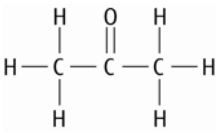
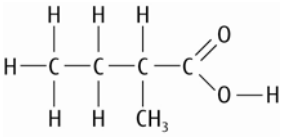
Core Worksheet – Chapter 10

1 Identify the functional groups present in the following molecules: [4]

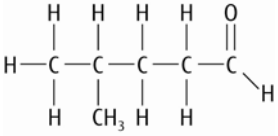
a



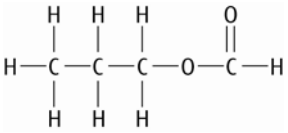
b



c



d

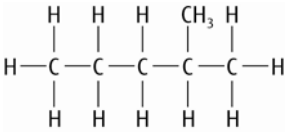


2 Give the structural formula of an isomer of each of the compounds in question 1 with a **different** functional group. [4]

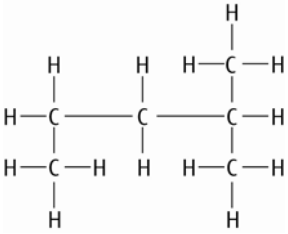
3 State and explain which of the compounds in question 1 has the highest boiling point. [3]

4 Name the following molecules: [4]

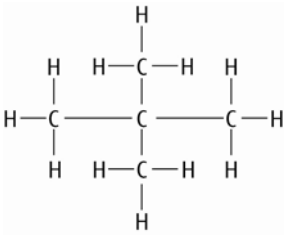
a



b



c



d $(CH_3)_2CHCH(CH_3)_2$

5 Write equations for the following reactions: [2]

a the complete combustion of pentane

b the incomplete combustion of butane producing carbon monoxide

6 **a** Under what conditions do alkanes react with bromine or chlorine? [1]

b In the reaction between an alkane and a halogen write equations for the following reactions: [4]

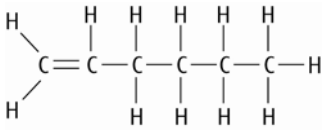
i a propagation step than produces bromoethane

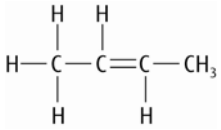
ii a propagation step that produces dichloromethane

iii a termination step that produces butane

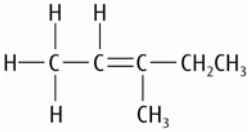
iv a termination step that produces 1,2-dibromoethane

7 **a** Name the following molecules: [4]

i 

ii 

iii $(CH_3)_2CCHCH_3$

iv 

b Write equations, using structural formulas, for the following reactions of the molecules in question 7a under suitable conditions: [4]

i 7a i + H_2

ii 7a ii + HBr

iii 7a iii + H_2O

iv 7a iv + Br_2

c Describe a chemical test that could be used to distinguish between the molecule in question 4a and molecule 7a i. [2]

8 **a** Name and give the formula of a suitable oxidising agent to oxidise propan-1-ol. [2]

b Write balanced chemical equations for the partial and complete oxidation of propan-1-ol. Use [O] to represent oxygen from the oxidising agent. [2]

c Name the organic compound obtained when each of the following undergoes complete oxidation: [3]

i ethanol

ii propan-2-ol

iii 2-methylpropan-1-ol

9 **a** Draw the full structural formulas of the following and classify each as primary, secondary or tertiary: [6]

i 2-chlorobutane

ii 2-bromo-3-methylpentane

iii 2-bromo-2-methylpentane

b Draw a reaction mechanism using curly arrows to show the reaction between 1-chloropropane and aqueous sodium hydroxide. [4]

c Explain what is meant by an **S_N1 mechanism**. [3]

10 Draw out reaction sequences showing structural formulas and all reagents and conditions for the following conversions: [9]

a ethene to ethanoic acid

b butane to butan-1-ol

c but-2-ene to butanone

