Website: contoureducation.com.au | **Phone:** 1800 888 300
Email: hello@contoureducation.com.au

VCE Chemistry ½

Properties & Real Life Use of Organic Chemicals [2.8]

Test Solutions

20 Marks. 1 Minute Reading. 16 Minutes Writing.

Results:

Quiz Questions	_____/ 15
Extension Questions	_____/ 5

Section A: Quiz Questions (15 Marks)

Question 1 (4 marks)

Tick whether the following statements are **True** or **False**.

Statement	True	False
a. Intramolecular bonds refer to those that occur within the molecule whereas intermolecular bonds refer to those that occur between the molecules.	✓	
b. Alcohol molecules have hydrogen bonds between each other.	✓	
c. Hydrocarbons have dipole-dipole forces as their strongest type of intermolecular force.		✓
d. Unsaturated hydrocarbons will have a lower melting point, since the kinks in the molecules will cause greater spacing between carbon chains.	✓	
e. Haloalkanes and esters are only able to undertake dipole-dipole bonds as their strongest type of intermolecular force.	✓	
f. Fossil fuels are renewable, however take a long time to regenerate.		✓
g. N_2O is a greenhouse gas because it is able to absorb and re-radiate thermal energy.	✓	
h. Ethanol is an example of a solvent because it can be easily dissolved into water.	✓	

Space for Personal Notes

Question 2 (3 marks)

Christa is exploring the different properties of alcohols, namely ethanol and butanol. In order to test the properties of these alcohols, she conducts a range of chemical and physical tests.

a. Which of the two alcohols would have a higher boiling point, and why? (1 mark)

Butanol would have a higher BP because it has a longer carbon chain meaning that it has greater dispersion forces.

b. Write out the complete combustion equation of butanol. (1 mark)

$C_4H_{10}O\ (g) + 6O_2(g) \rightarrow 4CO_2(g) + 5H_2O\ (l)$

c. Explain, with reference to intermolecular bonds, why ethanol is soluble in water. (1 mark)

Ethanol has an OH functional group which allows it to form hydrogen bonds with water.

Space for Personal Notes

Question 3 (8 marks)

Butanol is a fuel which is typically used in combustion engines to provide power to move vehicles. It can be found in a liquid form if condensed, or more commonly vaporised into a gaseous form.

a. Write the full combustion equation for butanol. (1 mark)

$C_4H_{10}O_{(g)} + 6O_{2(g)} \rightarrow 4CO_{2(g)} + 5H_2O_{(g)}$

b. Explain the process of boiling butanol with reference to the relevant intermolecular bonds. (3 marks)

Butanol has hydroxyl groups attached, which allows for hydrogen bonds to form between molecules. Due to this when boiling, these hydrogen bonds need to be completely broken in order to allow individual butanol molecules to be released from each other.

c. Would butanol and butane both be gaseous? Why or why not? (2 marks)

Butane only has weak dispersion forces whereas butanol has strong hydrogen bonds. Due to this butanol has stronger intermolecular bonds and thus is more likely to be a liquid.

d. During the combustion of butanol, carbon dioxide is released. Explain the environmental implications of this. (2 marks)

Carbon dioxide is a greenhouse gas, meaning that it can absorb and re-radiate thermal energy. Due to this it contributes to the greenhouse effect, whereby the temperature of the atmosphere increases.

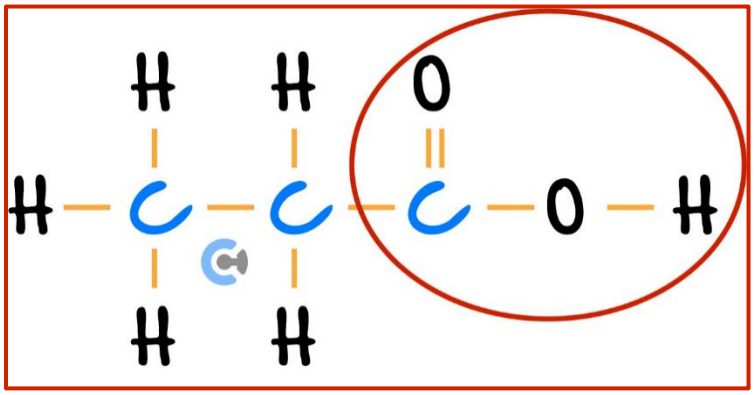
Space for Personal Notes

Section B: Extension Questions (5 Marks)

Question 4 (5 marks)

Carboxylic acids are used across many industries for solvents, food additives, antimicrobials, and flavourings. One of these common carboxylic acids is propanoic acid.

a. Draw a molecule of propanoic acid and circle/name the functional group. (1 mark)



b. Would propanoic acid or propanol be expected to have a higher boiling point? Why? (2 marks)

Propanoic acid. While they both are able to form hydrogen bonds, propanoic acid is able to form dimers with other propanoic acid molecules, which leads to more hydrogen bonds forming between propanoic acid molecules. Thus, more thermal energy is needed.

c. With reference to the intermolecular bonds of propanoic acid, identify the difference between melting point and boiling point. (2 marks)

Melting point – Disrupting/weaking the hydrogen bonds between propanoic acid molecules.
Boiling point – Completely breaking the hydrogen bond between propanoic acid molecules.

Space for Personal Notes

CONTOUREDUCATION

Website: contoureducation.com.au | **Phone:** 1800 888 300 | **Email:** hello@contoureducation.com.au

VCE Chemistry ½

Free 1-on-1 Support

Be Sure to Make the Most of These (Free) Services!

- Experienced Contour tutors (45 + raw scores, 99 + ATARs).
- For fully enrolled Contour students with up-to-date fees.
- After school weekdays and all-day weekends.

1-on-1 Video Consults	Text-Based Support
➢ Book via bit.ly/contour-chemistry-consult-2025 (or QR code below). ➢ One active booking at a time (must attend before booking the next).	➢ Message +61 440 137 304 with questions. ➢ Save the contact as "Contour Chemistry".

Booking Link for Consults
bit.ly/contour-chemistry-consult-2025

Number for Text-Based Support
+61 440 137 304