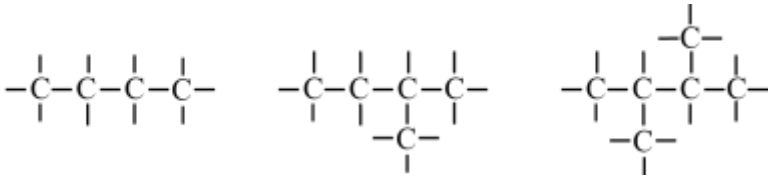
antwoorden opgaven

1 a tribroommethaan
b 3-broompropeen
c 2-chloor-2-methylpropaan
d 2-chloorpropaan
e chlooretheen
f 1-chloor-2-methylpropaan

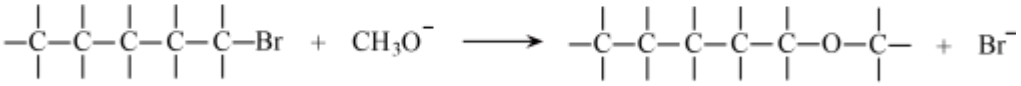
2 a $5\ CH_3CH_2OH + PCl_5 \rightarrow 5\ CH_3CH_2Cl + H_3PO_4 + H_2O$
b $3\ CH_3CH_2OH + PBr_3 \rightarrow 3\ CH_3CH_2Br + H_3PO_3$
c $CH_3CH_2OH + SOCl_2 \rightarrow CH_3CH_2Cl + SO_2 + HCl$
d $CH_3CH_2OH + HBr \rightarrow CH_3CH_2Br + H_2O$

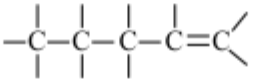
3 a $CH_3CHCH_2 + I_2 \rightarrow CH_3CHICH_2I$
b $CH_3C(CH_3)CH_2 + HBr \rightarrow CH_3C(CH_3)BrCH_3$

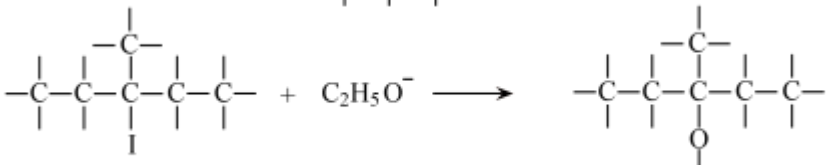
4 Je gebruikt hierbij vast Na. Dit reageert fel met water.

5 

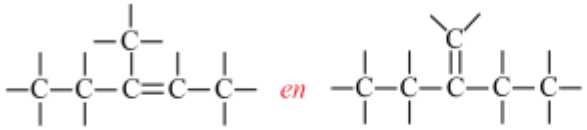
6 a 

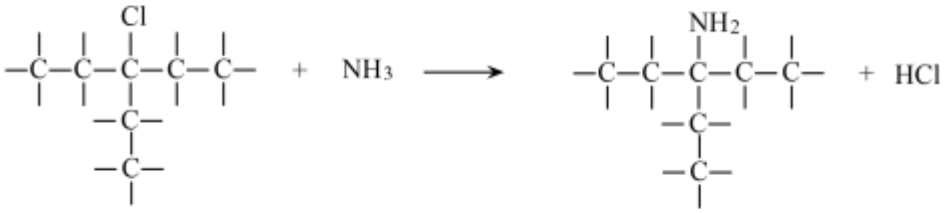
b 

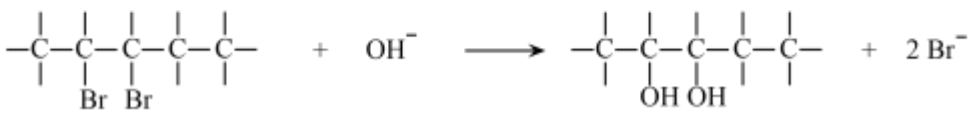
maar ... ook eliminatie: 

c 

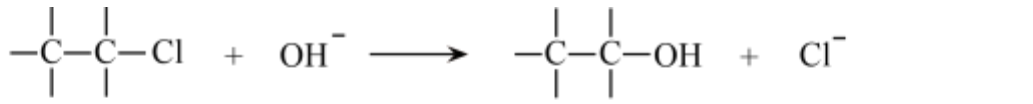
maar ... vooral eliminatie:

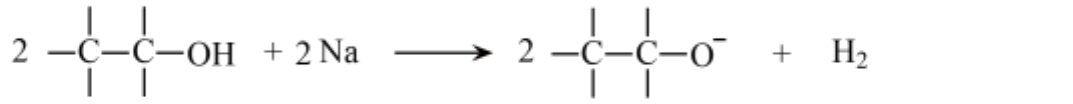
 *en*

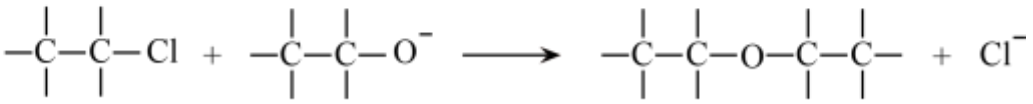
d 

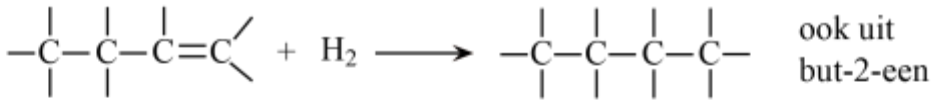
e 

Voor vraag 7 zijn er verschillende mogelijkheden… bijvoorbeeld:

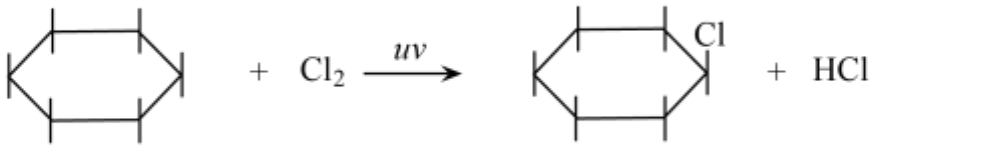
7 a 

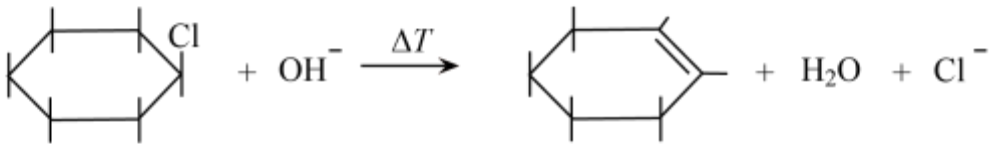


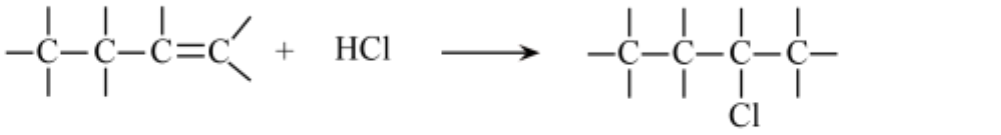


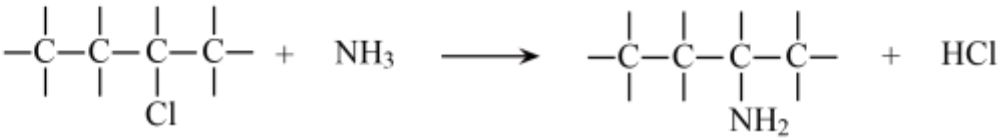
b 

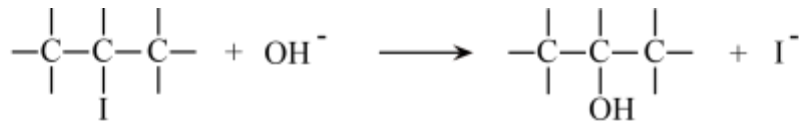
ook uit
but-2-een

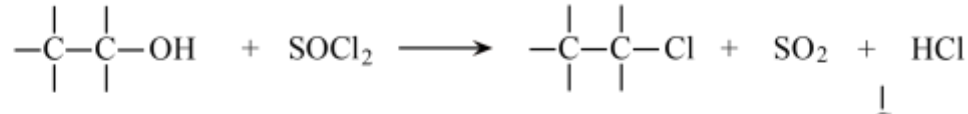
c 

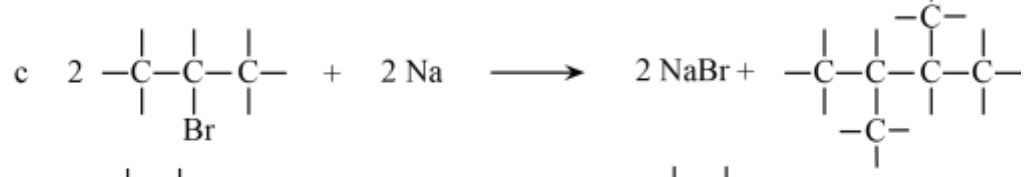


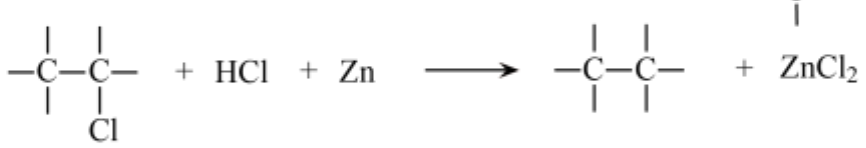
d 

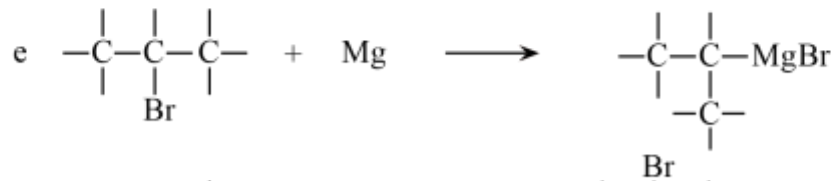


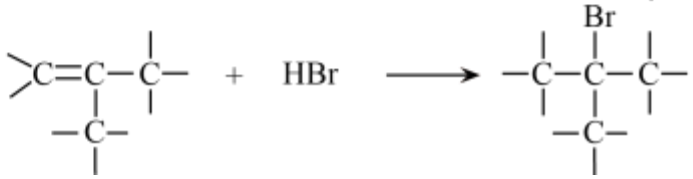
8 a 

b 

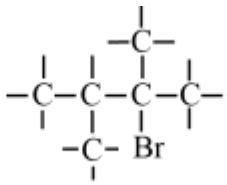
c 

d 

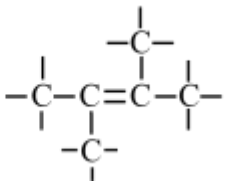
e 

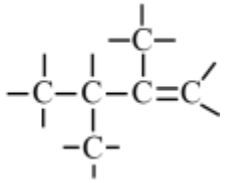
f 

9 Uitgangsstof:



Twee producten:





10

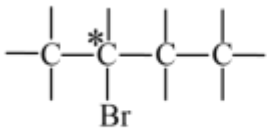
a	snel	langzaam	snelst (allylcarbokation)
b	langzaam	snelst	snel

11 Reactiviteit S_N1 (hoe gemakkelijk laat Cl^- los?)
c reageert het snelst. Het carbokation is stabieler dan bij a en b doordat de dubbele binding mesomerie geeft. Tussen a en b zal weinig verschil zijn.
f: langzaamst (primaire C) Tussen d en e is weinig verschil, welis waar heeft d een tertiaire C, maar het karbokation van e wordt stabieler door de mesomerie-mogelijkheid van het zuurstofatoom. (maar dat kon je misschien niet weten…)

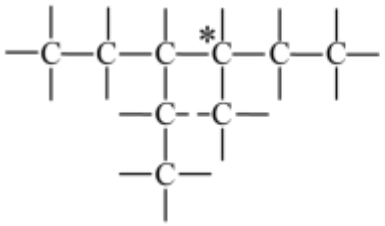
12 Sterische hinder: ruimtelijke hinder. De 3 alkylgroepen schermen het broomatoom af.

13 a 1-broom-2-buteen reactiever in S_N1: er is mesomerie mogelijk in het karbokation.
b $(CH_3)_3CCl$ reactiever in S_N1: meer vertakt karbokation.

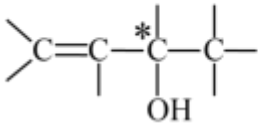
14 a



b



c



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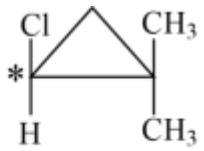

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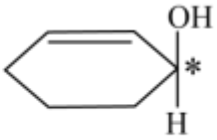

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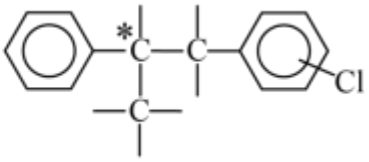


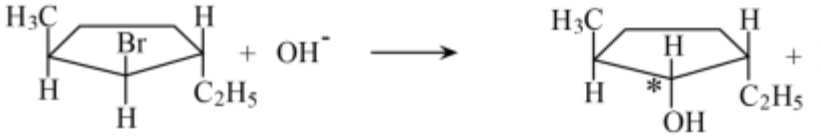
15 a $CH_3CH_2CH_2Br + I^- \longrightarrow CH_3CH_2CH_2I + Br^-$

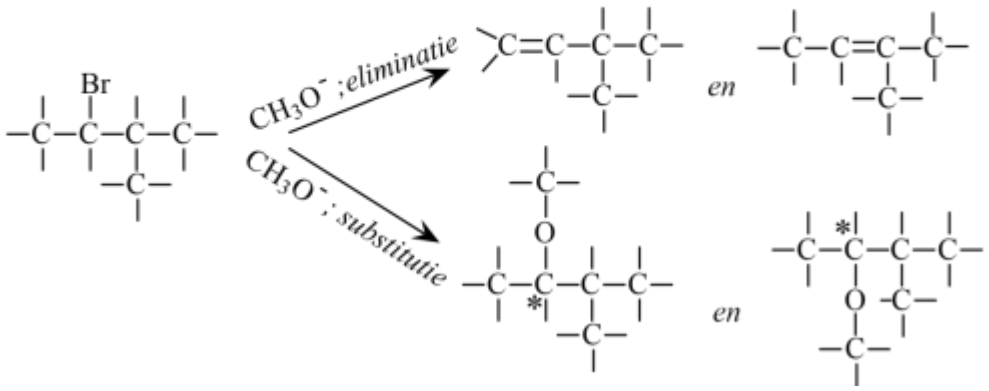
b 

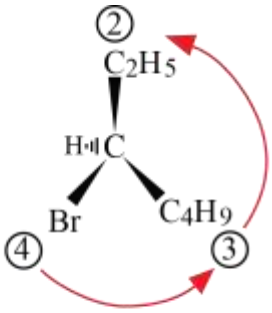
c $(CH_3)_3CBr + OH^- \longrightarrow (CH_3)_3COH + Br^-$

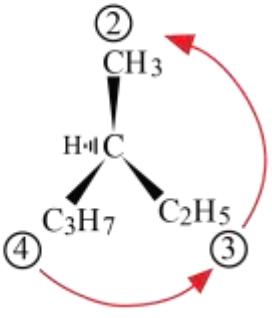
d $CH_3Cl + CH_3O^- \longrightarrow CH_3{-}O{-}CH_3 + Cl^-$

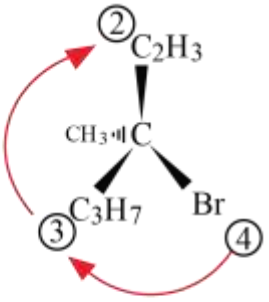
e 
ook eliminatie

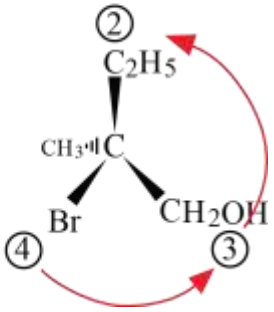
f 
ook eliminatie

g 

16 a 

b 

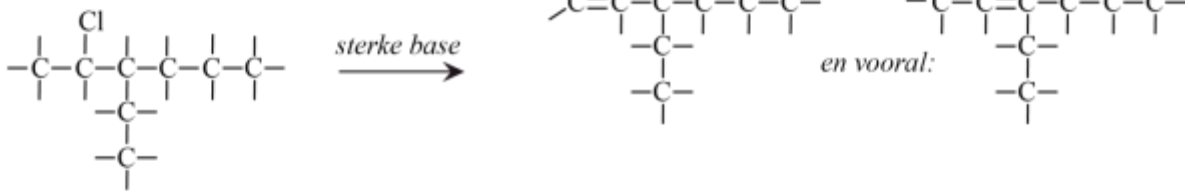
c 

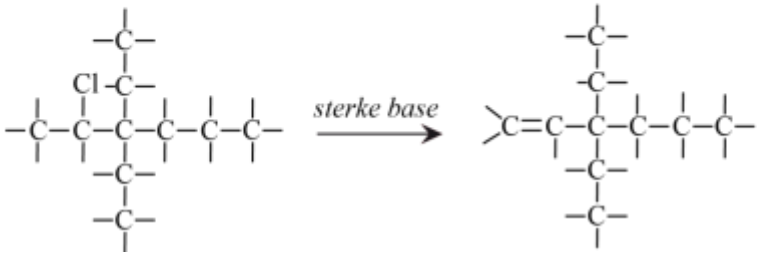
d 

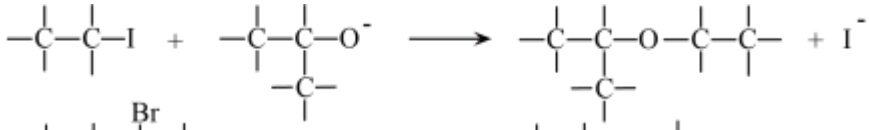
17 Bromide-ionen geven met het broombutaan een dynamisch evenwicht. Bij de ‘aanval’ van het bromide op het carbokation is er evenveel kans op het ontstaan van de ene enantiomeer als de andere. Zo ontstaat een mengsel in gelijke molaire hoeveelheden.

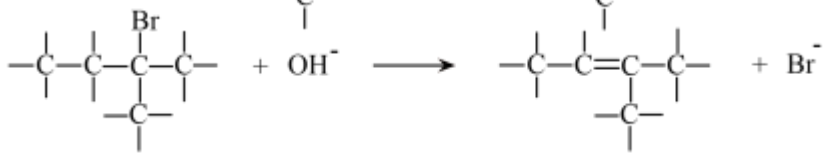
18 a 

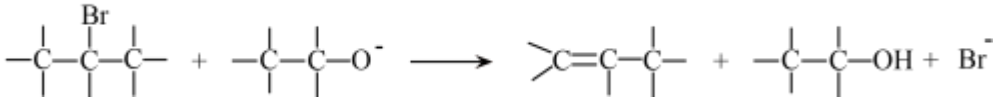
b 

c 

d 

19 a 

b 

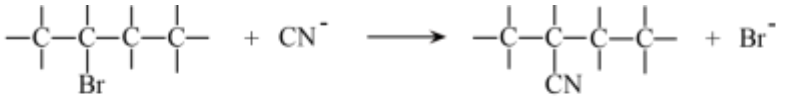
c 

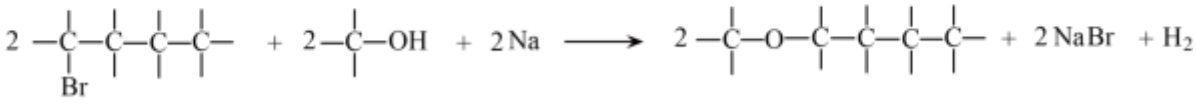
20 a $5\ \mathrm{R{-}OH} + \mathrm{PCl_5} \longrightarrow 5\ \mathrm{R{-}Cl} + \mathrm{H_3PO_4} + \mathrm{H_2O}$

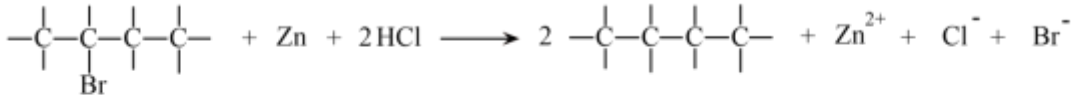
b $3\ \mathrm{R{-}OH} + \mathrm{PBr_3} \longrightarrow 3\ \mathrm{R{-}Br} + \mathrm{H_3PO_3}$

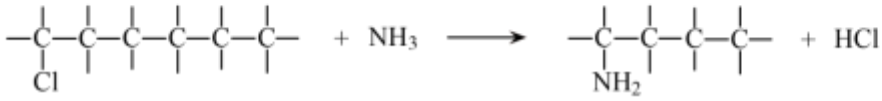
c $\mathrm{R{-}OH} + \mathrm{SOBr_2} \longrightarrow \mathrm{R{-}Br} + \mathrm{SO_2} + \mathrm{HBr}$

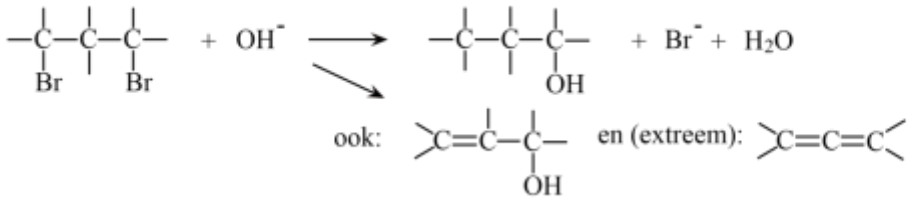
d $\mathrm{R{-}OH} + \mathrm{HBr} \longrightarrow \mathrm{R{-}Br} + \mathrm{H_2O}$

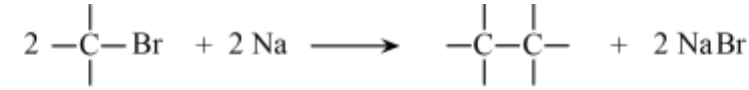
21 a 

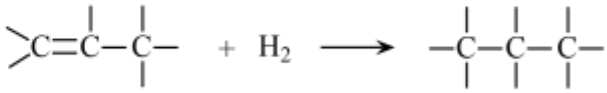
b 

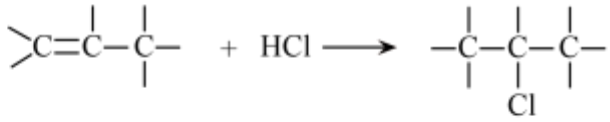
c 

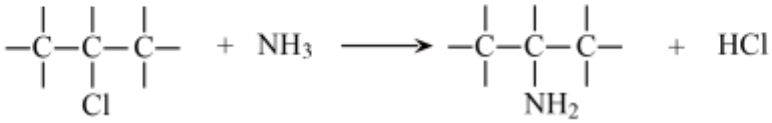
d 

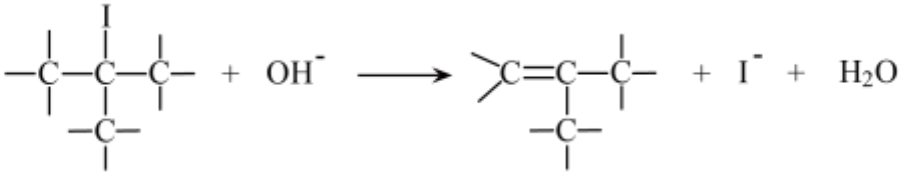
e 

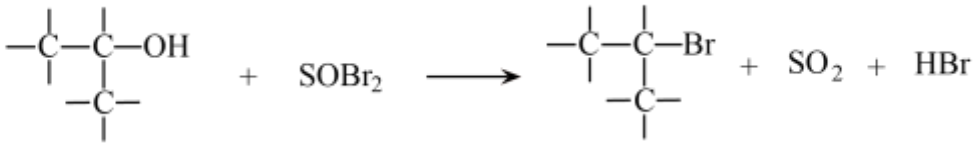
22 a 

b 

c I^{e} 

2^{e} 

23 a 

b 

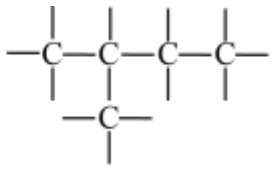
c $CH_3CH_2OH + CH(CH_3)_2Br \longrightarrow NaBr + CH_3CH_2OCH(CH_3)_2 + H_2$

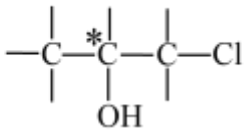
d $CH_3CH_2CH_2Cl + HCl + Zn \longrightarrow CH_3CH_2CH_3 + ZnCl_2$

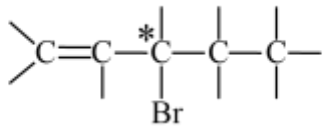
e $CH_3CHBrCH_2CH_3 + OH^- \xrightarrow{\text{ethanol}} CH_2CHCH_2CH_3 + Br^- + H_2O$

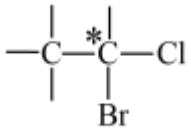
$CH_3CHCHCH_3 + Br^- + H_2O$

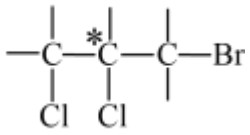
f $CH_3CHOHCH_2CH_3 + HBr \longrightarrow CH_3CHBrCH_2CH_3 + H_2O$

24 a 

b 

c 

d 

e 

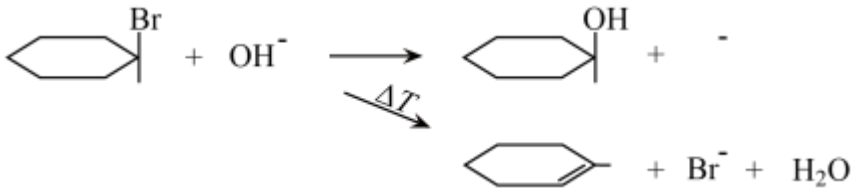
25 a $CH_3CH_2CH_2Br + Mg \longrightarrow CH_3CH_2CH_2MgBr$

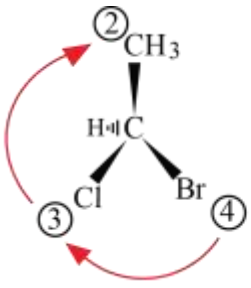
b $CH_3C(CH_3)ICH_2CH_3 \xrightarrow{OH^-} CH_3C(CH_3)CHCH_3$ *meest*

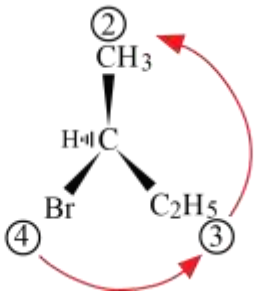
$CH_3C(CH_3)OHCH_2CH_3$ *minst*

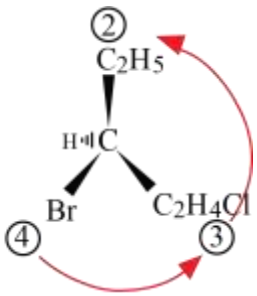
c $CH_3CHClCH_3 + CH_3O^- \longrightarrow CH_3CH(OCH_3)CH_3 + Cl^-$

$\xrightarrow{\Delta T} CH_3CHCH_2 + Cl^- + CH_3OH$

d 

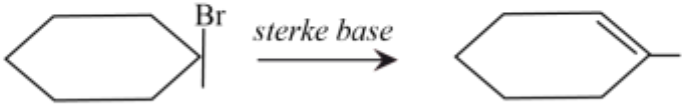
26 a 

b 

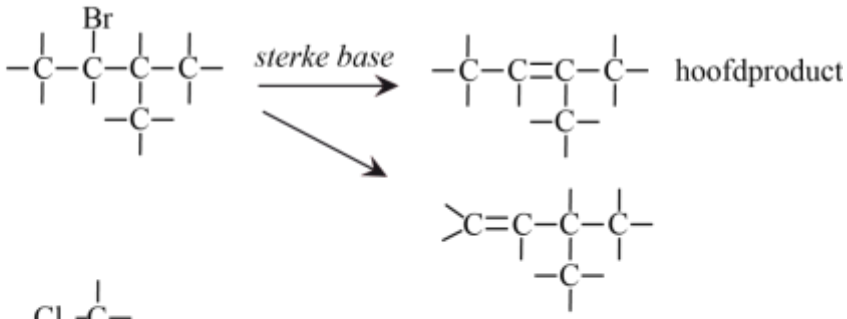
c 

27 a

b


Br
sterke base

c


Br
sterke base
hoofdproduct

d


Cl
sterke base
(geen alkeen)