





## KOOLWATERSTOFFEN



## OPDRACHT 1

NIVEAU: 1



Stof A, E, F en G zijn alkanen. Ze voldoen aan de algemene formule  $C_nH_{2n+2}$ .

Stof B en D kunnen alkenen zijn. Ze voldoen aan de algemene formule  $C_nH_{2n}$ .

Stof C en H zouden meer dan 1 dubbele binding kunnen hebben en daarmee ook onder de alkenen (of eigenlijk alkadiënen, alkatriënen, enz.) kunnen vallen.

## OPDRACHT 2

NIVEAU: 2



- |   |  |   |                     |
|---|--|---|---------------------|
| A | Alkaan, verzadigd                            | C | Alkeen, onverzadigd |
| B | Verzadigd (dit is eigenlijk een cycloalkaan) | D | Alkeen, onverzadigd |

## OPDRACHT 3

NIVEAU: 3

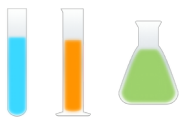


Tot welke homologe reeks(en) kunnen de volgende stoffen behoren?

- |   |         |   |            |   |         |   |             |
|---|---------|---|------------|---|---------|---|-------------|
| A | Alkanen | C | Alkadiënen | E | Alkanen | G | Alkatriënen |
| B | Alkenen | D | Alkenen    | F | Alkanen | H | Alkenen     |

Het is natuurlijk mogelijk dat er ringstructuren gevormd worden of driedubbele bindingen. Aangezien wij dit niet behandelen, zijn die mogelijkheden niet meegenomen in de antwoorden.





## ISOMERIE



## OPDRACHT 4

NIVEAU: 1



Wanneer ze dezelfde molecuulformule hebben, maar een verschillende structuurformule.

## OPDRACHT 5

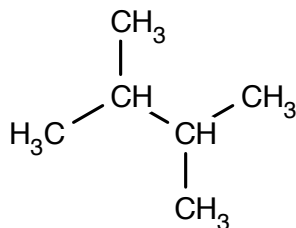
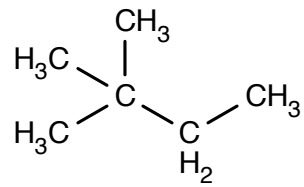
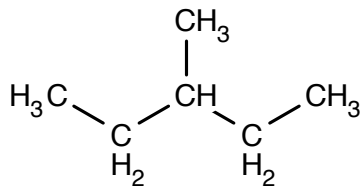
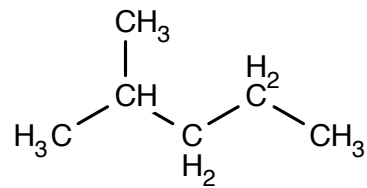
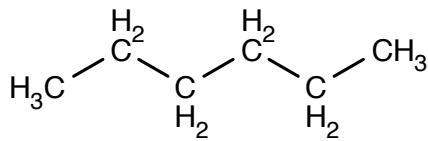
NIVEAU: 2



I en II

## OPDRACHT 6

NIVEAU: 2





## OPDRACHT 7

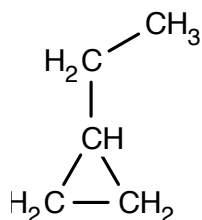
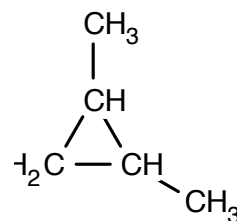
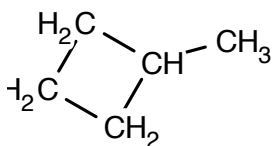
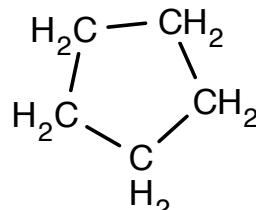
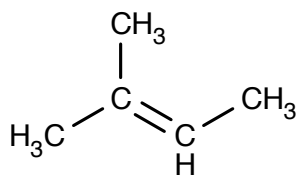
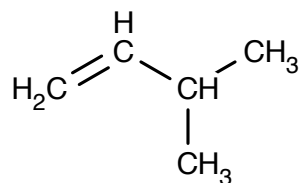
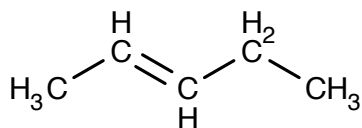
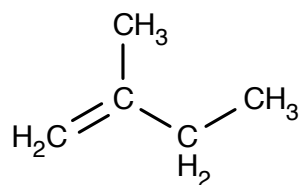
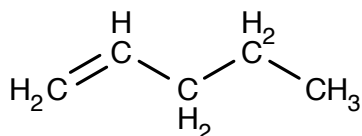
NIVEAU: 2



II en IV.

## OPDRACHT 8

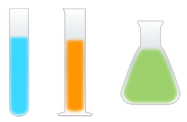
NIVEAU: 3

Teken alle mogelijke isomeren van C<sub>5</sub>H<sub>10</sub>.

Mocht je de structuren met een ring niet hebben, dan heb je het toch goed gedaan. Deze vallen buiten de stof die wij behandelen, maar zijn wel mogelijk.

Als je als eerste nog een nieuwe isomeer kan bedenken krijg je een lollie.





## ALKANEN



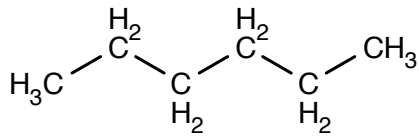
## OPDRACHT 9

NIVEAU: 2

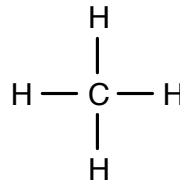


Teken de structuurformule van de volgende stoffen.

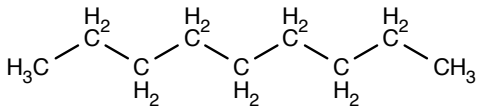
A



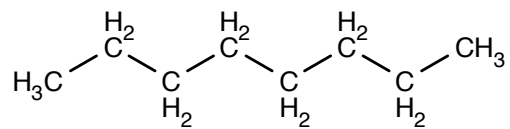
C



B



D



## OPDRACHT 10

NIVEAU: 2



- A ethaan  
B heptaan

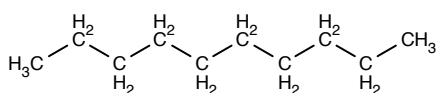
- C propaan  
D butaan

## OPDRACHT 11

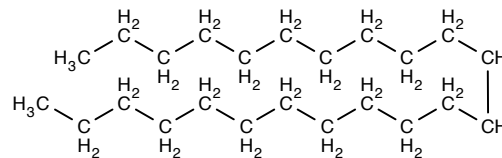
NIVEAU: 3

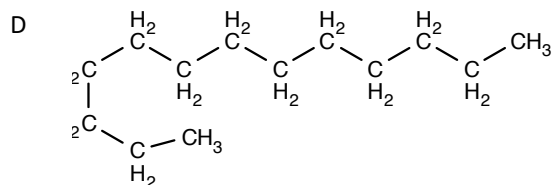
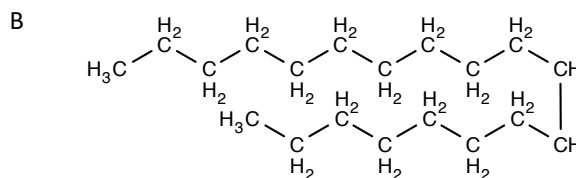


A



C





## OPDRACHT 12

NIVEAU: 3



A tetradecaan  
B undecaan

C nonaan  
D nonadecaan



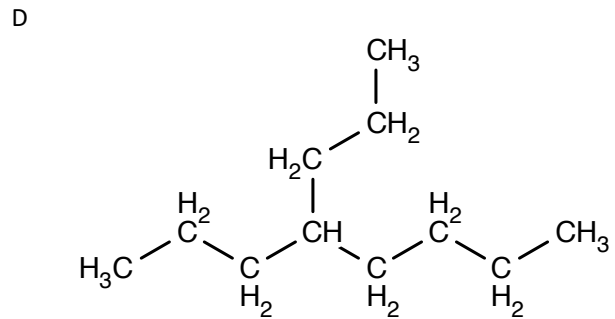
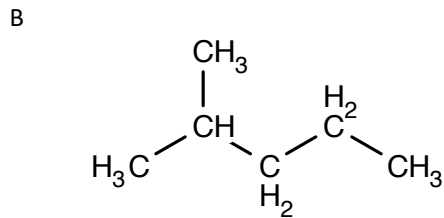
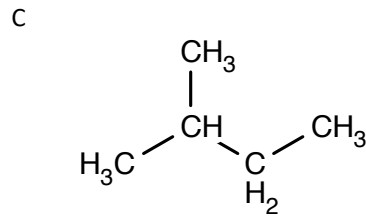
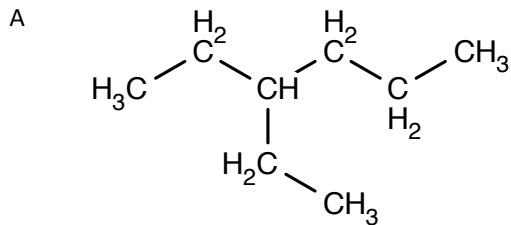


## VERTAKTE ALKANEN



## OPDRACHT 13

NIVEAU: 1



## OPDRACHT 14

NIVEAU: 1



- A propaan  
B methylpropaan

- C methylbutaan  
D 2-methylpentaan



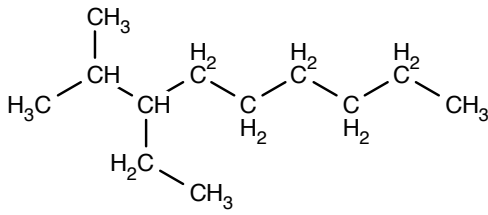


OPDRACHT 15

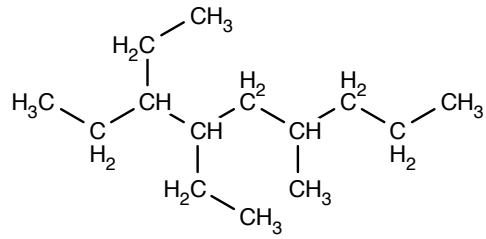
NIVEAU: 2



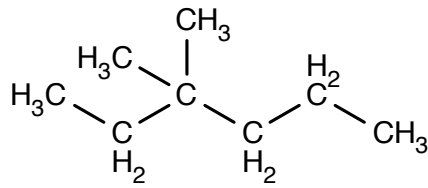
A



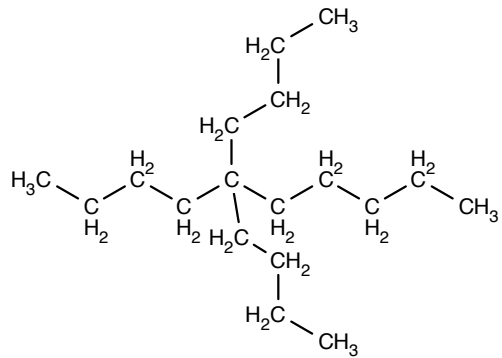
C



B



D



OPDRACHT 16

NIVEAU: 2

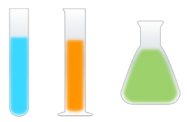


- A 4-ethyl-2,3-dimethylhexaan  
 B 3,4-dimethylhexaan

- C 2,5-dimethyl-4-propylheptaan  
 D 4,5,6-triethyl-3,7-dimethylnonaan





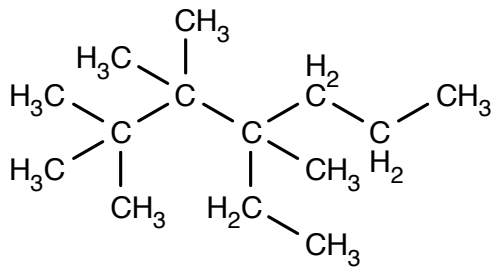


## OPDRACHT 17

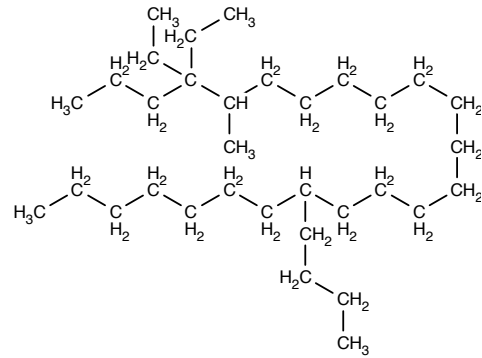
NIVEAU: 3



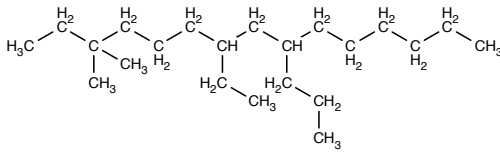
A



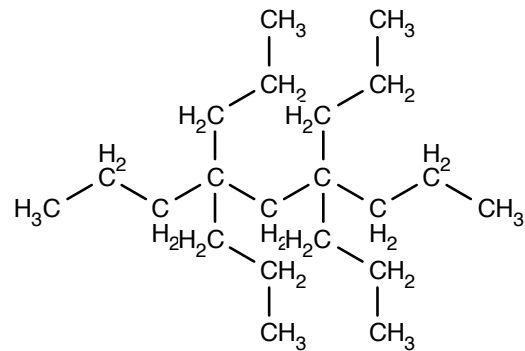
C



B



D





## OPDRACHT 18

NIVEAU: 3



- A 4,4,6,6-tetramethyl-8-propyldodecaan
- B 2,2,3,4-tetramethylhexaan

- C 3,5-diethyl-2,6-dimethylheptaan
- D 3,7,8-triethyl-2,4,5-trimethyldecaan

## OPDRACHT 19

NIVEAU: 3



- A 2,4-dimethylhexaan
- B 4-ethylheptaan

- C butaan
- D 5,5,6-tributyl-6-ethyldecaan





## ALKENEN

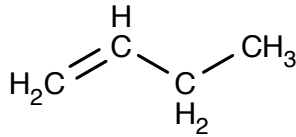


## OPDRACHT 20

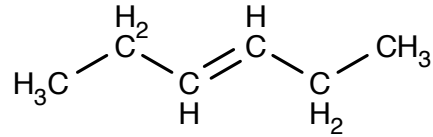
NIVEAU: 2



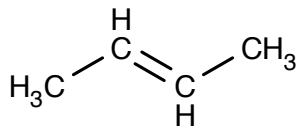
A



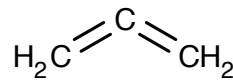
C



B



D



## OPDRACHT 21

NIVEAU: 2



- A Hex-3-een  
B Pent-2-een

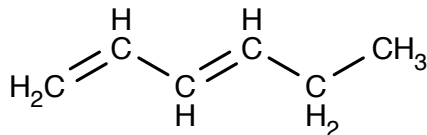
- C Penta-1,3-dieen  
D Pent-1-een

## OPDRACHT 22

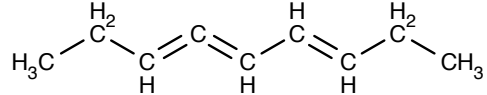
NIVEAU: 3



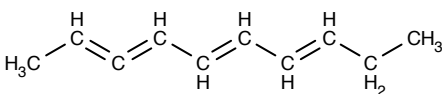
A



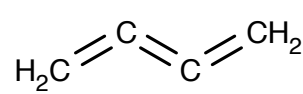
C



B



D





## OPDRACHT 23

NIVEAU: 3

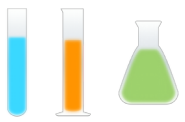


Geef de systematische namen van de volgende stoffen.

A Hexa-2,3-dieen  
B Octa-2,5-dieen

C Nona-1,3,8-trieen  
D Dodeca-1,3,5,7-tetraeen





## VERTAKTE ALKENEN

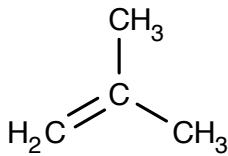


## OPDRACHT 24

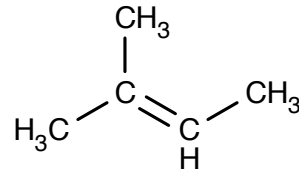
NIVEAU: 1



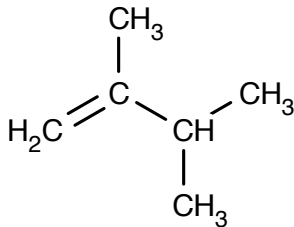
A



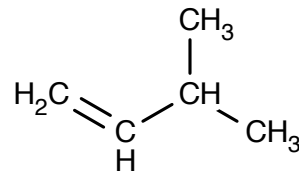
C



B



D



## OPDRACHT 25

NIVEAU: 1



- A 3-methylbut-1-een  
B 2-methylpent-2-een

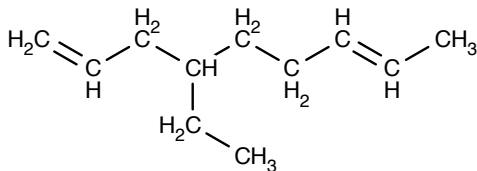
- C methylpropeen  
D 3-methylpent-2-een

## OPDRACHT 26

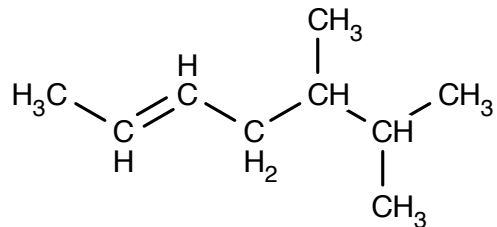
NIVEAU: 2

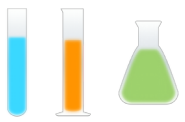


A

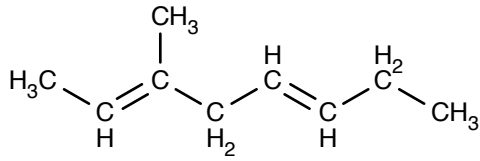


C

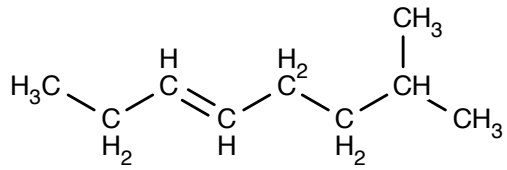




B



D



## OPDRACHT 27

NIVEAU: 2



- A 2-methylbut-1-een
- B 3,4-dimethylpenta-1,3-dien

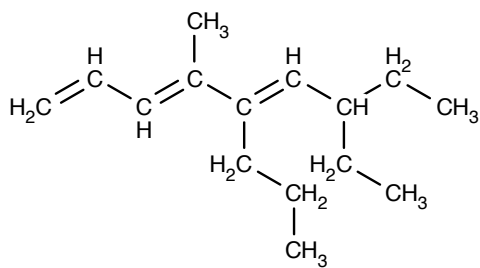
- C 5,6-dimethylhept-2-een
- D 3-ethyl-2-methylpenta-1,3-dien

## OPDRACHT 28

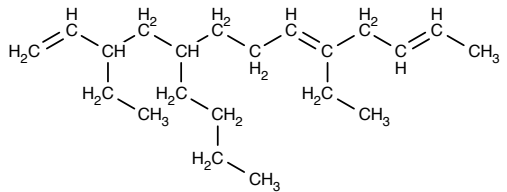
NIVEAU: 3



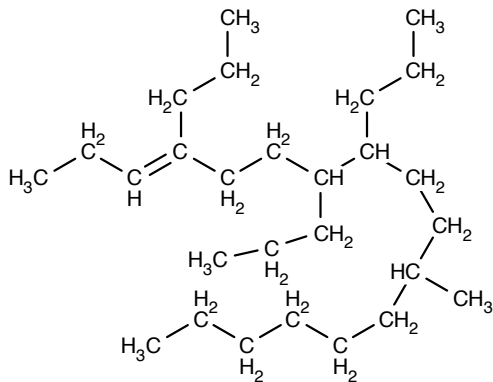
A



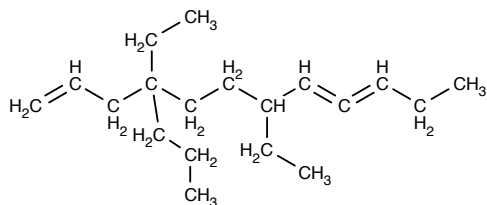
C



B



D





## OPDRACHT 29

NIVEAU: 3



- A 3-ethyl-4,7-dimethylnona-1,3,5-trieen
- B 3,4,5-triethylhept-3-een

- C 3-methylhexa-1,3,5-trieen
- D 7-butyl-6-propylundeca-1,4-7-trieen

## OPDRACHT 30

NIVEAU: 3



- A Hepta-1,4,5-trieen
- B methylbut-2-een

- C 3-ethyl-4,4-dimethylpent-1-een
- D But-1-een



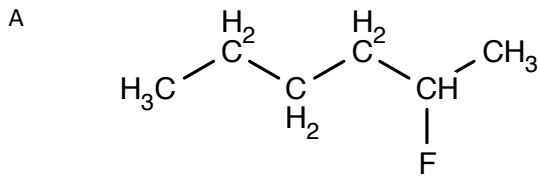


## HALOGENEN

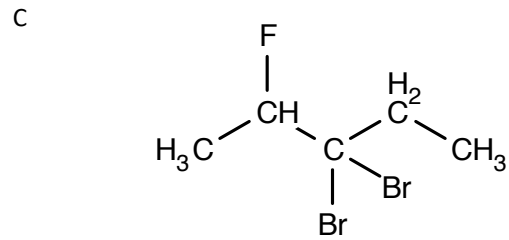


## OPDRACHT 31

NIVEAU: 1



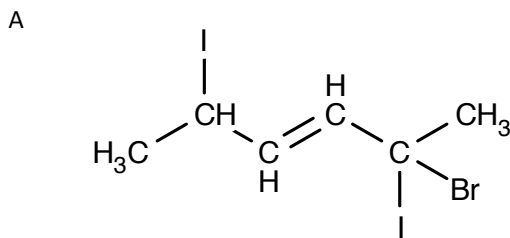
B 2-broom-5-fluorhexaan



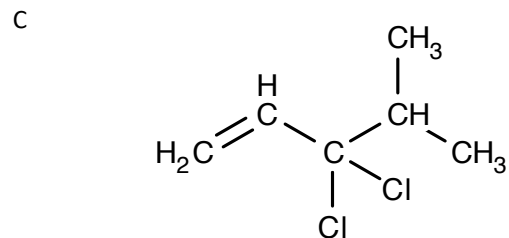
D 3,3,4-trifluorhexaan

## OPDRACHT 32

NIVEAU: 2



B 1,3-dibroom-2-methylbut-2-een



D 3,6-dibroomhepta-1,4-dieen

## OPDRACHT 33

NIVEAU: 3

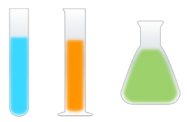


A 6,6-dibroomhex-1-een  
 B 1,2-difluormethylpropan

C 1-broom-3-fluorpenta-1,3-dieen  
 D 1-chloor-3-methylpentaan







## SUBSTITUTIE &amp; ADDITIE



## OPDRACHT 34

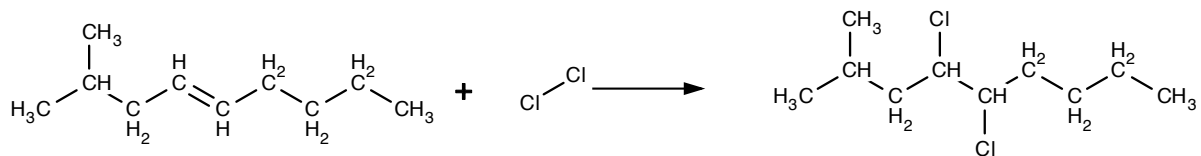
NIVEAU: 1



- A Additie, rondom de dubbele binding worden atomen toegevoegd (geaddeerd) en er worden geen atomen vervangen.
- B Substitutie, er worden atomen vervangen.

## OPDRACHT 35

NIVEAU: 2



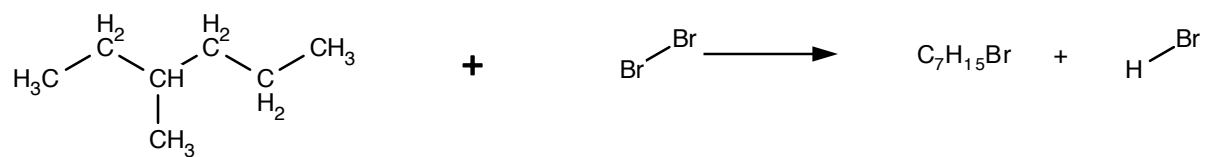
Er wordt gebruik gemaakt van een additiereactie, er worden namelijk atomen toegevoegd en geen atomen vervangen. Je moet van een additiereactie gebruik maken omdat je bij een substitutiereactie niet weet welke waterstofatomen vervangen gaan worden, waardoor je een mengsel van verschillende chloornonanen zou krijgen.

## OPDRACHT 36

NIVEAU: 2

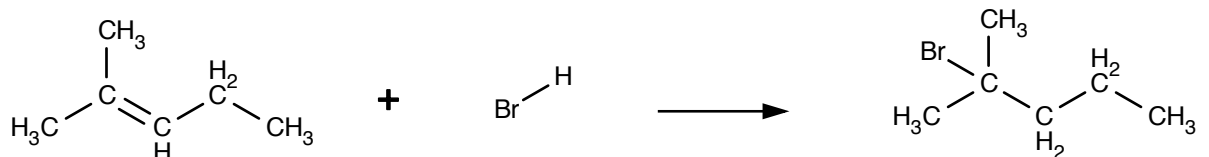


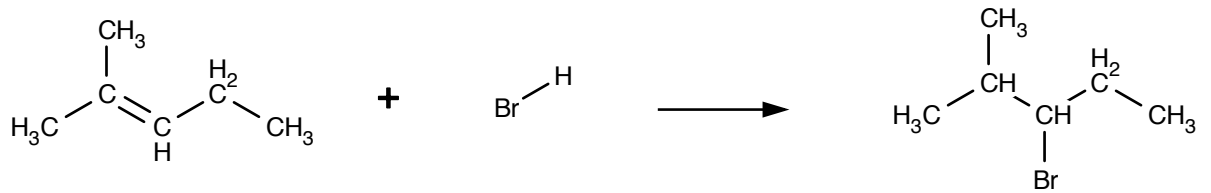
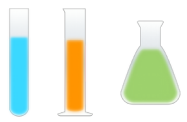
A.



Je kan geen structuurformule geven van  $\text{C}_7\text{H}_{15}\text{Br}$  omdat je niet weet welk H-atoom gesubstitueerd wordt.

B.





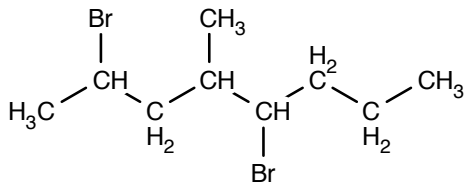
Er kunnen twee verschillende producten gevormd worden. Die kan je samen in een reactievergelijking zetten (vergeet hem dan niet kloppend te maken) of in twee losse vergelijkingen.

## OPDRACHT 37

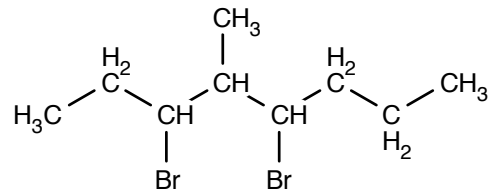
NIVEAU: 3



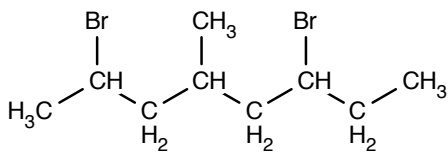
I



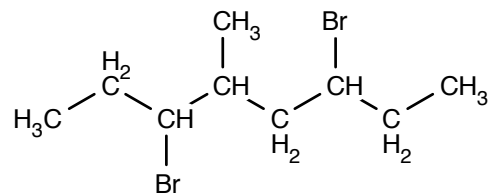
III

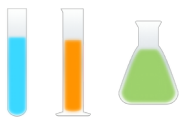


II



IV



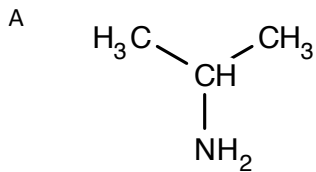


## AMINEN

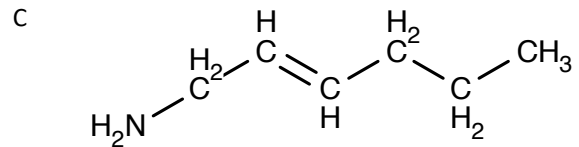


## OPDRACHT 38

NIVEAU: 1



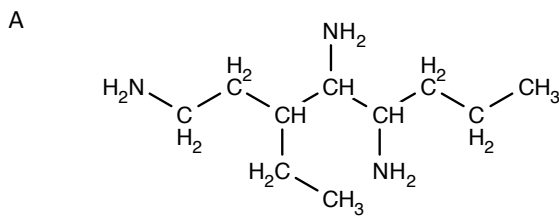
B Pentaan-2,3-diamine



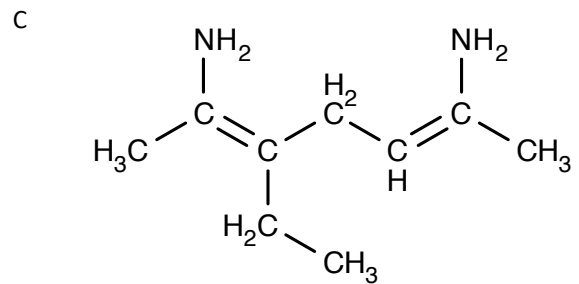
D But-2-een-1-amine

## OPDRACHT 39

NIVEAU: 2



B 3,5-dimethylhexaan-2,4-diamine



D buta-2,3-dieen-1-amine

## OPDRACHT 40

NIVEAU: 3



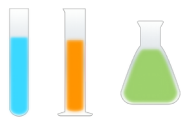
A hex-4-een-3-amine

B octa-1,2,8-triamine

C ethaanamine

D pentaan-1,4,4-triamine





## ALCOHOLEN

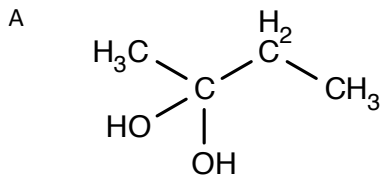


## OPDRACHT 41

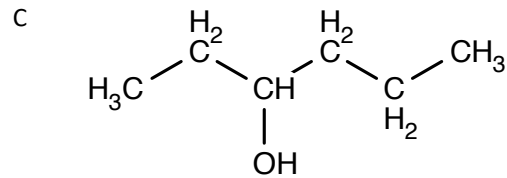
NIVEAU: 1



Zet van de onderstaande stoffen de systematische naam om in een structuurformule en andersom.



B pentaan-1-ol



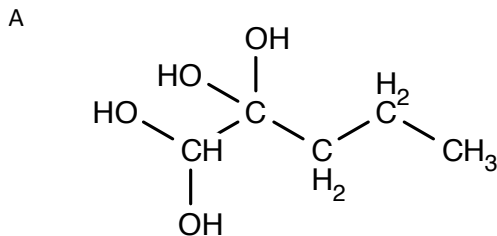
D propaan-1,2-diol

## OPDRACHT 42

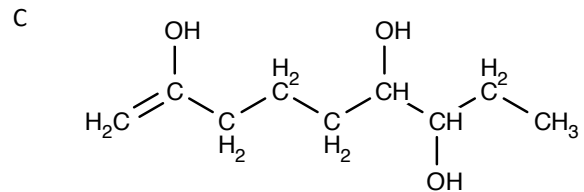
NIVEAU: 2



Zet van de onderstaande stoffen de systematische naam om in een structuurformule en andersom.

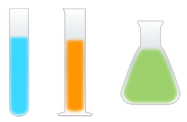


B butaan-1,1,2,3-tetraol



D buta-1,3-dieen-2-ol





## CARBONZUREN

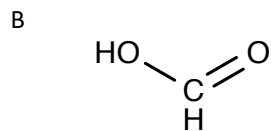


## OPDRACHT 43

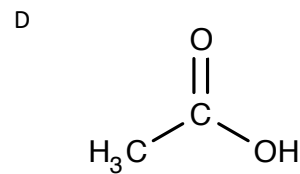
NIVEAU: 1



A propaanzuur



C butaanzuur

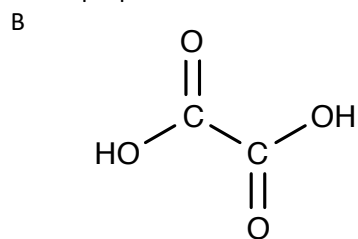


## OPDRACHT 44

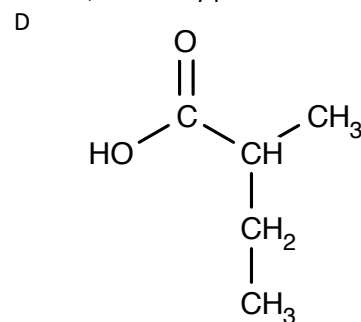
NIVEAU: 2



A propaandizuur

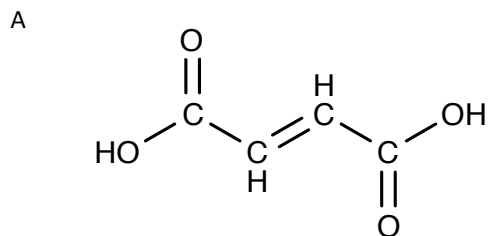


C 4,4-dimethylpentaanzuur

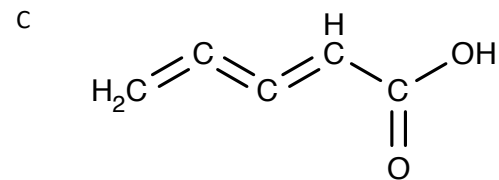


## OPDRACHT 45

NIVEAU: 3

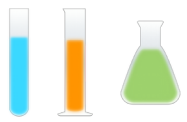


B 2,4-dimethylpent-3-eenzuur



D Penta-2,3-dieendizuur





## AMINOZUREN



## OPDRACHT 46

NIVEAU: 1



Geef aan wat de 3 letterige afkorting van de volgende aminozuren is.

- |   |     |   |     |
|---|-----|---|-----|
| A | Asn | C | Leu |
| B | Gln | D | Pro |

## OPDRACHT 47

NIVEAU: 2



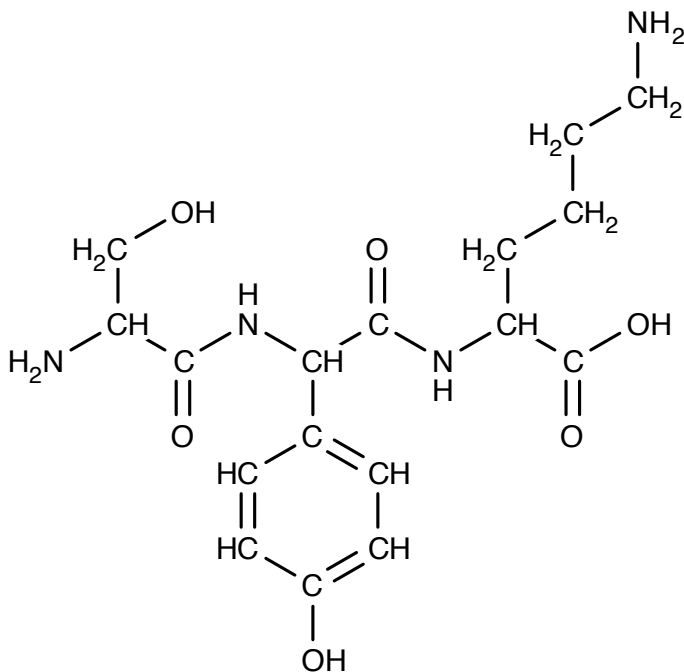
- |   |                            |   |                             |
|---|----------------------------|---|-----------------------------|
| A | 2-amino-3-methylbutaanzuur | C | 2-amino-3-methylpentaanzuur |
| B | 2-aminopentaanzuur         | D | 2,6-diaminohexaanzuur       |

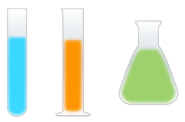
## OPDRACHT 48

NIVEAU: 3



Product van de reactie:





## ESTERS



## OPDRACHT 49

NIVEAU: 2



- A Ester van pentaanzuur en propaan-1-ol  
 B Ester van ethaanzuur en methanol  
 C Ester van methaanzuur en propaan-1-ol  
 D Ester van pentaanzuur en methanol

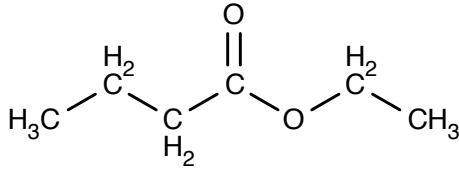
## OPDRACHT 50

NIVEAU: 2

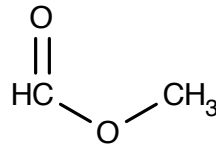


Teken van de onderstaande stoffen de structuurformule

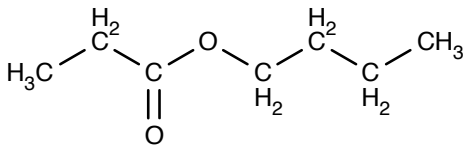
A



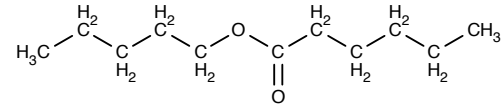
C



B



D



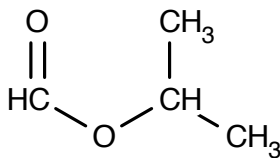
## OPDRACHT 51

NIVEAU: 3

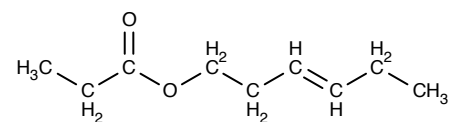


Zet de onderstaande structuurformules om in namen en andersom.

A



C



B De ester van ethaanzuur en butaan-2-ol

D De ester van methaanzuur en prop-2-een-1-ol





## ESTERREACTIES

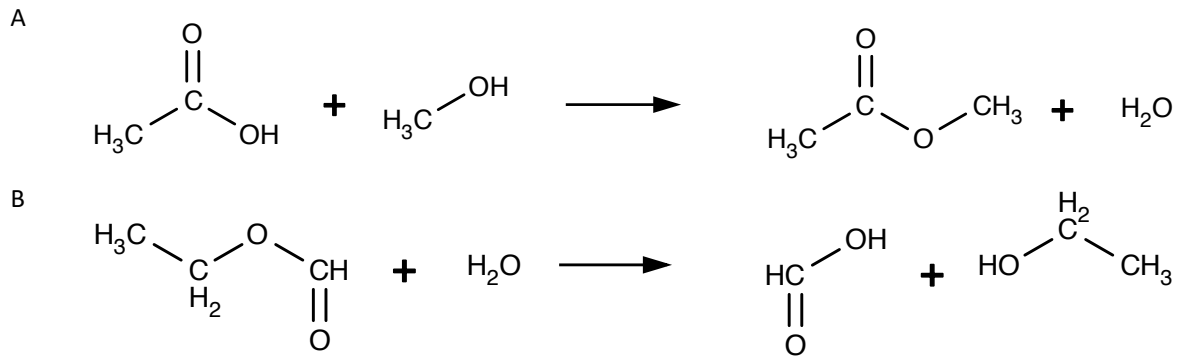


## OPDRACHT 52

NIVEAU: 2



Teken de reactievergelijking in structuurformules van de volgende reactie

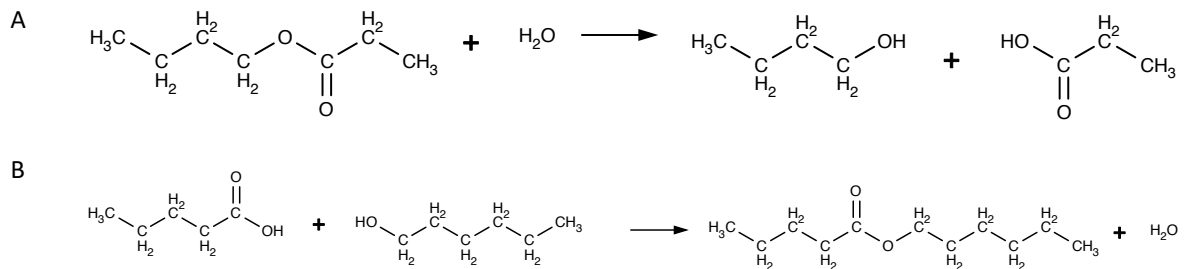


## OPDRACHT 53

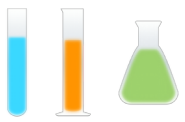
NIVEAU: 3



Teken de reactievergelijking in structuurformules van de volgende reactie







## OLIËN & VETTEN



### OPDRACHT 54

NIVEAU: 1



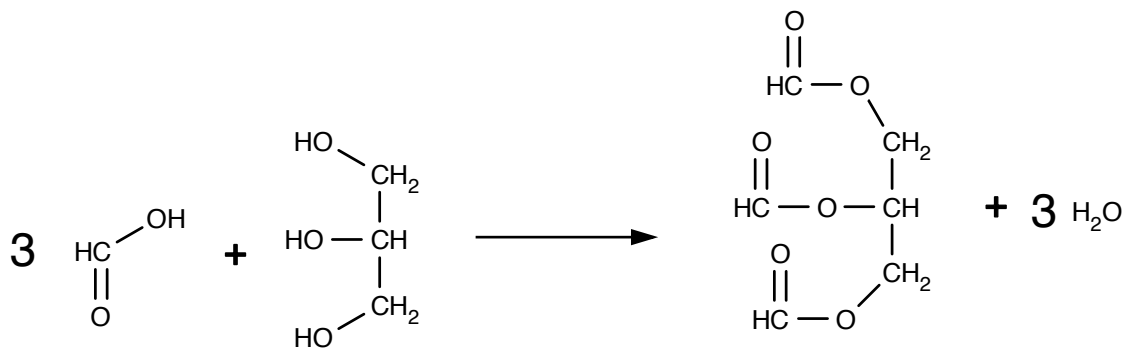
Als een vet een dubbele binding tussen twee koolstofatomen in de C-keten van een van de stamten heeft (het vetzuur waaruit het op is gebouwd had dus een dubbele binding) is het een onverzadigd vet. In dat geval zal het vet vloeibaar zijn bij kamertemperatuur. Als het alleen enkele bindingen tussen de koolstofatomen heeft is het een verzadigd vet en zal het vast zijn bij kamertemperatuur.

### OPDRACHT 55

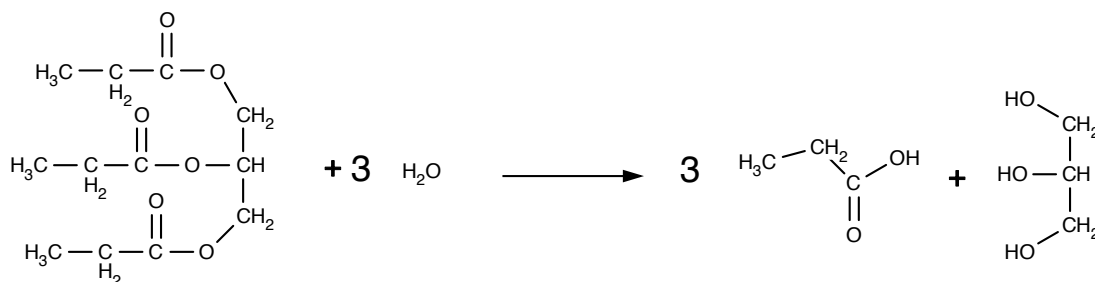
NIVEAU: 2

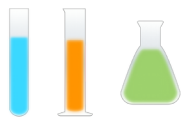


A



B



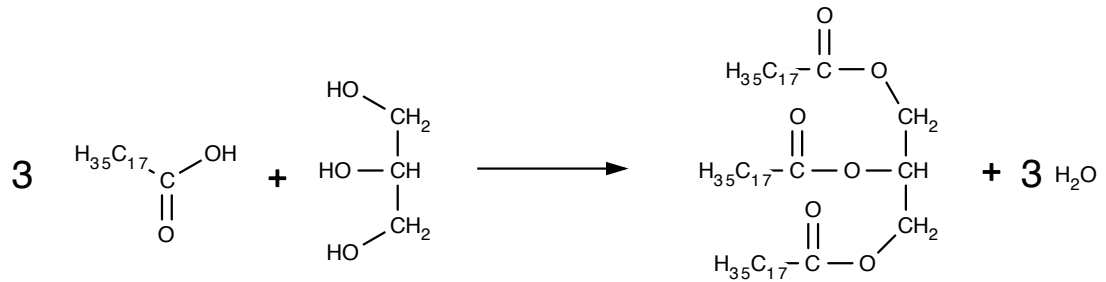


## OPDRACHT 56

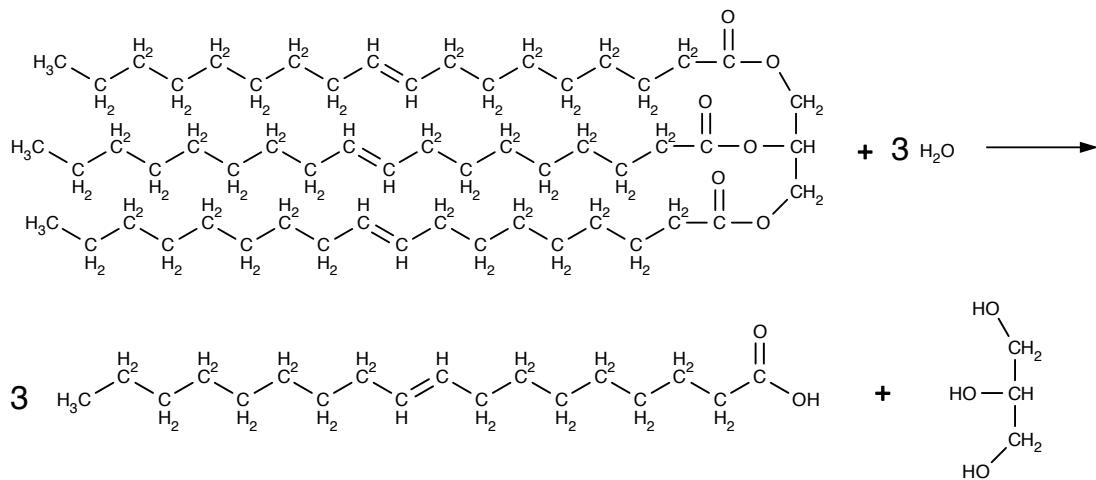
NIVEAU: 3

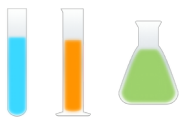


A



B





## COMBINATIES



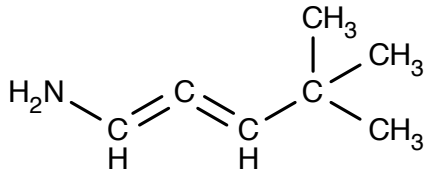
## OPDRACHT 57

NIVEAU: 1



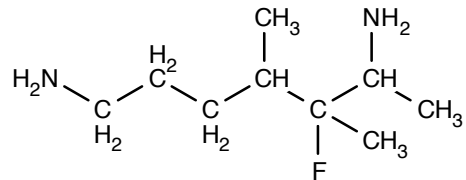
Zet van de onderstaande stoffen de systematische naam om in een structuurformule en andersom.

A



B 4-chloorhex-2-een-1-ol

C



D 1,1,2-trifluorethaan-1-ol

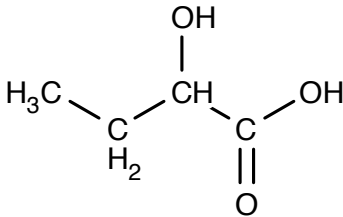
## OPDRACHT 58

NIVEAU: 2



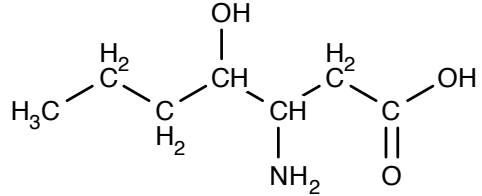
Zet van de onderstaande stoffen de systematische naam om in een structuurformule en andersom.

A



B 3-aminopropaan-1-ol

C



D 4-broom-3-hydroxypent-3-eenzuur

## OPDRACHT 59

NIVEAU: 3



Frits heeft een aantal stoffen een verkeerde naam gegeven. Help Frits en geef de goede naam van de stoffen.

A 4-amino-3-broomheptaan-1-ol

C 2-fluor-4-methylhex-2-een-1,6-diol

B 2-aminobutaan-1-ol

D 5-amino-3-hydroxypentaaanzuur

