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

VCE Chemistry ½
Introduction to Organic Chemistry [0.17]
Workshop

Error Logbook:

New Ideas/Concepts	Didn't Read Question
Pg / Q #: _____ Notes:	Pg / Q #: _____ Notes:
Algebraic/Arithmetic/ Calculator Input Mistake	**Working Out Not Detailed Enough**
Pg / Q #: _____ Notes:	Pg / Q #: _____ Notes:

Section A: Recap

[2.5.1] - Write molecular, structural, semi-structural, and skeletal formulae of straight-chained & branched alkanes

- Multiple ways to express an organic molecule:
- _____ formula lists the actual number of atoms in the compound.
- _____ formula shows the arrangement of all atoms and all bonds.
- _____ formula is a more **compact** way of drawing the structural formula and is also known as the _____ structural formula.
- It is written by writing the _____ of atoms surrounding each carbon atom.
- Skeletal structure: [do] / [do not] include **carbon** and **hydrogen**.
- Any intersection/end is assumed to be a _____ atom.
- The lines are assumed to be a _____ between adjacent carbon atoms.

Space for Personal Notes

[2.5.2] - Write IUPAC names of branched & unbranched alkanes

Longest Carbon Chain Length	Prefix
1	
2	
3	
4	
5	
6	
7	
8	

- A hydrocarbon is an organic compound that consists only of the following elements:
  - _____
  - _____
- Alkanes are hydrocarbons with only _____ bonds.
- General molecular formula of an alkane is _____.
- **IUPAC Nomenclature:**
  - The [main] / [side] branch is typically the one with **less** carbons.
  - Side branches are known as _____ chains, named using '-yl':
  - The position of a branch is indicated by a number at the [beginning] / [end] of the name.
  - There [are] / [are no] **spaces** in a name, apart from esters and carboxylic acids.
  - Numbers and letters are separated by _____.

- If there is more than one type of functional group to be listed at the beginning of a name, they are listed in _____ order.

- More than one of the _____ types of functional group, the prefixes 'di-', 'tri-' or 'tetra-' are used.
- Numbers are separated from other numbers by _____.
- Two side chains of different lengths: Priority is given to the [shorter] / [longer] side chain.
- When naming, [do] / [do not] count 'di-, tri- or tetra-' when comparing alphabetical order.
- When alkyl / functional groups can only have a **specific** pre-determined location, beware of _____ numbers.

[2.5.3] - Write molecular, structural, semi-structural, and skeletal formulae of straight-chained & branched haloalkanes

- Halogens are found in Group _____ and can thus form _____ covalent bond with a hydrocarbon chain to form a **haloalkane.**
- Haloalkanes follow all the same general rules as alkanes.
- When drawing skeletal structures, if elements other than carbon or hydrogen are used, they [need] / [do not need] to be **explicitly mentioned**.

[2.5.4] - Write IUPAC names OF branched & unbranched haloalkanes

- Halogens are simply added to the _____ of the name of the organic compound as a **prefix**.
- They are named by abbreviating the halogen's name and adding an _____.
- When **numbering**, the [lowest] / [heaviest] atom/chain gets priority.
- Halogens [have] / [do not have] priority over alkyl groups when **numbering**.
- If there is more than one type of functional group to be listed at the beginning of a name, they are listed in _____ order.

[2.5.5] - Identify and draw simple cycloalkanes & write their IUPAC names

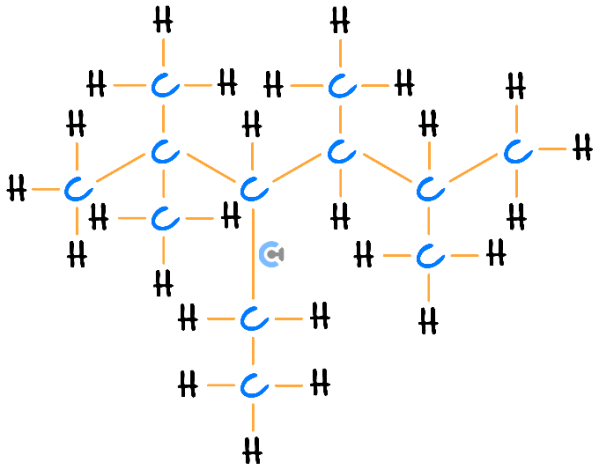
- Instead of having a **chain** of carbons, can also have a _____ of carbons forming a closed loop, creating a cyclic/ringed molecule.
- When naming cyclic molecules, simply add the prefix _____ in front of the molecule.
- The general molecular formula for cycloalkanes is _____.

Space for Personal Notes

Question 1 Walkthrough.

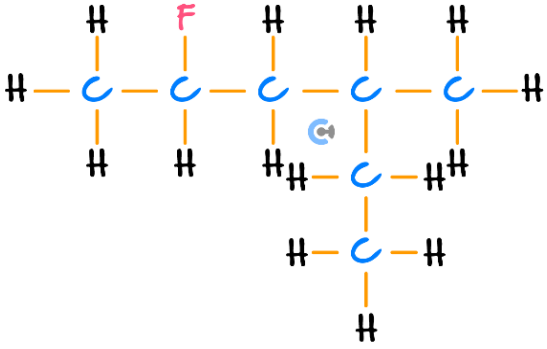
Name each of the following organic compounds and write their semi-structural formula and skeletal structure.

a.



Name	Skeletal Structure

b.



Name	Skeletal Structure

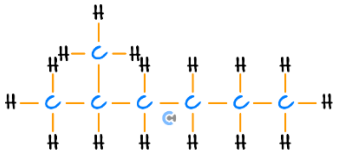
Section B: Warm-up Questions (14 Marks)

INSTRUCTION: 14 Marks. 9 Minutes Writing.

Question 2 (8 marks)

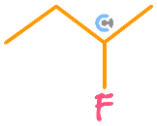
Write the full IUPAC name for the following organic compounds:

a. (1 mark)



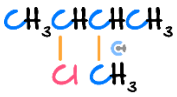
_____

b. (1 mark)



_____

c. (1 mark)

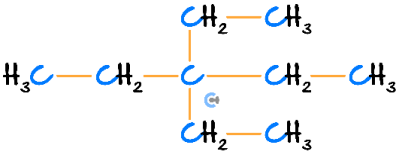


_____

d. (1 mark)

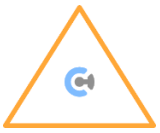
_____

e. (1 mark)



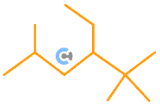
_____

f. (1 mark)



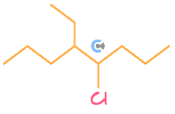
_____

g. (1 mark)



_____

h. (1 mark)



_____

Question 3 (6 marks)

Below are the IUPAC names of several organic compounds. Draw the skeletal structure of each of these organic compounds.

a. 2-methylnonane. (1 mark)

b. 3,3-dimethylpentane. (1 mark)

c. 3-ethylpentane. (1 mark)

d. 3-ethyl-2-methylheptane. (1 mark)

e. 2,3-dimethylbutane. (1 mark)

f. 3,4-diethyloctane. (1 mark)

Space for Personal Notes

Section C: Ramping it Up (20 Marks)

INSTRUCTION: 20 Marks. 15 Minutes Writing.

Question 4 (4 marks)

Draw the structural formula of the following organic compounds:

a. 1,2-dichlorobutane. (1 mark)

b. 2-iodo-3-methylpentane. (1 mark)

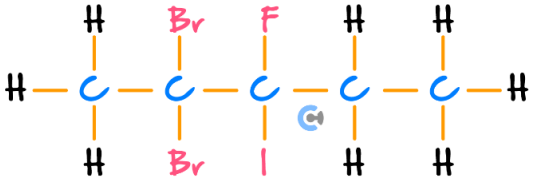
c. Methylpropane. (1 mark)

d. Cyclohexane. (1 mark)

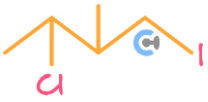
Question 5 (5 marks)

Name the following molecules:

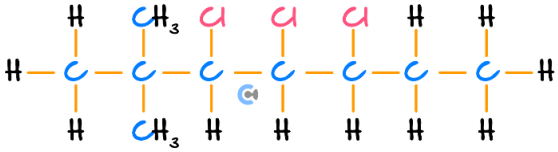
a. (1 mark)



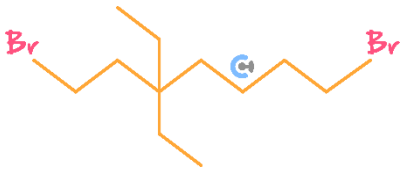
b. (1 mark)



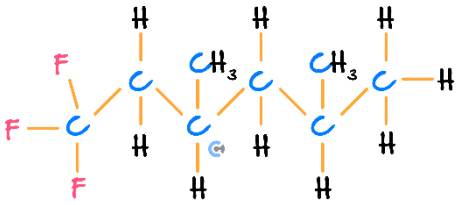
c. (1 mark)



d. (1 mark)



e. (1 mark)



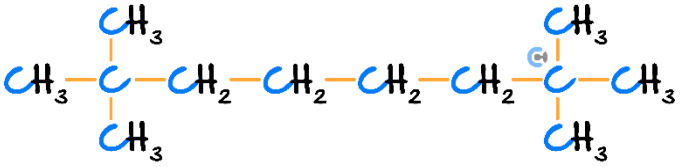
Question 6 (4 marks)

Write the semi-structural formula for the following compounds:

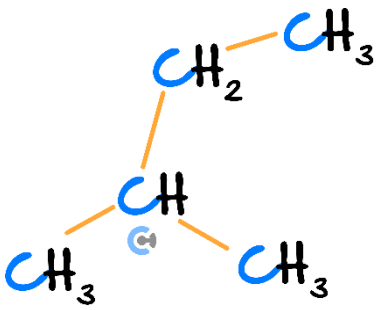
a. 3-methylhexane. (1 mark)

b. 1,2-dibromoethane. (1 mark)

c. (1 mark)



d. (1 mark)



Question 7 (7 marks)

Consider the haloalkane, 3-chloro-2,2-difluoro-3-methylpentane.

a. Draw its structural formula and give its semi-structural formula. (2 marks)

b. If this molecule was a regular alkane instead of a haloalkane, then give its skeletal formula and name. (2 marks)

c. Between the two molecules, which do you think will be more soluble in water? Justify your answer with reference to intermolecular bonding. (3 marks)

_____

_____

_____

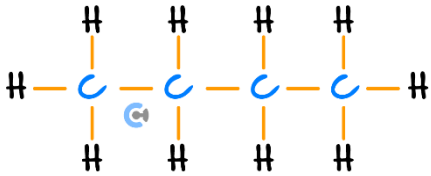
_____

Section D: Getting Trickier I (17 Marks)

INSTRUCTION: 17 Marks. 14 Minutes Writing.

Question 8 (6 marks)

Angad, after developing a recent interest in the field of Organic Chemistry, is studying some of the theories about why organic molecules look and behave the way they do. He takes a molecule of butane for reference, which he draws below:



a. What is the maximum number of covalent bonds that carbon can form, and why? (2 marks)

_____

_____

b. Has Angad drawn the shape of this molecule with 100% accuracy? If not suggest how it can be fixed and why this is the case. (2 marks)

_____

_____

_____

c. Angad takes a second molecule which he refers to as methylbutane, however, his lab supervisor refuses to work with him until he fixes his naming. Why is methylbutane not accepted by IUPAC? (1 mark)

_____

d. Later on, Angad makes a similar mistake, naming a molecule.

'2-methyl heptane'

What is the issue with this? (1 mark)

_____

Question 9 (5 marks)

Cyclic compounds, often used to produce smells and flavours, refer to molecules that include at least one cyclic region.

a. With reference to what a cyclic molecule is, provide the general molecular formula for cyclic molecules. (2 marks)

_____

_____

_____

b. What is the minimum number of carbons which is required for a cyclic molecule? (1 mark)

_____

c. Draw the skeletal structure of cyclobutane. (1 mark)

d. Draw the skeletal structure of methylcyclopropane. (1 mark)

Space for Personal Notes

Question 10 (6 marks)

Sia is revising for her Organic Chemistry SAC and is trying to make cue cards of key concepts in order to revise. However, after writing down some questions, she finds that she cannot remember the answers.

a. According to the IUPAC convention, why is Iodine prioritised over bromine? (1 mark)

_____

b. Through what order are organic compounds named? (1 mark)

_____

c. What is meant by a haloalkane? How does this differentiate from an alkyl halide? (2 marks)

_____

_____

_____

d. Identify the general formula of an alkane, and explain how it is derived. (2 marks)

_____

_____

_____

Space for Personal Notes

Section E: Getting Trickier II (10 Marks)

INSTRUCTION: 10 Marks. 9 Minutes Writing.

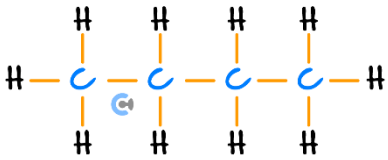
Question 11 (10 marks)

Consider the homologous series of alkanes.

a. What does each alkane differ by in the homologous series? (1 mark)

_____

b. Through what order are organic compounds named? (1 mark)



c. This compound is commonly used as a fuel for gas stoves across the world. Its complete combustion in excess oxygen produced carbon dioxide and water vapour.

i. Draw the fully balanced structural formulae reaction. (4 marks)

ii. What is the percentage of reagents that are converted into carbon dioxide? (2 marks)

d. If we decided to make the compound into a haloalkane by swapping out hydrogen for a fluorine atom at the 1st carbon in the chain, give its semi-structural formula and skeletal formula. (2 marks)

Let's take a BREAK!

Space for Personal Notes

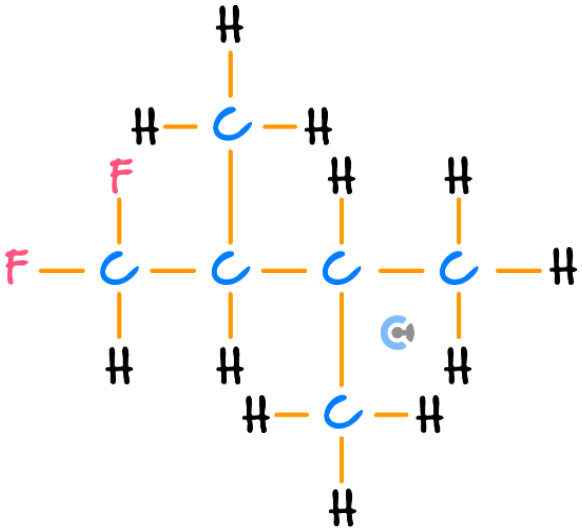
Section F: VCAA-Level Questions I (8 Marks)

INSTRUCTION: 8 Marks. 30 Seconds Reading. 8 Minutes Writing.

Question 12 (4 marks)

IUPAC nomenclature is important to adhere to, as it allows a standardised form of representation for all chemical molecules.

a. Consider the following molecule:



i. Would the name 2,3-dimethyl-1,1-fluorobutane be correct? Explain your answer. (2 marks)

_____

_____

_____

ii. Hence, or otherwise, give its IUPAC name. (1 mark)

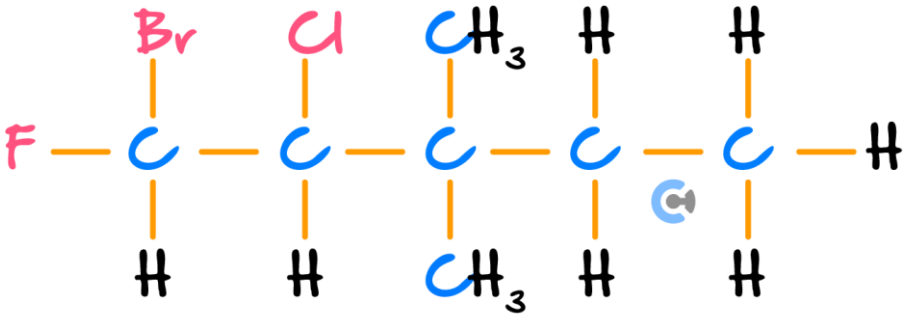
_____

b. What would its semi-structural formula be? (1 mark)

_____

Question 13 (4 marks)

Consider the following molecule:

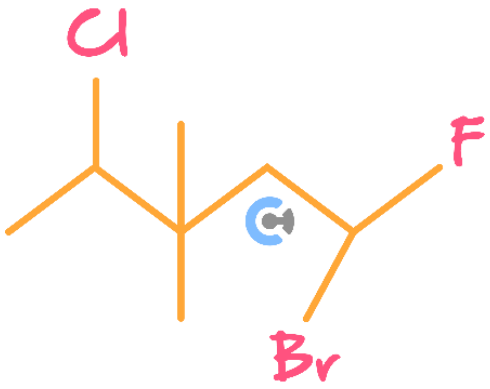


a. Name the molecule. (1 mark)

_____

b. What is its skeletal diagram? (1 mark)

c. Would the following molecule be considered the same molecule as above? Explain your answer. (2 marks)



_____

_____

_____

Section G: Multiple Choice Questions (10 Marks)

INSTRUCTION: 10 Marks. 10 Minutes Writing.

Question 14 (1 mark)

Which one of the following defines what an organic molecule is?

A. The presence of carbons.

B. The presence of oxygens.

C. The presence of covalent bonds.

D. The presence of water.

Question 15 (1 mark)

Which of the following is the least informative type of representation of molecules?

A. Structural formula.

B. Molecular formula.

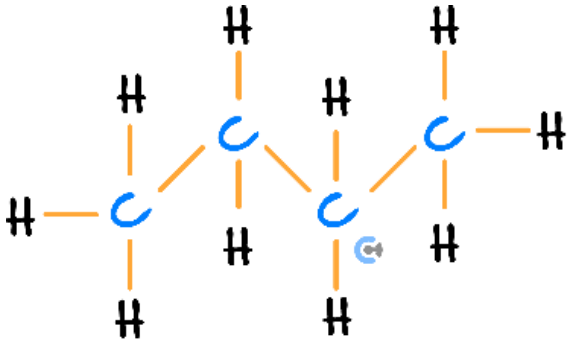
C. Semi-structural formula.

D. Skeletal formula.

Space for Personal Notes

Question 16 (1 mark)

What is the name of the following molecule?



A. Butene

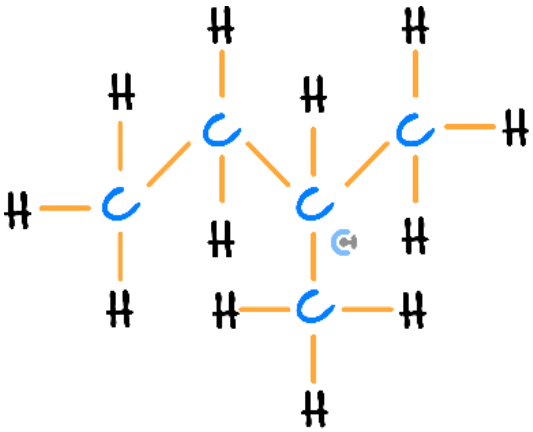
B. Propene

C. Propane

D. Butane

Question 17 (1 mark)

Name the following molecule.



A. 1,2-dimethylpropane

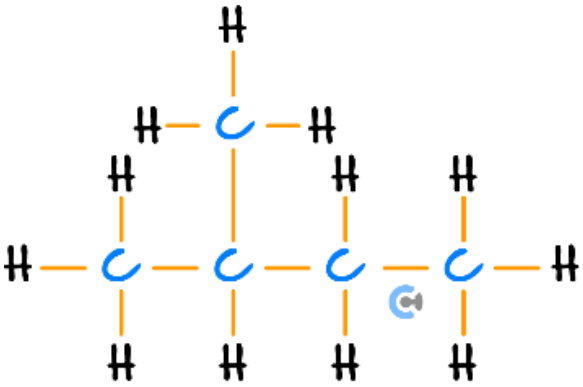
B. 2-methylbutane

C. 2,3-dimethylpropane

D. Methylbutane

Question 18 (1 mark)

Which of the following is the correct semi-structural formula for the following molecule?



A. $CH_3CHCH_3CH_2\ CH_3$

B. $CH_3CHCH_3(CH_2)CH_3$

C. $CH_3CH_2CH_3CH_2CH_3$

D. $CH_3CH(CH_3)CH_2CH_3$

Question 19 (1 mark)

What is the correct IUPAC name for the following semi-structural formula?

$$CH_3C(CH_3)_2CH_2CH_3$$

A. 2-dimethylbutane

B. 2,2-dimethylbutane

C. 2,3-dimethylbutane

D. 3-dimethylbutane

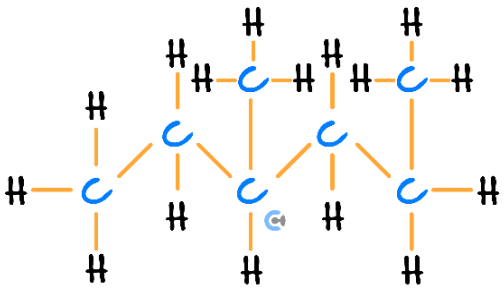
Space for Personal Notes

Question 20 (1 mark)

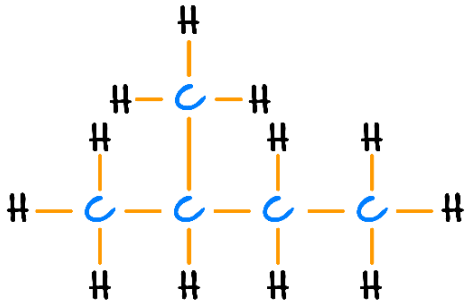
Which of the following is the correct skeletal formula for the following molecule?

2,3-dimethylbutane

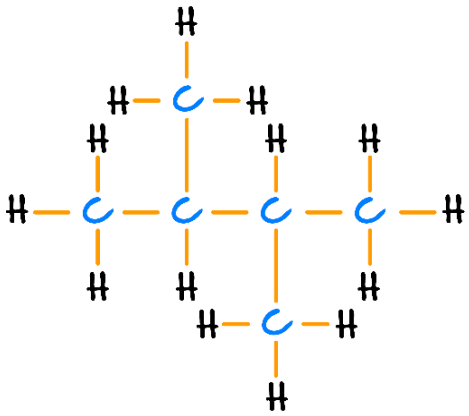
A.



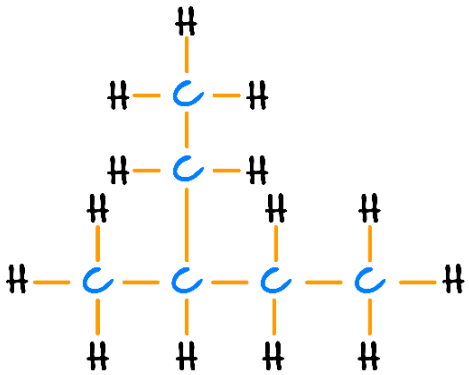
B.



C.

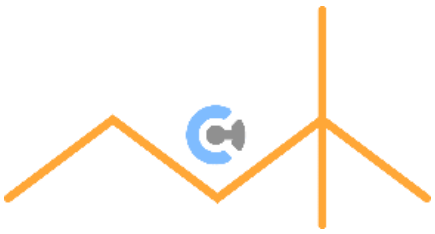


D.



Question 21 (1 mark)

What is the correct IUPAC name for the following skeletal formula?



A. 2-dimethylpentane

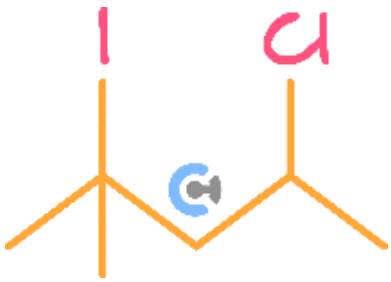
B. 2,2-dimethylpentane

C. 2-methylhexaneCo

D. 2-ethylhexane

Question 22 (1 mark)

What is the most correct IUPAC name for the following organic molecule?



A. 4-chloro-3-iodo-3-methylpentane

B. 4-chloro-2-iodo-2-methylpentane

C. 2-chloro-3-iodo-3-methylpentane

D. 2-chloro-4-iodo-4-methylpentane

Space for Personal Notes

Question 23 (1 mark)

Given the molecular formula C_4H_8, how many cyclic molecules can be formed?

A. 0

B. 1

C. 2

D. 3

Space for Personal Notes

Section H: VCAA-Level Questions II (12 Marks)

INSTRUCTION: 12 Marks. 30 Seconds Reading. 12 Minutes Writing.

Question 24 (6 marks)

Consider the cyclic molecule which contains 4 carbons.

a. Draw the structural formula and give its name. (2 marks)

b. Can we create an alkane while preserving the molecular formula from the cyclic molecule identified in **part a.**? Justify your answer using diagrams if necessary. (2 marks)

_____

_____

_____

c. Can we form another cyclic molecule while preserving the molecular formula from the cyclic molecule identified in **part a.**? Justify your answer using diagrams if necessary. (2 marks)

_____

_____

_____

Question 25 (6 marks)

Consider the following molecules:

a. 3,3-dimethyl-2-ethylheptane.

i. Draw its structural formula. (1 mark)

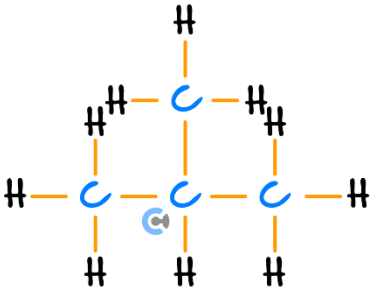
ii. Draw its skeletal diagram. (1 mark)

b. 1,3-dibromo-2-methylpentane.

i. Draw its structural formula. (1 mark)

ii. Give its semi-structural formula. (1 mark)

c.



i. Give its name. (1 mark)

_____

ii. Give its skeletal diagram. (1 mark)

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