

Which is the odd one out? (Organic)

Part 1

For each question, one or more reasons have been given but you may well have thought of other reasons which are equally good if not better. You may decide as group which you prefer.

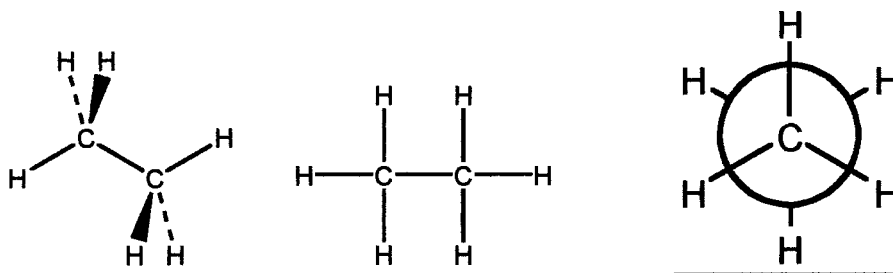
1. Ammonia, hydroxide, chloride

Chloride is such a weak base that it hardly acts as a base at all whereas the other two are more basic. Chloride is also a poorer nucleophile than the other two.

2. Hydrogen chloride, oxygen, bromine

The other two are electrophiles and oxygen is not.

3.



The 'saw-horse' representation shows specifically the lowest energy conformation of the molecule at temperatures as high as room temperature, with the two ends of the molecule rotating relative to each other like helicopter blades.

4. Amide, nitrile, amine

Amines are at a different oxidation level to amides and nitriles which are both at the oxidation level of carboxylic acid derivatives. Both amides and nitriles hydrolyse to form carboxylic acids. The hydrolysis of amines forms alcohols.

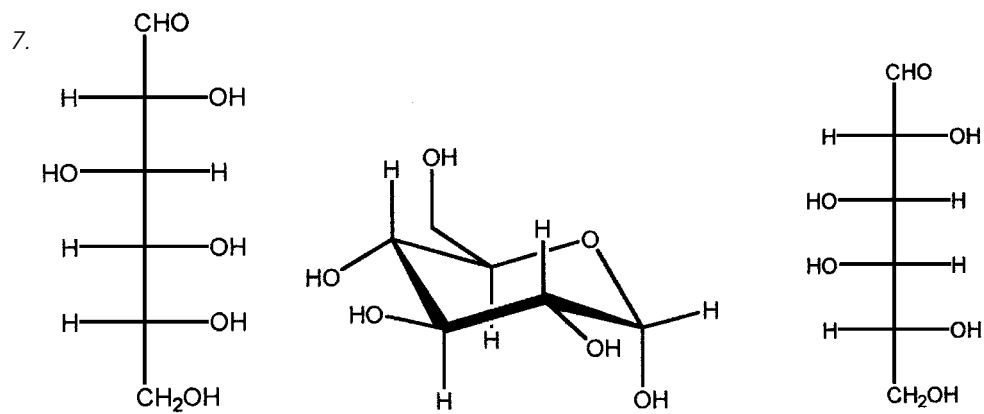
5. Ethanol, benzene, ethene

Ethanol contains no π bonds/ethanol is not a hydrocarbon.

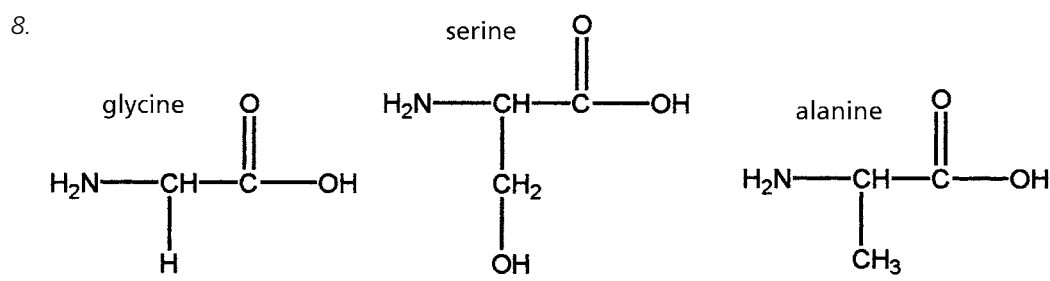
6. Butan-2-ol, propan-2-ol, pentan-2-ol

Propan-2-ol does not have a chiral centre and will therefore not have optical isomers.

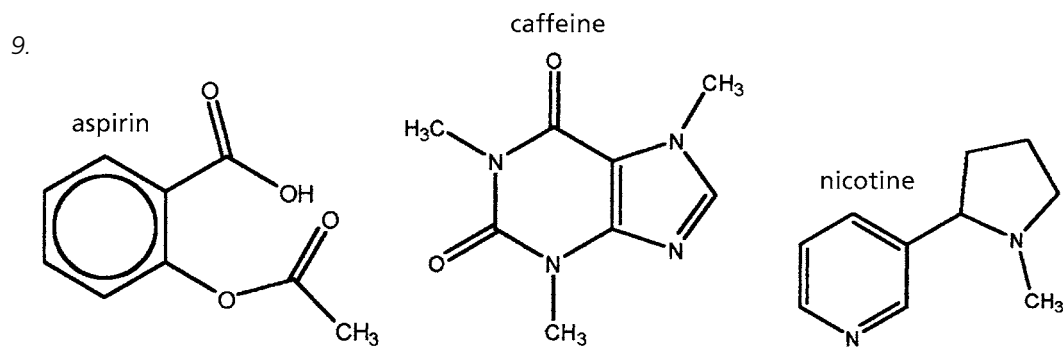
continued on page 2



The first two structures are both glucose. It exists in solution as both ring and open chain form. The third compound is the open chain form of galactose.



All three are naturally occurring amino acids. Glycine is the only naturally occurring amino acid that is not a specific enantiomer. All the others have a chiral centre.



Aspirin is an analgesic (painkiller) the other two are stimulants. Aspirin also contains a delocalised ring with carbon atoms only (the other two have rings with at least one heteroatom (non carbon) in). The other two are addictive to some extent, aspirin is not.

10. *Propan-1-ol, propylamine, propanal*

Propanal has to be reduced to convert it to either of the other two. The other two can be interconverted without oxidation or reduction.

continued on page 3



Chemistry for the gifted and talented

11. Ethylpropoxide, ethylpropanoate, N-ethylpropanamide

The other two hydrolyse to form propanoic acid. The other two contain a C=O bond.

12. LiAlH_4 (ether), $\text{Zn(s)} + \text{HCl(aq)}$ or $\text{K}_2\text{Cr}_2\text{O}_7\text{(s)} + \text{H}_2\text{SO}_4\text{(aq)}$

The first two options are reducing agents, $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$ is an oxidising mixture.

13. Poly(ester), poly(ethene), poly(tetrafluoroethene)

Poly(ester) is a condensation polymer, the other two are addition polymers.

14. Reflux, distillation, solvent extraction

Reflux is a condition used in some reactions, both distillation and solvent extraction are separation techniques used to purify products of reactions.