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VCE Chemistry ½

Isomerism in Organic Chemistry [2.6]

Test Solutions

20 Marks. 1 Minute Reading. 16 Minutes Writing.

Results:

Quiz Questions	_____ / 15
Extension	_____ / 5

Section A: Quiz Questions (15 Marks)

Question 1 (4 marks)

Tick whether the following statements are **true** or **false**.

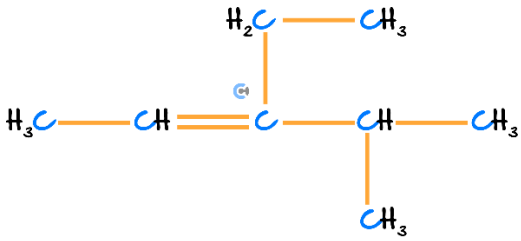
Statement	True	False
a. Alkenes contain only carbon-to-carbon double bonds.		✓
b. The functional group name of an alkene is called an alkenyl.	✓	
c. Alkenes tend to have less carbon than their equivalent alkanes.		✓
d. Double bonds cause "kinks" to form in the chain due to the double bond representing a trigonal planar-like shape in the molecule.	✓	
e. Isomers refer to molecules with similar chemical properties but different molecular formulas.		✓
f. If a hydrocarbon has only a hydroxyl group, it can be classified as an alcohol.	✓	
g. Hydroxyl groups tend to have a low numbering priority, with halogens typically taking priority over them.		✓
h. 1,1-propandiol refers to a base of propanol with two hydroxyl groups attached.	✓	

Space for Personal Notes

Question 2 (2 marks)

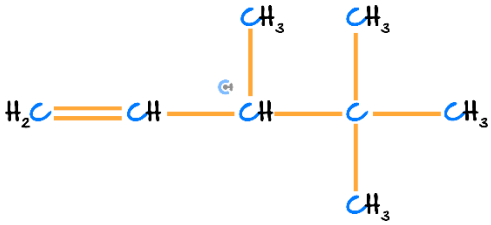
Name the following molecules according to IUPAC standards:

a. (1 mark)



3-ethyl-4-methylpent-2-ene

b. (1 mark)



3,4,4-trimethylpent-1-ene

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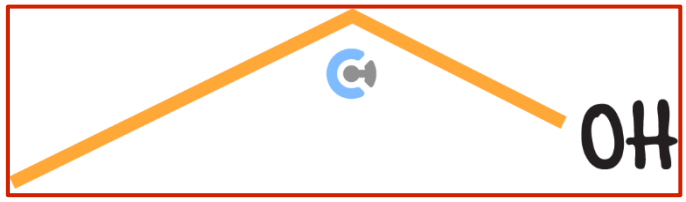
Question 3 (4 marks)

Sarah is fascinated by the behaviour of humans upon consumption of alcohol and thus wishes to study this organic compound. In order to do this, she chooses to analyse a sample of ethanol.

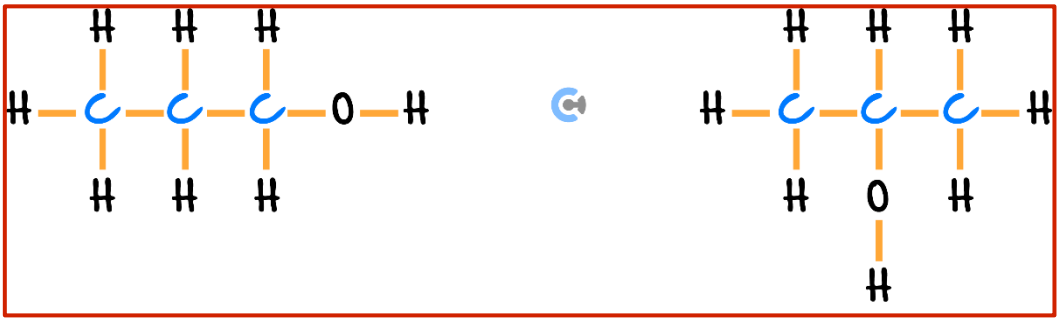
a. Draw the skeletal formula of ethanol. (1 mark)



b. Name the functional group present in a molecule of ethanol. (1 mark)

Hydroxyl

c. Another alcohol that catches the attention of Sarah is propanol. Draw all of the possible positional isomers of this molecule. (2 marks)



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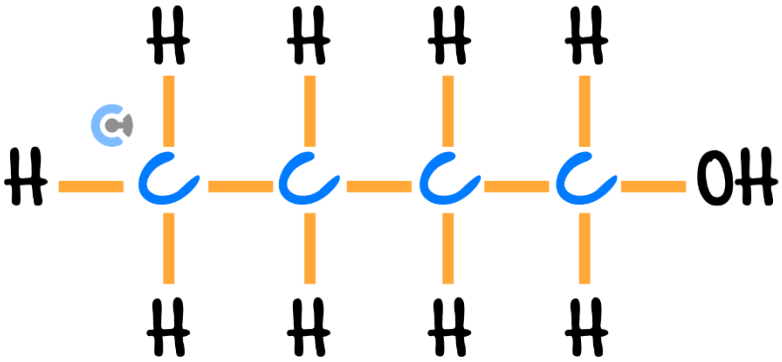
Question 4 (5 marks)

Tamanna is investigating the concept of isomers, and begins with the following molecule as her reference:



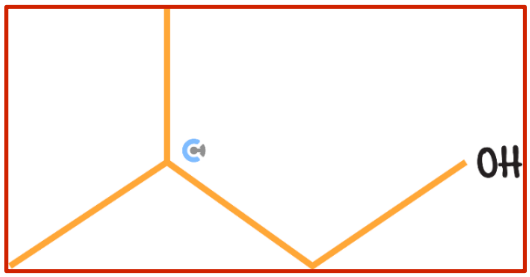
a. How many different positional isomers of this molecule would exist? Explain with reference to why it is limited to the number selected. (2 marks)

2. Past this they would be the same molecules just flipped or mirrored.

b. What is the difference between a functional isomer and a positional isomer? Thus, would it be possible to have a functional isomer of this molecule? (1 mark)

Functional isomers have a different functional group, whereas positional isomers have the same functional group but in another position. No other functional isomer would be possible.

c. Draw a possible chain isomer of this molecule in a skeletal structure. (1 mark)



d. What type of intermolecular bonding would be expected of the molecule provided? Make sure to provide the IUPAC name of the molecule in your answer. (1 mark)

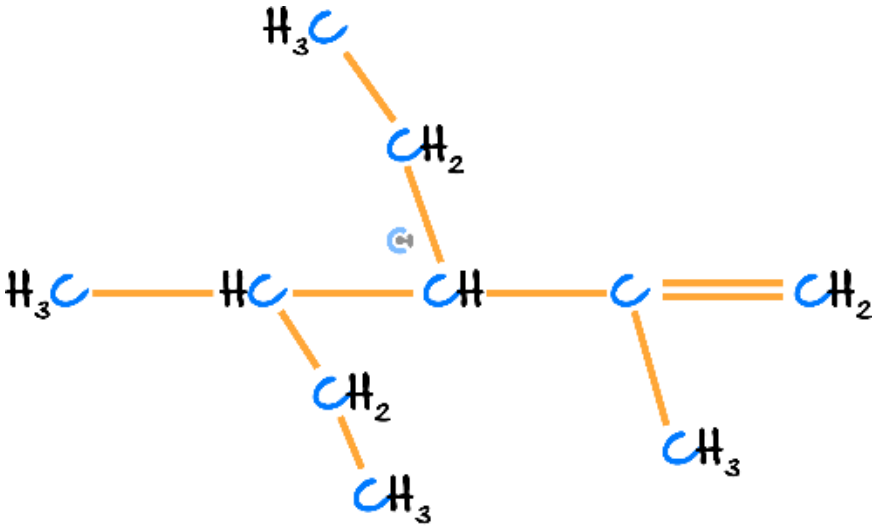
Butane would have hydrogen bonding due to the hydroxyl group (FON).

Section B: Extension (5 Marks)

Question 5 (2 marks)

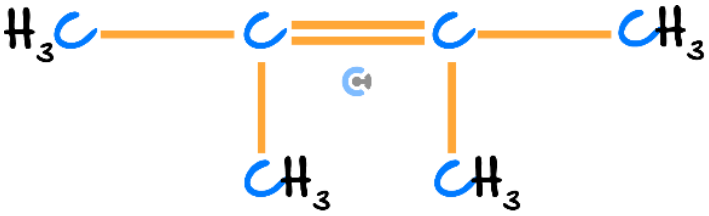
Name the following molecules according to IUPAC standards:

a. (1 mark)



3,4-diethyl-2-methylpent-1-ene

b. (1 mark)



2,3-dimethylbut-2-ene

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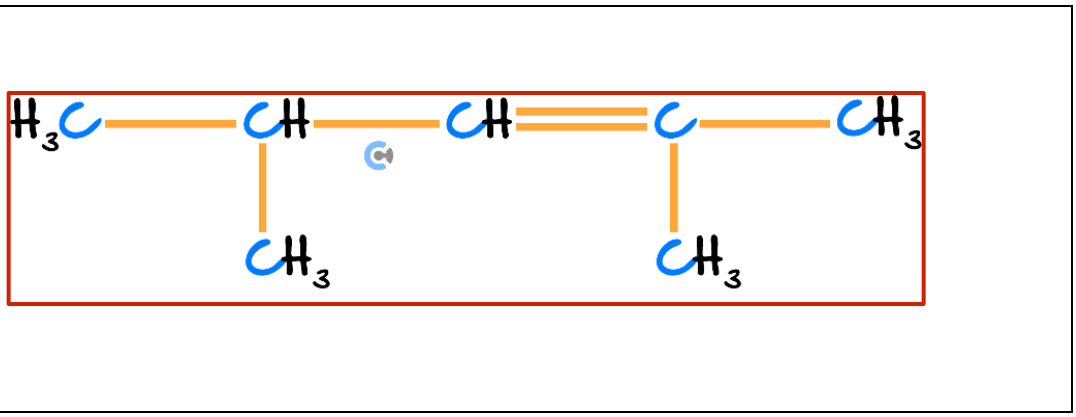
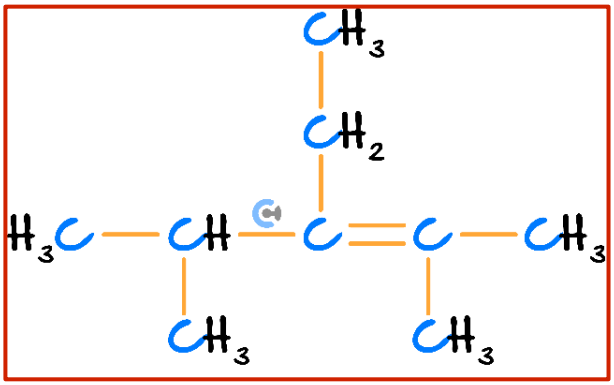
Question 6 (3 marks)

Draw the structural formulas for the following molecules based on their IUPAC name:

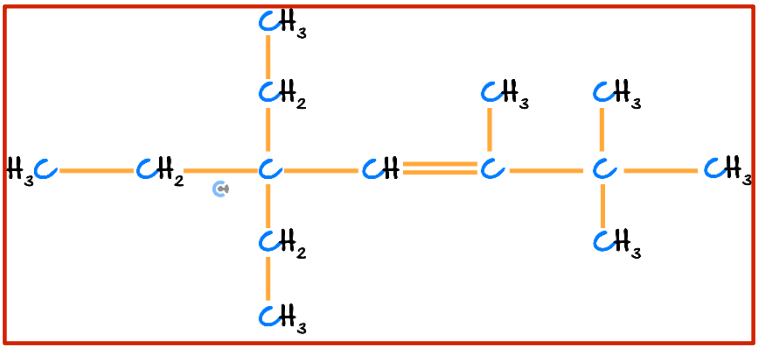
a. 2,4-dimethylpent-2-ene. (1 mark)



b. 3-ethyl-2,4-dimethylpent-2-ene. (1 mark)



c. 5,5-diethyl-2,2,3-trimethylhept-3-ene. (1 mark)



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