

Organic Chemistry | (7th Edition)

Chapter 4, Problem 42P

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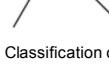
ON

Step-by-step solution

Step 1 of 8

Terpenes are the molecules synthesized by the plant by linking the two or more molecular units of isoprene:

Isoprene unit: This is the unit present in terpene which has 5 carbons.



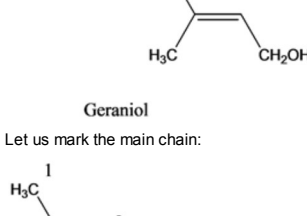
Classification of terpenes:

Number of carbons	Number of isoprene units	Type of terpene
10	2	Monoterpene
15	3	Sesquiterpene
20	4	Diterpene

[Comment](#)

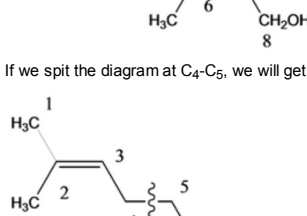
Step 2 of 8

(a) Let us consider the following molecule:

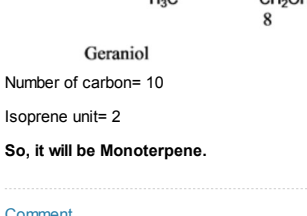


Geraniol

Let us mark the main chain:



If we split the diagram at C₄-C₅, we will get two isoprene units.



Geraniol

Number of carbons= 10

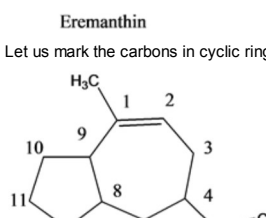
Isoprene unit= 2

So, it will be Monoterpene.

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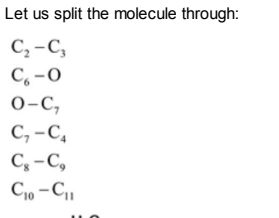
Step 3 of 8

(b) Let us consider the following molecule:



Ercmanthin

Let us mark the carbons in cyclic rings.



Let us split the molecule through:

C₁-C₃

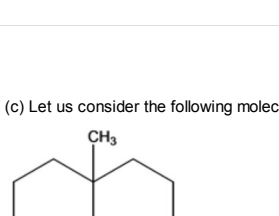
C₃-O

O-C₇

C₇-C₄

C₄-C₉

C₁₀-C₁₁



Number of carbons= 15

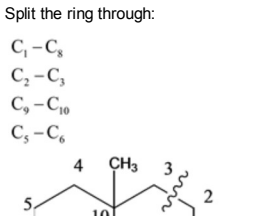
Isoprene unit= 3

So, it will be Sesquiterpene.

[Comment](#)

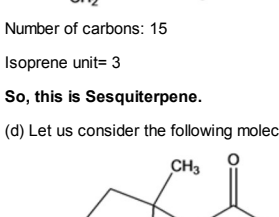
Step 4 of 8

(c) Let us consider the following molecule:



Eudesmol

Let us mark the carbon of the cyclic rings:



Split the ring through:

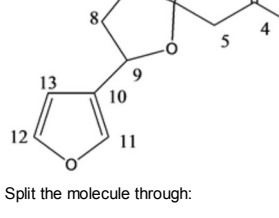
C₁-C₉

C₂-C₃

O-C₉

C₄-C₅

C₁₀-C₁₁

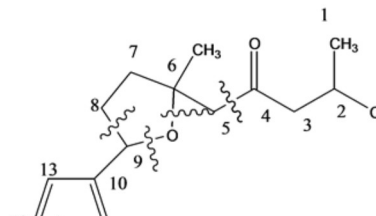


Number of carbons= 15

Isoprene unit= 3

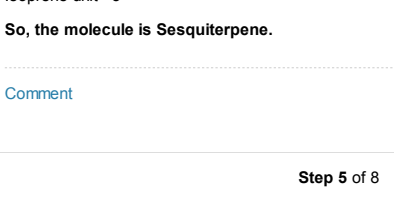
So, this is Sesquiterpene.

(d) Let us consider the following molecule:



Ipomeamarone

Let us mark the carbons:



Split the molecule through:

C₄-C₃

C₆-O

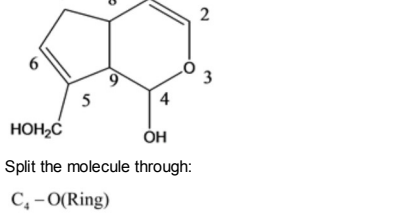
O-C₉

C₄-C₅

C₁₁-O

C₁₂-O

We get,



Number of carbons= 15

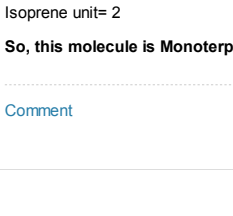
Isoprene unit= 3

So, the molecule is Sesquiterpene.

[Comment](#)

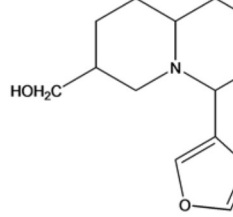
Step 5 of 8

(e) Let us consider the following molecule:



Genipin

Let us mark the carbons:



Split the molecule through:

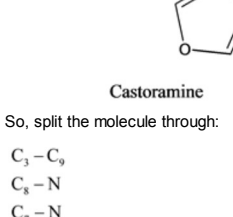
C₁-O(Ring)

C₆-C₇

O(Ring)-C₂

C₄-C₉

C₁-OH



Number of carbons= 10 (exclude the ester carbon as this is not linked to the system.)

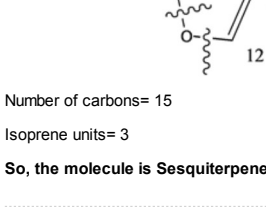
Isoprene unit= 2

So, this molecule is Monoterpene.

[Comment](#)

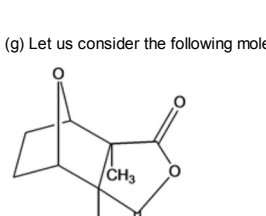
Step 6 of 8

(f) Let us consider the following molecule:



Castoramine

Let us mark the carbon:



Castoramine

So, split the molecule through:

C₁-C₉

C₇-N

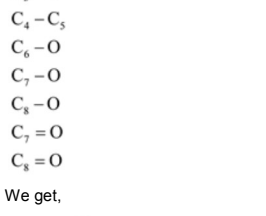
C₉-N

C₆-C₇

C₁₂-O

C₁₃-O

We get,



Number of carbons= 15

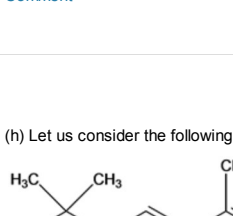
Isoprene units= 3

So, the molecule is Sesquiterpene.

[Comment](#)

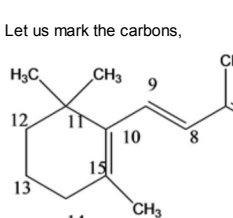
Step 7 of 8

(g) Let us consider the following molecule:



Cantharidin

Let us mark the carbons.



Split the molecule through:

C₁-C₂

C₃-O

C₄-C₅

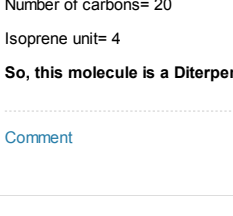
C₆-O

C₇-O

C₈-O

C₉-O

We get,



Number of carbons= 10

Isoprene unit= 2

So, the molecule will be Monoterpene.

[Comment](#)

Step 8 of 8

(h) Let us consider the following molecule:



Vitamin A

Let us mark the carbons.

Split the molecule through:

C₁-C₅

C₇-CH₃

C₉-C₆

C₁₁-C₁₃

C₁₃-C₁₄

We get,

Number of carbons= 20

Isoprene unit= 4

So, this molecule is a Diterpene

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Chapter 4, Solution 42P

Let us consider the following glucose isomers:

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Chapter 4, Solution 32P

(a) Let us draw most stable conformation of cyclohexanol. The equatorial conformation of cyclohexanol is the most...

[See solution](#)

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