2002-N-2

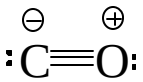
- 4.29×10^{14} Hz – 6.67×10^{14} Hz
  2.84×10^{-19} J – 4.42×10^{-19} J (171 kJ mol^{-1} – 266 kJ mol^{-1})

- Electron density is the probability of finding an electron at that point in space.

- F: The 2*p* electrons are not effective in screening other 2*p* electrons, so the electrons in F feel a higher effective nuclear charge in F than in O.
  O: The 2*p* electrons in O are closer to the nucleus and therefore held more tightly than the 3*p* electrons in S.

- To get strong double and triple bonds the nuclei need to be close together, since the orbital overlap in a π-type bond is not as good as in a σ-type bond. Hence only small atoms (mainly second row) can form multiple bonds.

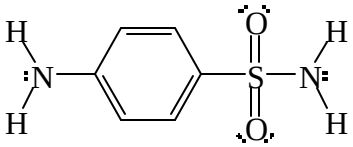
2002-N-3

- 

  Electronegativity values suggest that the O would be δ– and the C would be δ+. The formal charges, however, counteract the electronegativity differences and a small molecular dipole results.

- 1,4-Butanediol will be more soluble in water as it can form more hydrogen bonds than 1-butanol.
  Chloroform will be more soluble as it is more polar than carbon tetrachloride. Being more polar, it will have stronger dipole-dipole interactions with the very polar solvent.

2002-N-4

- 

  tetrahedral

  sp^2

  120°

  10

- Hydrogen bonding: O is small enough and electronegative enough to form H-bonds.

  Dipole-dipole: The H_2S molecule has a dipole - S is too big to form H-bonds, yet not big enough to have significant dispersion forces.

  Dispersion: Te is less electronegative than S, so the dipole in H_2Te is less than that in H_2S. However, the b.p. of H_2Te is greater than that of H_2S, so the dominant force must be dispersion forces - Te is much larger atom than S and therefore more polarisable.

2002-N-5

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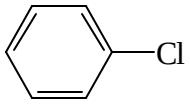
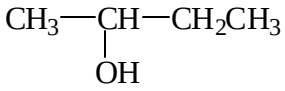
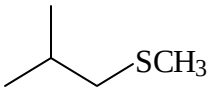
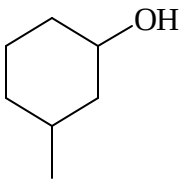
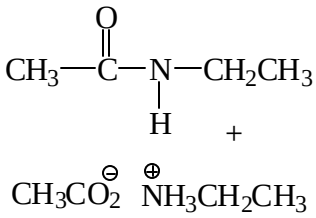
		
	1) CH_3MgI 2) H^+ / H_2O	2-butanol
		
		
3-methylcyclohexanone		
1-propyl acetate		CH_3COOH + $HOCH_2CH_2CH_3$
		
	conc. H_2SO_4 / heat	

2002-N-6

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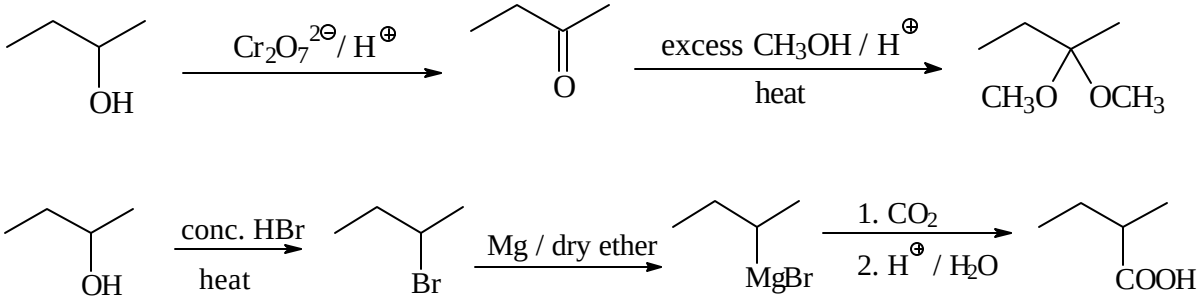

2002-N-7

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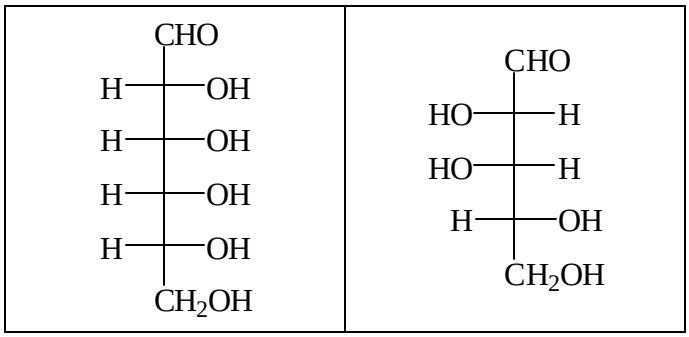

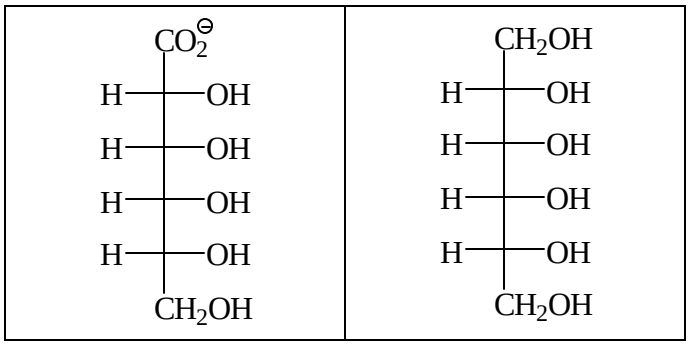

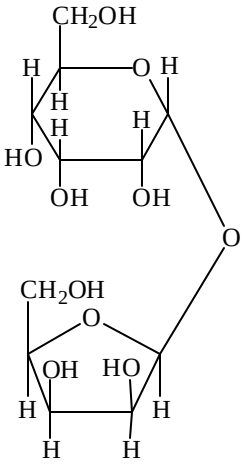

2002-N-8

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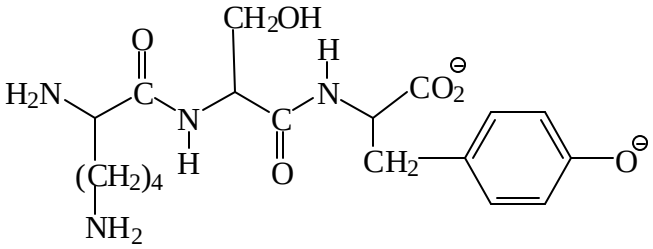
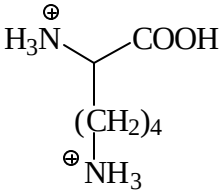
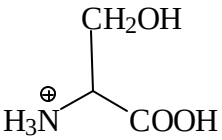
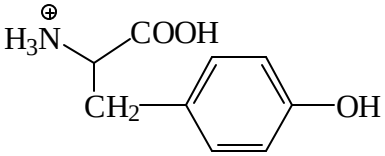
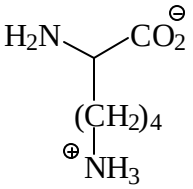


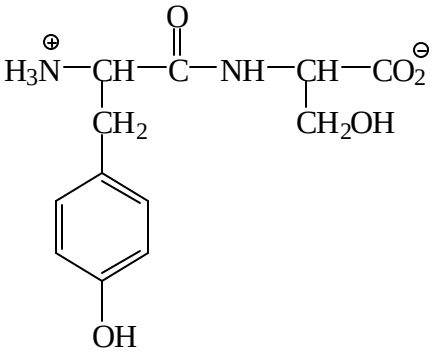
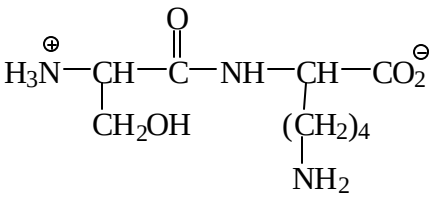








pH = 9.74

2002-N-9

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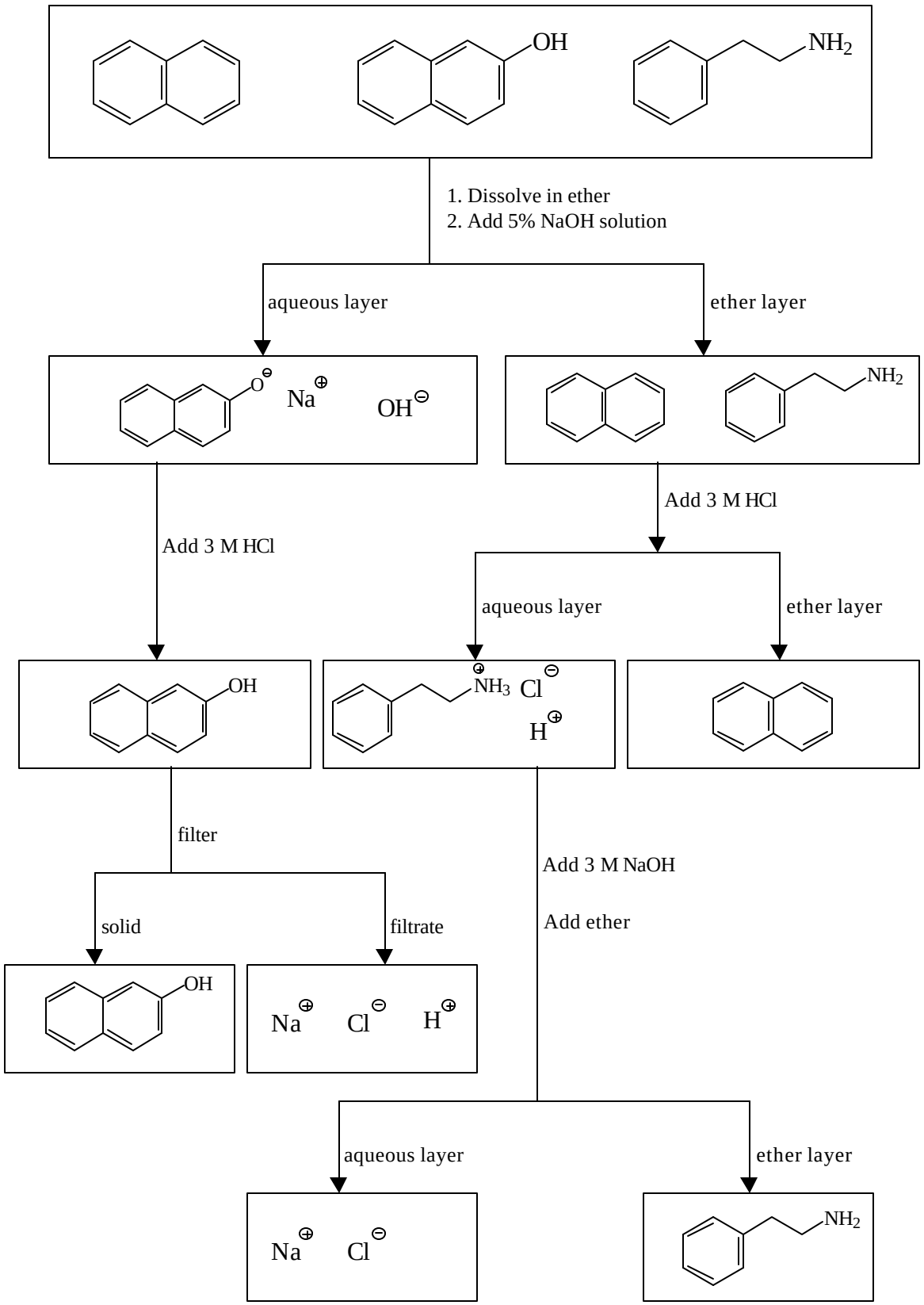
OH
NH2
1. Dissolve in ether
2. Add 5% NaOH solution
aqueous layer
ether layer
O
Na
OH
NH2
Add 3 M HCl
Add 3 M HCl
aqueous layer
ether layer
OH
NH3
Cl
H
filter
Add 3 M NaOH
Add ether
solid
filtrate
OH
Na
Cl
H
aqueous layer
ether layer
Na
Cl
NH2