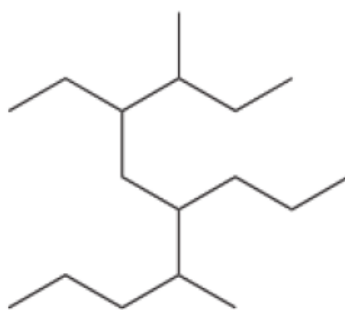
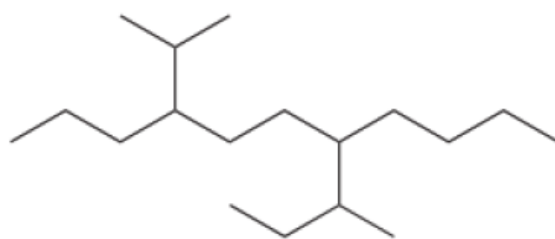


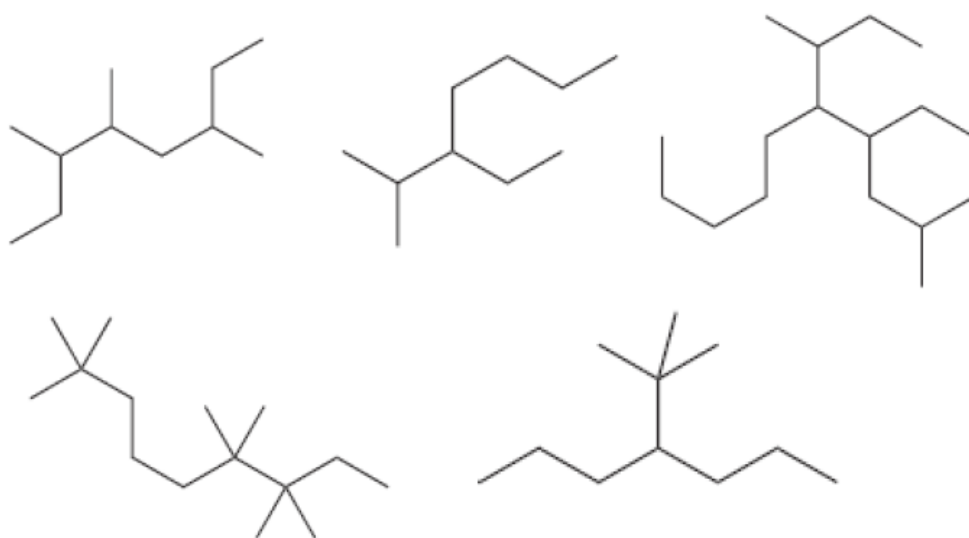
- Define melting point, hydrogen bonding
- Give examples of compounds capable of forming hydrogen bonding
- Identify and name all the substituents in the following compound



- In the following compound, identify the substituents, and indicate their systematic name



- Provide a systematic name for each of the following compounds



- What is the effect of M.wt. on melting and boiling points?
- What is the effect of branching on melting and boiling points?

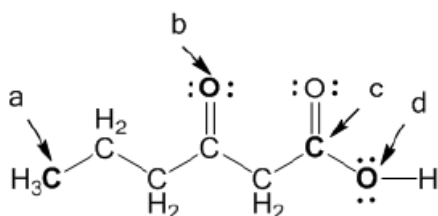
Sample Questions on Part 1 and Part 2

Q1/ Define the following terms

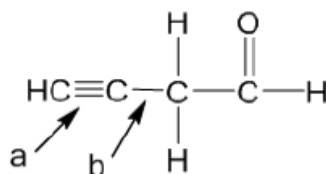
1. H-bonding
2. Boiling point
3. Acids
4. sp Hybridisation
5. Intermolecular forces

Q2/ Answer the following questions

1. Explain the differences in hybridisation and geometry between ethylene and ethyne.
2. Determine the type of hybridisation for the 4 indicated atoms



3. Arrange the 2 indicated bonds according to their relative strengths, then explain the reason for your answer



Q3/ Explain the reason for the following

1. Both NH_3 and H_2O molecules are sp^3 hybridised, but they have different shapes.
2. Heterolytic bond dissociation energy for CH_3-H bond is higher than homolytic bond dissociation energy for the same bond.
3. Dipole moment of $\text{CHCl}_3 = 1.15 \text{ D}$ is higher than that of $\text{CCl}_4 = 0 \text{ D}$.
4. Melting points of ionic compounds are much higher than those of organic compounds.
5. Melting point values can be used as indication for purity.

7. Without referring to tables, list the following hydrocarbons in order of decreasing boiling points (i.e., highest boiling at top, lowest at bottom):

- (a) 3,3-dimethylpentane (c) 2-methylheptane (e) 2-methylhexane
(b) *n*-heptane (d) *n*-pentane

8. Write balanced equations, naming all organic products, for the following reactions:

- (a) isobutyl bromide + Mg/ether (d) product of (b) + H₂O
(b) *tert*-butyl bromide + Mg/ether (e) product of (a) + D₂O
(c) product of (a) + H₂O (f) *sec*-butyl chloride + Li, then CuI
(g) product of (f) + ethyl bromide

9. Write equations for the preparation of *n*-butane from:

- (a) *n*-butyl bromide (d) 1-butene, CH₃CH₂CH=CH₂
(b) *sec*-butyl bromide (e) 2-butene, CH₃CH=CHCH₃
(c) ethyl chloride

10. Draw structures of all products expected from monochlorination at room temperature of:

- (a) *n*-hexane (c) 2,2,4-trimethylpentane
(b) isohexane (d) 2,2-dimethylbutane