

## SL & HL Answers to Fundamentals of organic chemistry (2) questions

1.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$  or  $\text{CH}_3(\text{CH}_2)_4\text{CH}_3$  : hexane  
 $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$  : 2-methylpentane  
 $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$  : 3-methylpentane  
 $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}_3$  : 2,2-dimethylbutane  
 $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{CH}_3$  : 2,3-dimethylbutane
  
2. i. **A:** carboxyl      **B:** carbonyl (or ketone)
  
- ii. **A:** propanoic acid    **B:** butan-2-one (or 2-butanone)  
 (Note: As butan-2-one is the only ketone isomer of  $\text{C}_4\text{H}_8\text{O}$  the name butanone is also acceptable for **B.**)
  
- iii. **A** (propanoic acid) will have the higher boiling point as there is hydrogen bonding between the molecules which are stronger intermolecular forces than the dipole-dipole interactions in **B** (butan-2-one). Due to hydrogen bonding **A** will also be more soluble in water.
  
3. (a) **I.** propan-2-ol (or 2-propanol)  
**II.** butan-1-ol (or 1-butanol)  
**III.** 2-methylpropan-2-ol
  
- (b) propan-2-ol (**I**) is secondary  
 butan-1-ol (**II**) is primary  
 2-methylpropan-2-ol(**III**) is tertiary.
  
4. i. Tyrosine: amine (or amino), carboxyl, phenyl and hydroxyl.
  
- ii. Aspirin: carboxyl, phenyl and ester.

