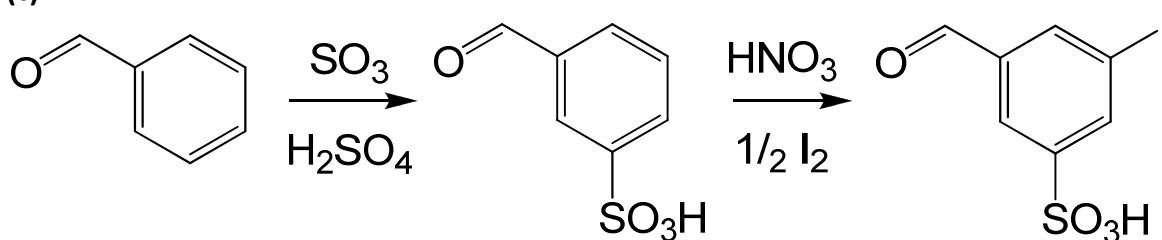
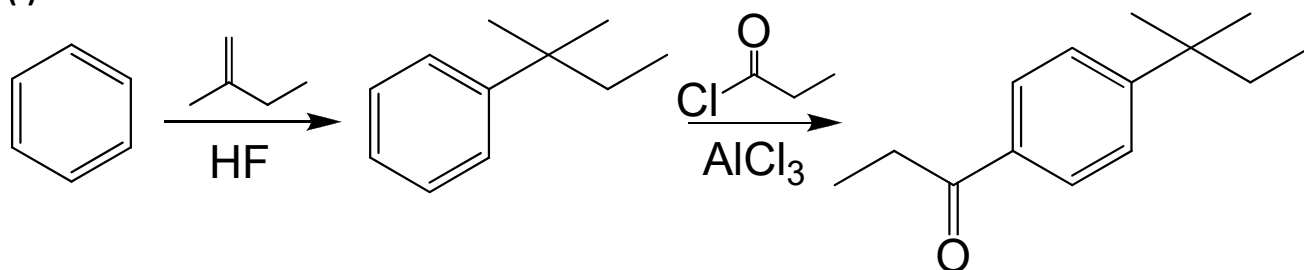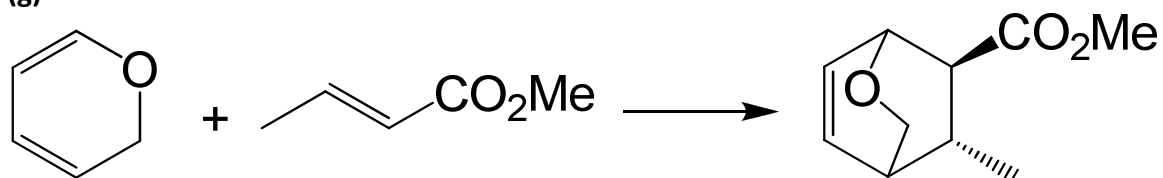**(d)**
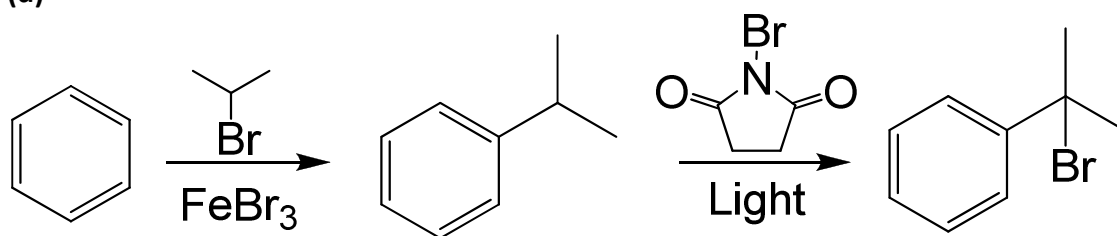
(f)

(g)

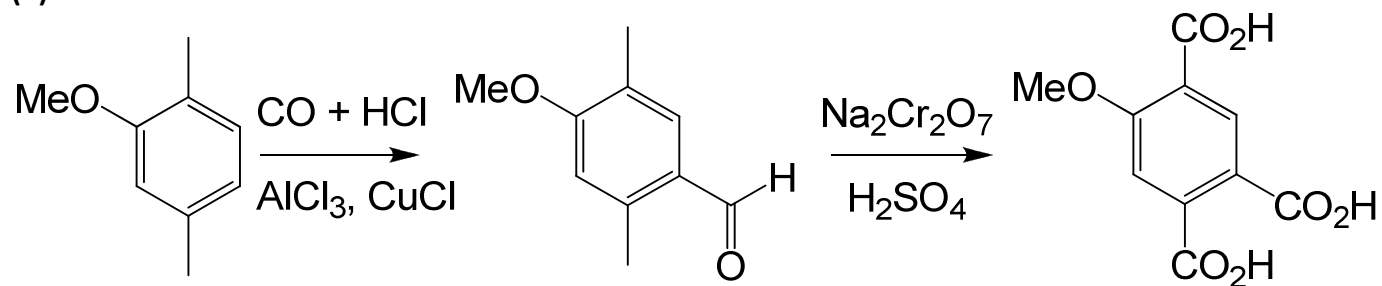**(h)**
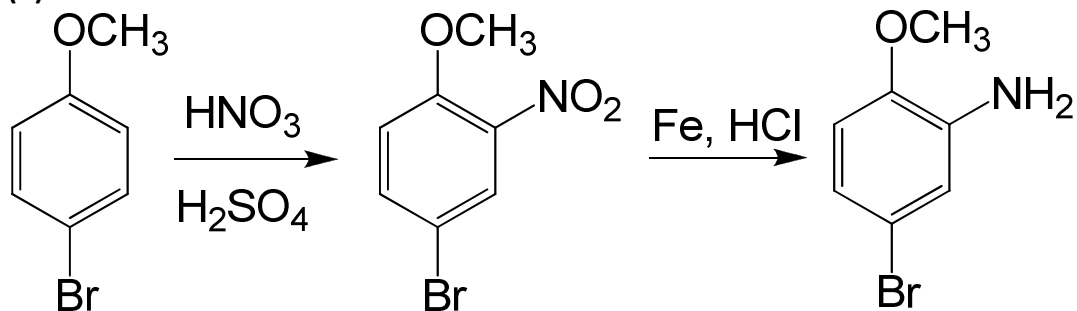
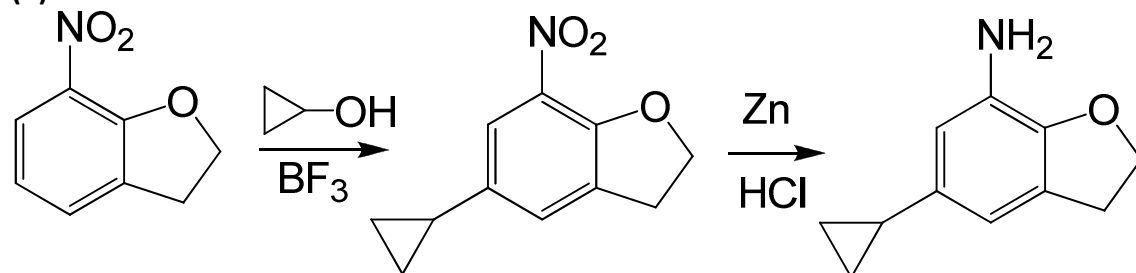**(i)**
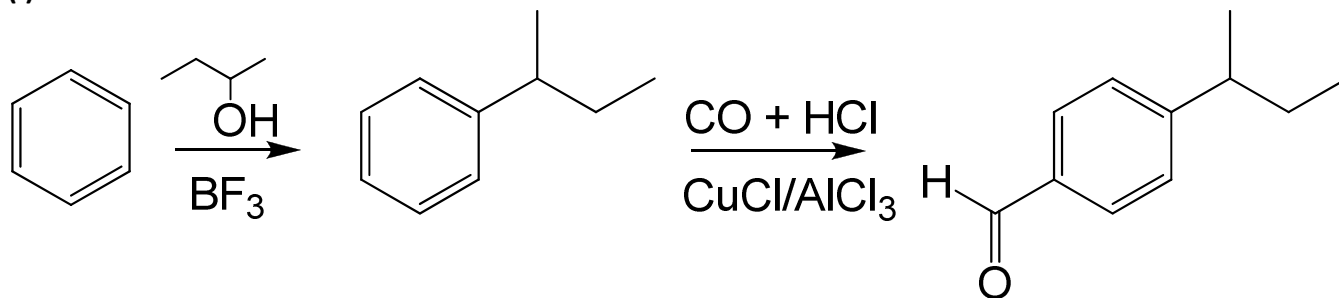
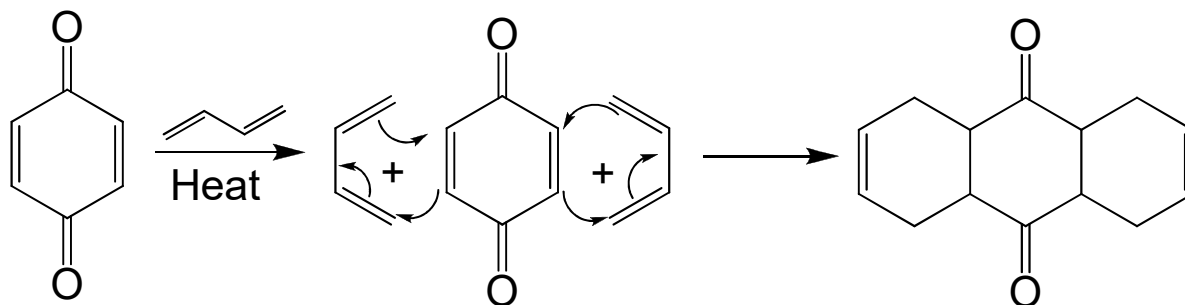**(j)**
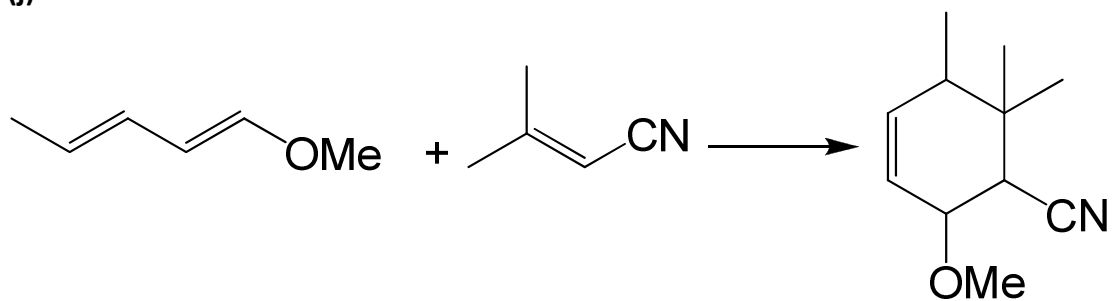
(k)
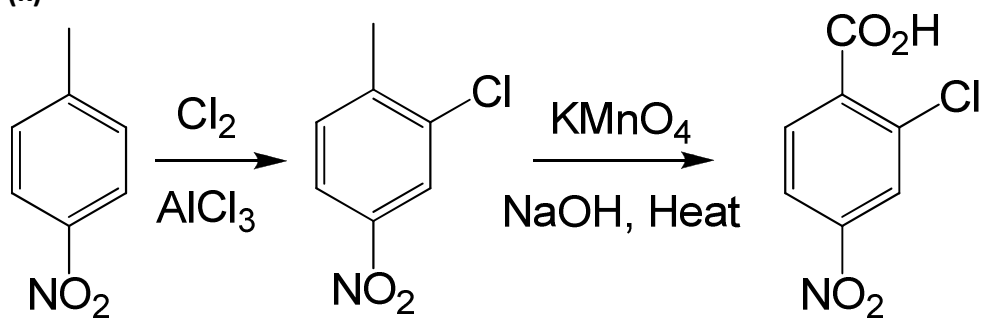
(l)
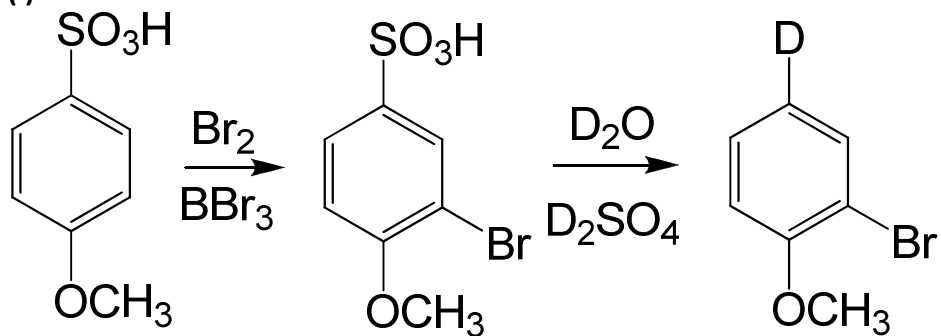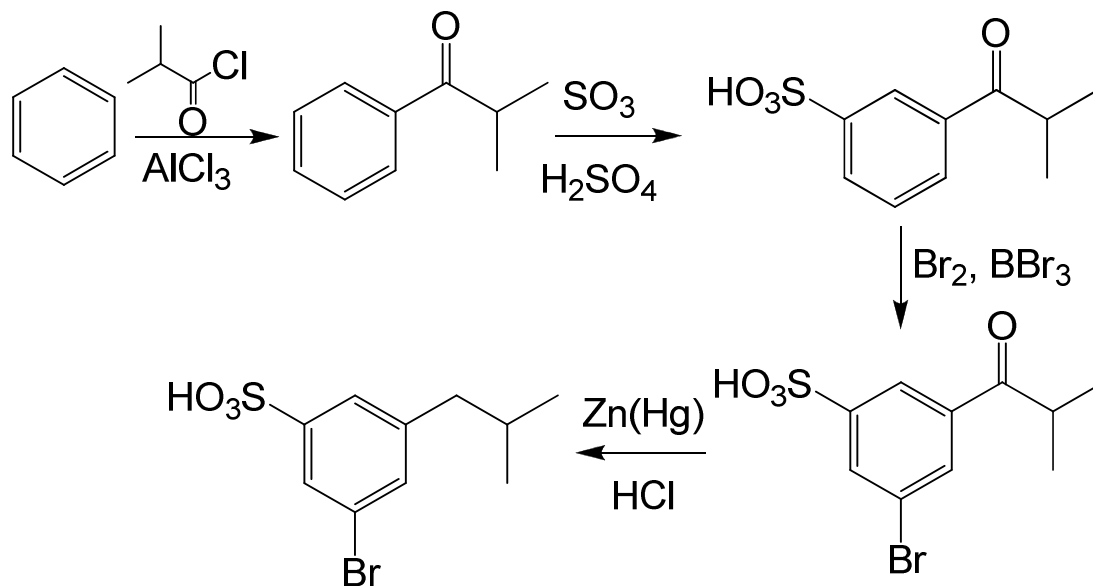

(m)
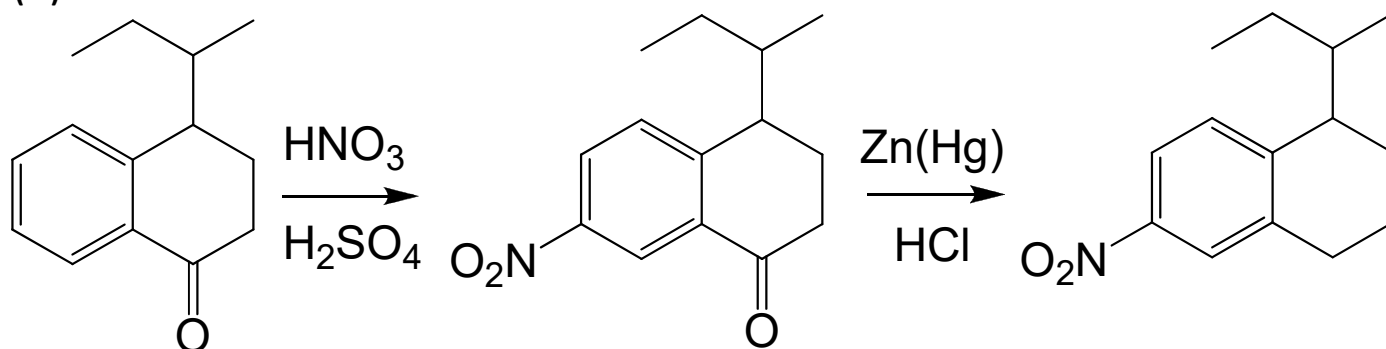
(n)

(o)

5. Show how you would synthesize each of the following compounds from the given starting material(s). You must draw keys intermediates to receive full credit (3 x 6 = 18 pts)
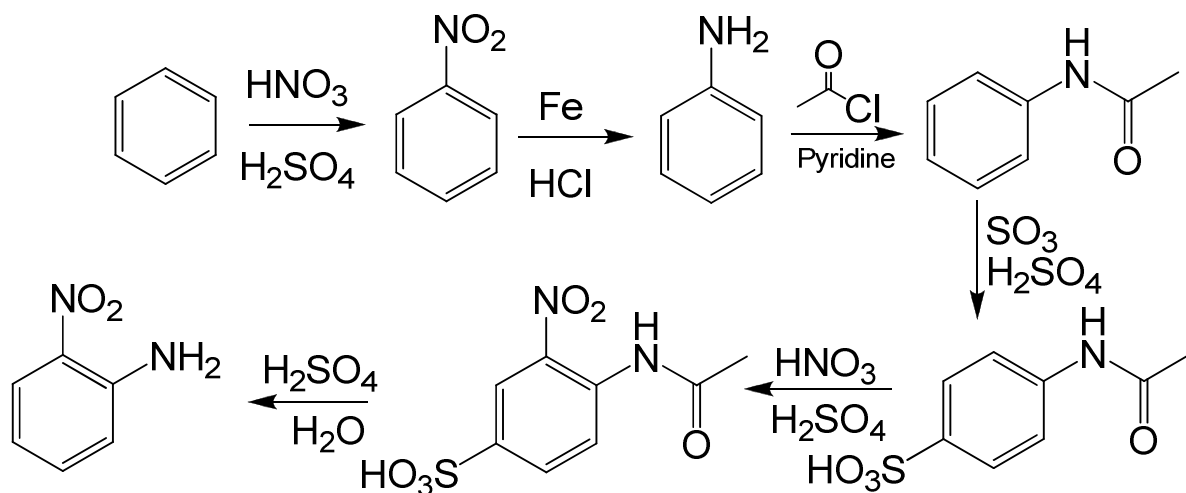
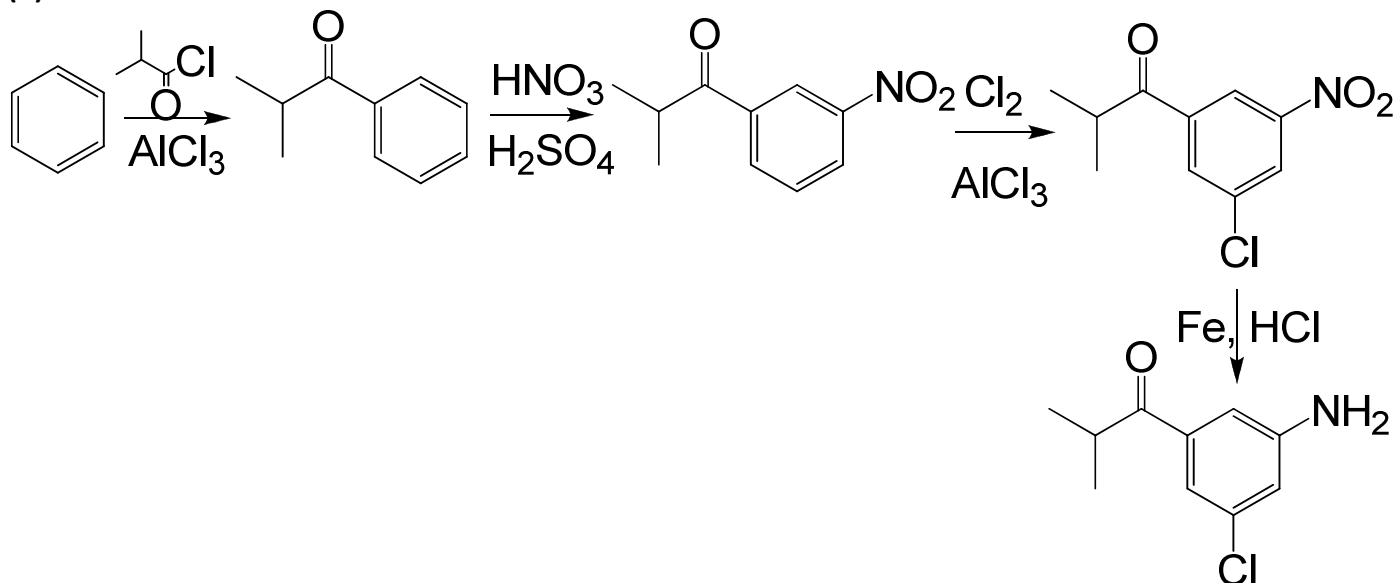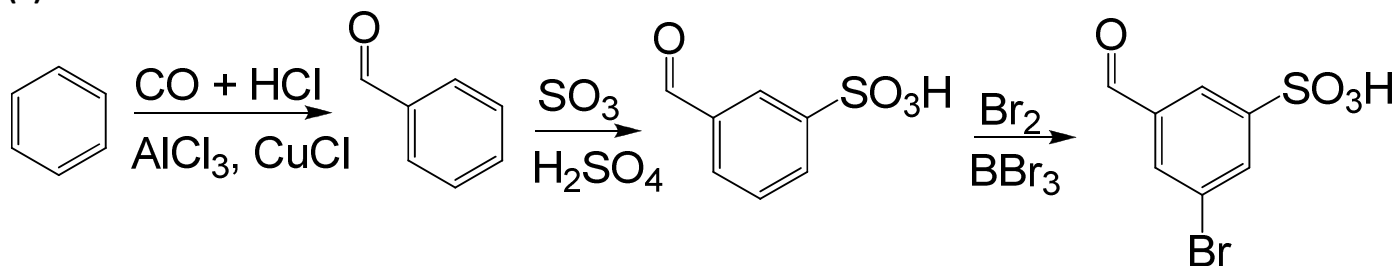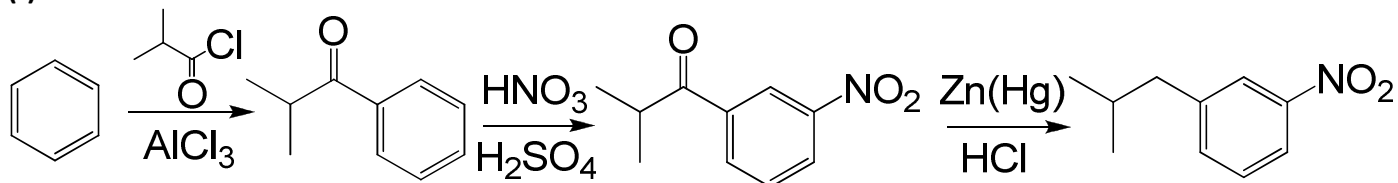**(a)**

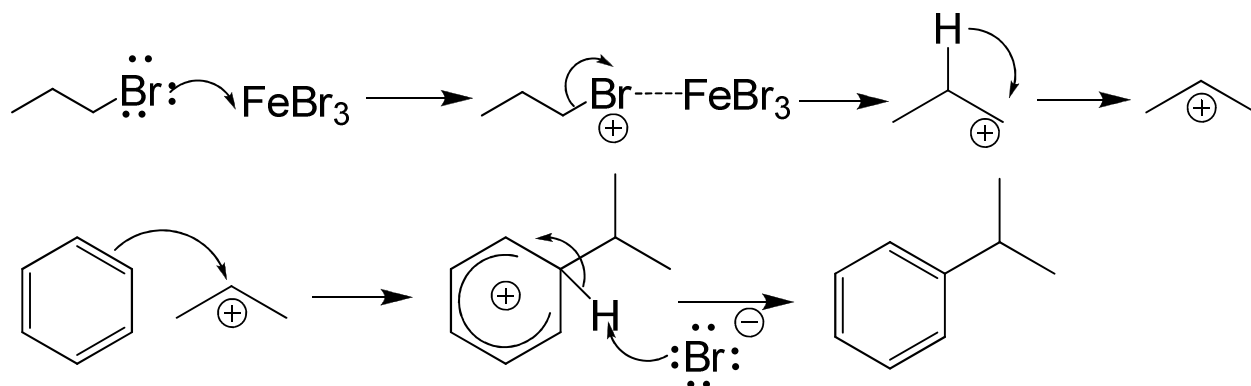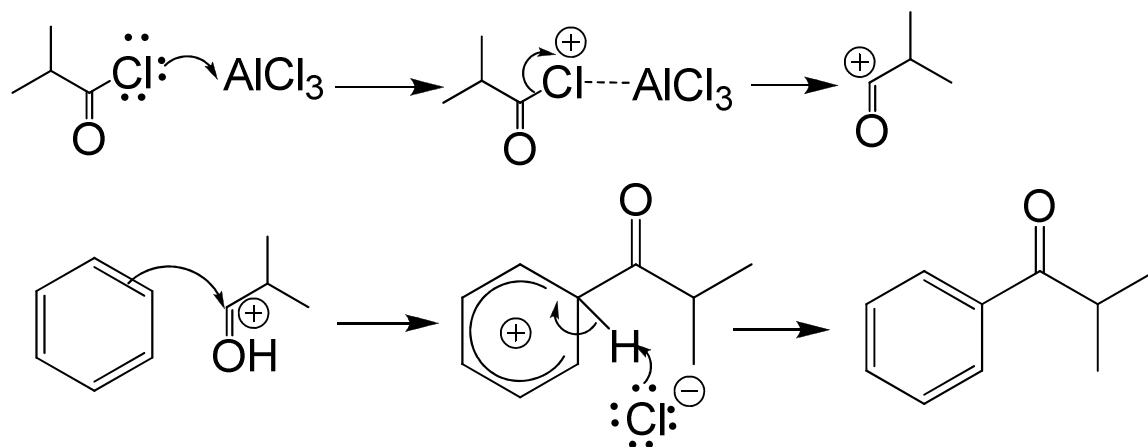**(b)**

(c)

(d)

(e)

(f)

6. Propose a mechanism consistent with the following reactions (you must show all the intermediates to receive full credit) (3 x 3 = 9 pts)

(a)

(b)

(c)