VERIFICA LE TUE CONOSCENZE

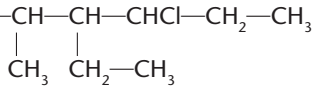
1 A	**9** B	**17** A	**25** A	**33** D	**41** C
2 B	**10** A	**18** D	**26** D	**34** B	**42** D
3 C	**11** D	**19** C	**27** B	**35** D	**43** B
4 D	**12** B	**20** B	**28** C	**36** C	**44** A
5 A	**13** C	**21** D	**29** A	**37** A	**45** D
6 D	**14** C	**22** C	**30** A	**38** C	**46** B
7 C	**15** B	**23** B	**31** B	**39** A	**47** A
8 A	**16** B	**24** B	**32** C	**40** B	

VERIFICA LE TUE ABILITÀ

48 **a.** $CH_3—CHCl—CH_2—CH_3$

b. $CH_2Br—CH_2—CH_2—CH_2—CH_3$

c. $CH_2Cl—CCl_2—CH_2—CH_3$

d.


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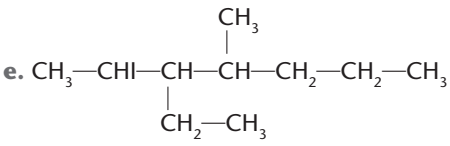

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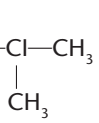

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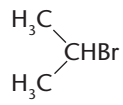

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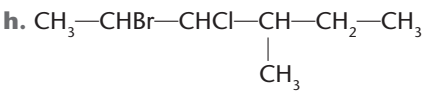

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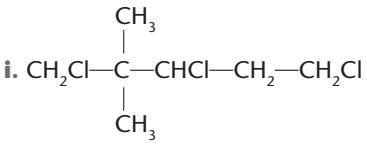
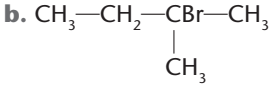


j. $CH_3—CHI—CH_2—CH_3$

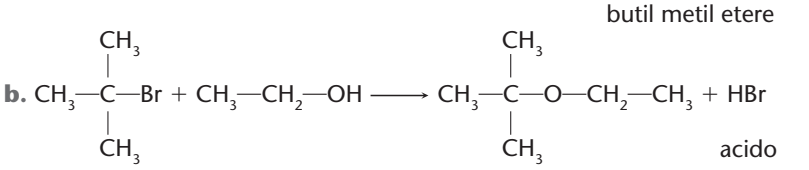
49 **a.** 1-bromopropano
b. 2-cloropentano
c. 2,3,3-tricloropentano
d. bromuro di *terz*-butile
e. 1-iodo-2,3-dimetilbutano
f. 2-bromo-2-isopropilbutano
g. 3-bromo-2-cloro-1-iodo-4,4-dimetilesano

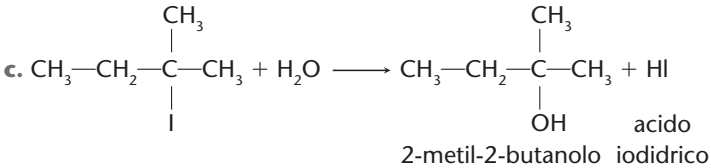
50 **a.** $CH_3—CH_2—CH_2Cl$

b.


c. $CH_3—CHI—CH_2—CH_2—CH_2—CH_3$

51 **a.** $CH_3—CH_2—CH_2—CH_2—Cl + CH_3ONa \longrightarrow CH_3—CH_2—CH_2—CH_2—O—CH_3 + NaCl$
butil metil etere — cloruro di sodio

b.

terz-butil etil etere — acido bromidrico

c.

2-metil-2-butanolo — acido iodidrico

d. $CH_3—CH_2—CH_2—F + NaOH \longrightarrow CH_3—CH_2—CH_2—OH + NaF$
1-propanolo — fluoruro di sodio

SOLUZIONI DEGLI ESERCIZI DI FINE CAPITOLO

52 **a.** $CH_3—\underset{\displaystyle CH_3}{\underset{|}{C}}Cl—CH_3 + OH^- \longrightarrow CH_3—\underset{\displaystyle CH_3}{\underset{|}{C}}=CH_2 + H_2O + Cl^-$

2-metilpropene — ione cloruro

b. $CH_3—CH_2—CH_2—Br + OH^- \longrightarrow CH_3—CH=CH_2 + H_2O + Br^-$

propene — ione bromuro

53 **a.** $CH_3—CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_2—CH_3$

b. $CH_3—CHCl—CHCl—CH_2OH$

c. $CH_3—CH_2—CH_2—CH_2—\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}—CH_2OH$

d. $CH_3—\underset{\displaystyle OH}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}—CH_3$

e. $CH_3—CH_2—CH_2—CH_2—O^-K^+$

f. $CH_2=\underset{\displaystyle CH_3}{\underset{|}{C}}—CH_2OH$

g. $CH_2Br—\underset{\displaystyle OH}{\underset{|}{CBr}}—C\equiv C—CH_3$

h. $CH_3—\underset{\displaystyle OH}{\underset{|}{CH}}—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_2—CH_3$

i. $CH_3—CH_2—\underset{\displaystyle OH}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}—CH_2—CH_2—CH_3$

j. $CH_2Br—\underset{\displaystyle OH}{\underset{|}{CH}}—\overset{\displaystyle CH_3}{\overset{|}{CH}}—CH_3$

54 **a.** 3-pentanolo
b. 3-metil-2-butanolo
c. 2-cloro-2-butanolo
d. 3,3-dibromo-2-butanolo
e. 2-buten-1-olo
f. 3-pentin-2-olo

55 **a.** 2-metil-1-butanolo
b. 2,3-dimetil-2-butanolo
c. 2-propen-1-olo
d. 4-cloro-2-pentanolo

56 **a.** primario
b. terziario
c. primario
d. terziario

57 **a.** cloruro di propile < 1-butanolo < 1-propanolo
b. 1-pentanolo < 1,5-pentandiolo < < 1,2,3-pentantriolo

58 **c.** < **a.** < **b.**

59 **a.** $2\ CH_3—\underset{\displaystyle OH}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}—CH_2—CH_3 + 2\ K \longrightarrow 2\ CH_3—\underset{\displaystyle O^-K^+}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}—CH_2—CH_3 + H_2$

2-metil-2-butanolo — 2-metil-2-butossido di potassio

b. $2\ CH_3—CH_2—CH_2—CH_2—CH_2—OH + 2\ Na \longrightarrow 2\ CH_3—CH_2—CH_2—CH_2—CH_2—O^-Na^+ + H_2O$

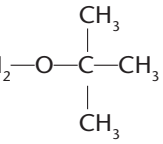
pentossido di sodio

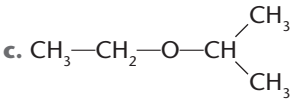
60 $2\ CH_3—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_2—CH_2—CH_3 \xrightarrow{H^+/180°C} CH_3—CH=CH—CH_2—CH_3 + CH_2=CH—CH_2—CH_2—CH_3 + 2\ H_2O$

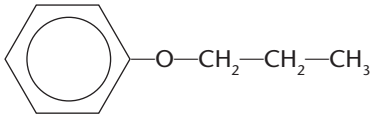
2-pentene — 1-pentene

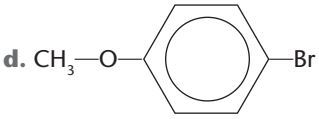
61 **a.** $CH_3—CH_2—CH_2—CH_2—CH_2—OH \xrightarrow{[O]} CH_3—CH_2—CH_3—CH_2—CHO$

b. $CH_3—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_2—CH_2—CH_3 \xrightarrow{[O]} CH_3—\underset{\displaystyle O}{\underset{\|}{C}}—CH_2—CH_2—CH_3$

62 **a.** 

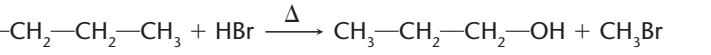
c. 

b. 

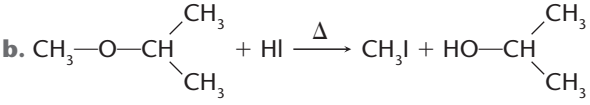
d. 

63 **a.** *p*-clorofenil etil etere **b.** dietil etere **c.** metil propil etere

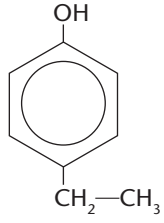
64 **c.** < **a.** < **b.**

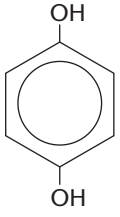
65 **a.** 

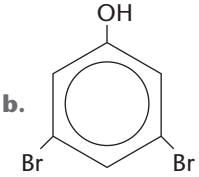
1-propanolo bromometano

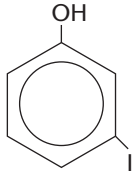
b. 

iodometano alcol isopropilico

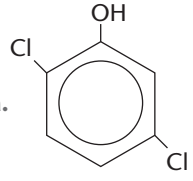
66 **a.** 

c. 

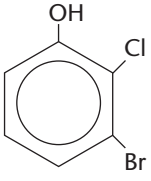
b. 

d. 

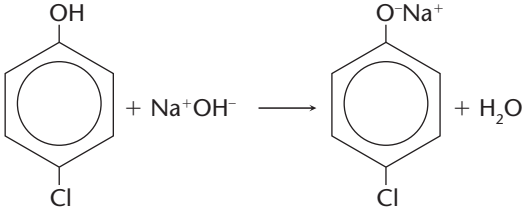
67 **a.** 2,4,6-trinitrofenolo
b. 4-etil-3-metilfenolo
c. *p*-bromofenolo
d. 4-bromo-3-clorofenolo

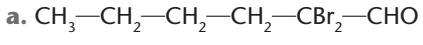
68 **a.** 

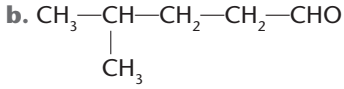
2,5-diclorofenolo

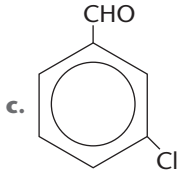
b. 

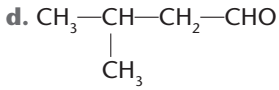
3-bromo-2-clorofenolo

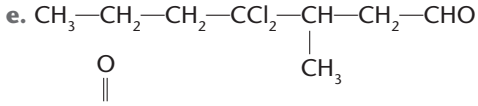
69 

70 **a.** 

b. 

c. 

d. 

e. 

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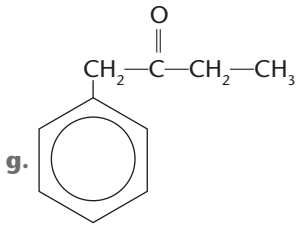
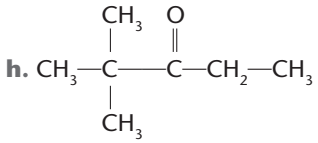
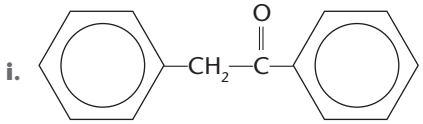
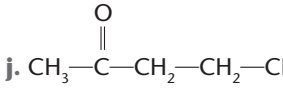
g. 

h. 

i. 

j. 

SOLUZIONI DEGLI ESERCIZI DI FINE CAPITOLO

71 **a.** 4,4-dimetilesanale
b. 2-bromo-2-cloropropanale
c. *p*-bromobenzaldeide
d. 3-idrossipentanale
e. 3-bromo-2-metilbutanale
f. 3,3-dicloro-2-pentanone
g. difenil chetone
h. 3,4-dibromo-2-pentanone
i. etil fenil chetone
j. 3-esanone

72 **c.** < **b.** < **a.**

73 **a.** $CH_3—\overset{\overset{O}{\|}}{C}—CH_2—CH_2—CH_3 \xrightarrow{[H]} CH_3—\overset{\overset{OH}{|}}{CH}—CH_2—CH_2—CH_3$
2-pentanolo

b. $CH_3—CH_2—CH_2—CH_2—\overset{\overset{O}{\|}}{C}—H \xrightarrow{[H]} CH_3—CH_2—CH_2—CH_2—CH_2—OH$
1-pentanolo

74 **a.** $CH_3—CHCl—CH_2—COOH$

b. $CH_3—\underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{CH}}—COOH$

c. $CH_3—\underset{\underset{O}{\|}}{C}—\underset{\underset{CH_3}{|}}{CH}—CH_2—CH_2—COOH$

d. $(CH_3—COO^-)_2Ca^{2+}$

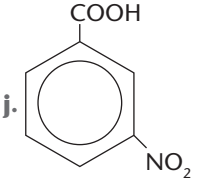
e. $CH_3—\overset{\overset{O}{\|}}{C}—O—CH_2—CH_2—CH_3$

f. $CH_3—\underset{\underset{CH_3}{|}}{CH}—\overset{\overset{O}{\|}}{C}—O—CH_2—CH_3$

g. $CH_3—\underset{\underset{CH_3}{|}}{CH}—\overset{\overset{O}{\|}}{C}—NH_2$

h. $CH_3—CH_2—CH_2—CH_2—\overset{\overset{O}{\|}}{C}—NH—CH_2—CH_3$

i. $CH_3—CH_2—\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}—COOH$

j.


75 **a.** acido 4-bromopentanoico
b. acido 4-idrossi-2-metilpentanoico
c. acido 2-metil-3-ossopentanoico
d. butanoato di potassio
e. etanoato di isopropile
f. N-etil-N-metil-propanammide

76 **b.** < **a.** < **c.**

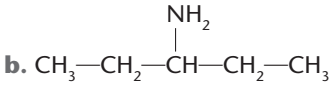
77 **c.** < **a.** < **b.**

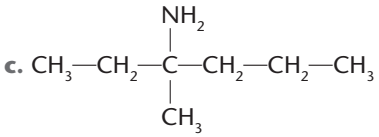
78 **a.** $CH_3—COOH + CH_3—OH \longrightarrow CH_3—COO—CH_3 + H_2O$
etanoato di metile

b. $CH_3—CH_2—COOH + NH_3 \longrightarrow CH_3—CH_2—CO—NH_2 + H_2O$
propanammide

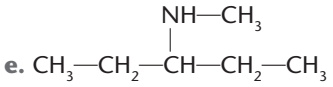
c. $CH_3—CH_2—CH_2—COOH + KOH \longrightarrow CH_3—CH_2—CH_2—COO^-K^+ + H_2O$
butanoato di potassio

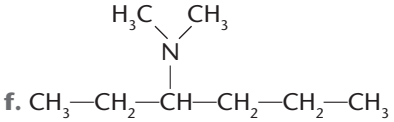
79 **a.** $CH_3—CH_2—CH_2—NH_2$

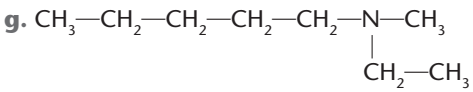
b. 

c. 

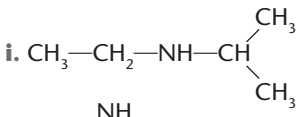
d. $CH_3—CH_2—NH—CH_2—CH—CH_3$

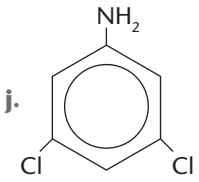
e. 

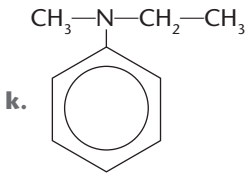
f. 

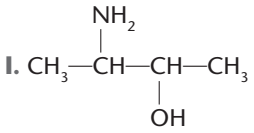
g. 

h. $CH_3—NH—CH_2—CH_2—CH_3$

i. 

j. 

k. 

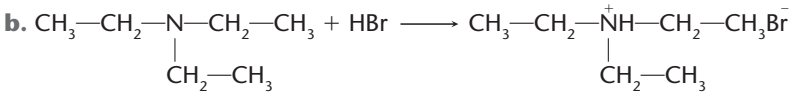
l. 

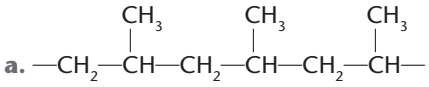
80 **a.** 1-amminobutano
b. 2-amminobutano
c. 2-metil-2-amminopentano
d. N-metilamminoetano
e. N-metil-2-amminobutano
f. N,N-dimetilamminopentano
g. 4-metilanilina
h. 3,5-dibromoanilina

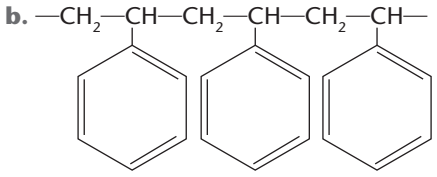
81 **c.** < **a.** < **b.**

82 **c.** < **b.** < **a.** < **d.**

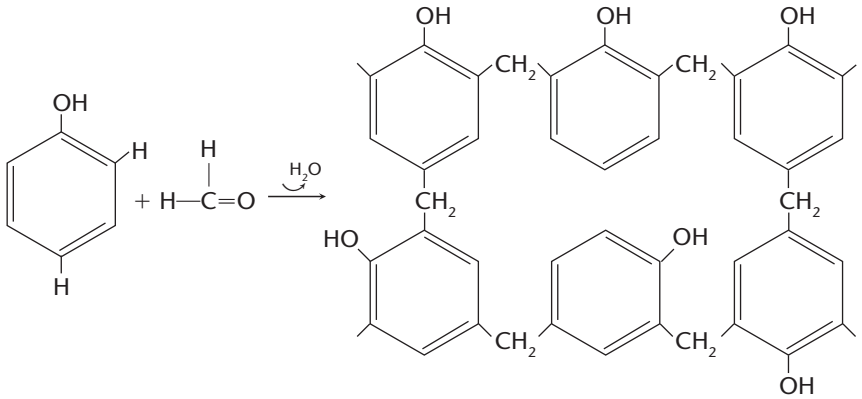
83 **a.** $CH_3—CH_2—NH_2 + HI \longrightarrow CH_3—CH_2—\overset{+}{N}H_3I^-$ ioduro di etilammonio

b. 
bromuro di trietilammonio

84 **a.** 

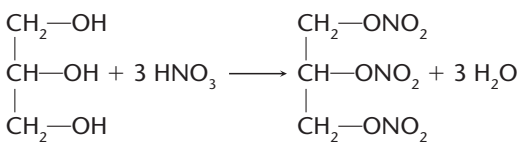
b. 

85 $—CCl_2—CH_2—CH_2—CHCl—CCl_2—CH_2—CH_2—CHCl—$

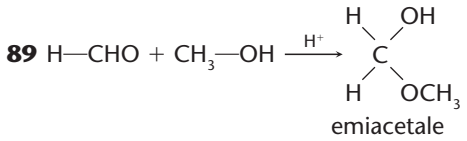
86 

TEST YOURSELF

87 **c.** < **b.** < **a.** < **d.**

88


nitroglicerina

89


emiacetale

90 **b.** < **a.** < **c.**

91 **c.** < **b.** < **a.**

VERSO L'UNIVERSITÀ

92 A **93** E **94** C

VERSO L'ESAME

CLASSIFICA

95 **Alogenazione degli alcheni:** addizione. **Disidratazione degli alcoli:** eliminazione. **Esterificazione:** sostituzione.

COLLEGA

96 **a.** Una reazione acido-base (salificazione).
b. Il principio dell'equilibrio chimico di Le Châtelier (la reazione si sposta verso destra per sottrazione di prodotto).

97 La stabilizzazione per risonanza del prodotto (base coniugata).

OSSERVA E CONFRONTA

98 **Prima figura:** gli atomi sono rappresentati da sfere, con colori diversi a seconda dell'elemento (bianco per l'idrogeno, nero per il carbonio e rosso per l'ossigeno), per cui i legami chimici non sono evidenziati, ma è raffigurato l'ingombro sterico.
Seconda figura: gli atomi sono rappresentati da sfere, con colori diversi a seconda dell'elemento chimico (bianco per l'idrogeno, nero per il carbonio e rosso per l'ossigeno) e dimensioni proporzionali al volume atomico, mentre i legami chimici sono rappresentati da bastoncini.
Un modello è una rappresentazione della realtà, non una sua riproduzione fedele, infatti è possibile costruire più modelli per evidenziare aspetti diversi della stessa molecola.
Terza figura: gli atomi sono raffigurati dalle estremità e dalle intersezioni tra i bastoncini che rappresentano i legami chimici, mentre i colori simboleggiano i diversi elementi (bianco per l'idrogeno, giallo per il carbonio e rosso per l'ossigeno).

IPOTIZZA E ARGOMENTA

99 Le molecole di etanolo possono formare legami idrogeno, essendo presenti gruppi donatori e accettori di legami idrogeno.
Le molecole di etere, invece, presentano un potenziale accettore di legame idrogeno (l'atomo di ossigeno), ma non un gruppo donatore, per cui i legami intermolecolari sono rappresentati da attrazioni dipolo-dipolo più deboli dei legami idrogeno.

IPOTIZZA

100 Gli acidi organici, come il ketoprofene, sono deboli e quindi solo parzialmente dissociati, mentre i loro sali in acqua sono completamente dissociati e, quindi, più solubili per formazione di legami ione-dipolo.

101 **a.** Estere.
b. Un processo biologico come la fermentazione, in quanto gli enzimi sono stereoselettivi.

RICERCA E RIFLETTI

102 **a.** Entrambe le molecole presentano un anello benzenico con un gruppo carbossilico come sostituente; in posizione orto rispetto al gruppo carbossilico, l'acido salicilico presenta un ossidrile, mentre l'acido acetilsalicilico un estere (gruppo acetilico).
b. L'acido salicilico non possiede un gruppo acetilico e quindi non è in grado di determinare la reazione di inibizione irreversibile causata dall'acido acetilsalicilico.

IPOTIZZA

103 Gli idrocarburi presentano gli stessi gruppi funzionali (radicali alchilici), mentre i composti funzionalizzati presentano una maggiore varietà strutturale.