Soluzioni degli esercizi di fine capitolo

Soluzioni degli esercizi per capitolo

Chimica organica: una visione d'insieme • Capitolo C1

VERIFICA LE TUE CONOSCENZE

1 A
2 C
3 B
4 D
5 A
6 B
7 C
8 A
9 A
10 B
11 D
12 A
13 C
14 C
15 C
16 B
17 C

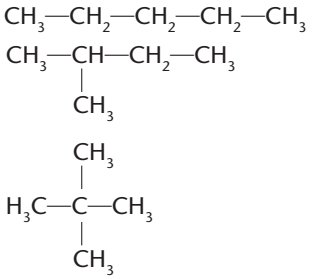
VERIFICA LE TUE ABILITÀ

18 **a.** sp^2; **b.** sp^3; **c.** sp^2; **d.** sp

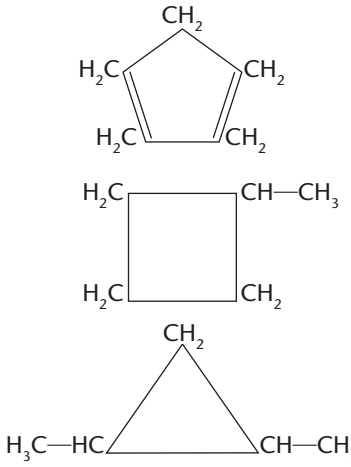
19 **a.** C–1 = –1; C–2 = –1
b. +2
c. –2
d. C–1 = –3; C–2 = +2; C–3 = –3

20 **a.** C–1 = –3; C–2 = –2; C–3 = –3
b. C–1 = –3; C–2 = 0; C–3 = –1
c. C–1 = –2; C–2 = –1; C–3 = –3
d. C–1 = –1; C–2 = 0; C–3 = –3

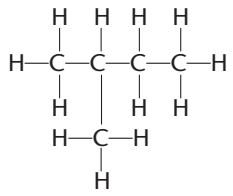
21 **a.** C_5H_{12}



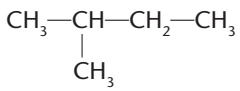
b. C_5H_{10}



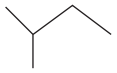
22 **a.** Lewis



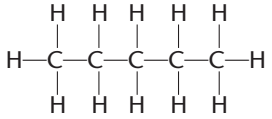
razionale



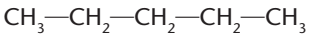
topologica



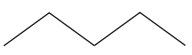
b. Lewis



razionale

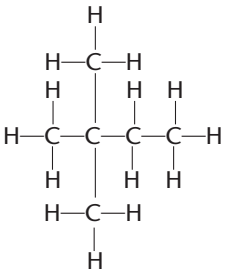


topologica

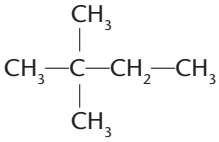


Esercizi di fine capitolo
David Sadava, David M. Hillis, H. Craig Heller, May R. Berenbaum, Vito Posca
Il carbonio, gli enzimi, il DNA. Chimica organica, biochimica e biotecnologie

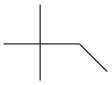
c. Lewis



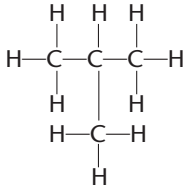
razionale



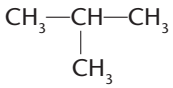
topologica



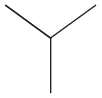
d. Lewis



razionale

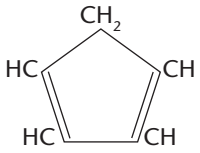


topologica



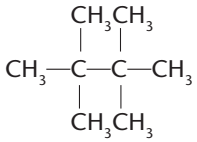
23 **a.** $CH_2=CH-CH(CH_3)-CH_3$

b.



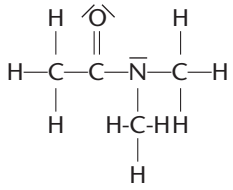
c. $CH_3-CH_2-O-CH_2-CH_3$

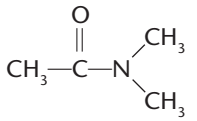
d.



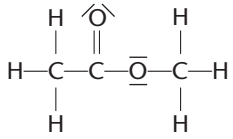
24 $CH_3CH_2CH(CH_3)C(CH_3)_3$

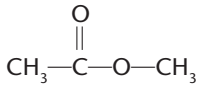
25 **a.**





b.



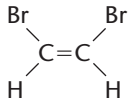


26 **a.** $CH_3-CH_2-CHCl_2$ $CH_3-CHCl-CH_2Cl$

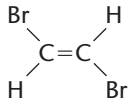
$CH_2Cl-CH_2-CH_2Cl$ $CH_3-CCl_2-CH_3$

b. $CH_3-CH_2-CH_2I$ $CH_3-CHI-CH_3$

27 **a.**

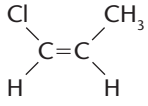


cis

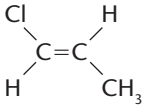


trans

b.



cis

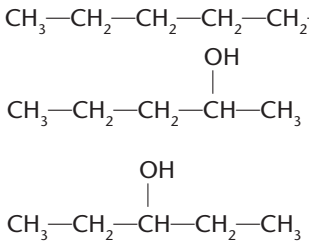


trans

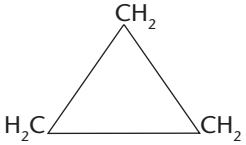
28 **a.** $CH_3-CH_2-CH_2OH$ $CH_3-CH_2-O-CH_3$

b. $CH_3-CH_2-CH_2-CH_2OH$ $CH_3-CH_2-O-CH_2-CH_3$

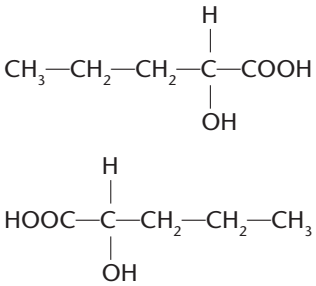
29



30 $CH_2=CH-CH_3$



31



32 **a.** (5 isomeri)

1. $CH_3—CH_2—CH_2—CH_2—CH_2—CH_3$

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

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

4. $CH_3—\underset{\displaystyle CH_3}{\underset{|}{CH}}—\underset{\displaystyle CH_3}{\underset{|}{CH}}—CH_3$

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

b. (9 isomeri)

1. $CH_3—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_3$

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

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

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

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

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

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

8. $CH_3—\underset{\displaystyle CH_3}{\underset{|}{CH}}—\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}—CH_3$

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

33 (6 isomeri)

1. $CH_3—CH_2—CH_2—CH_2—OH$

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

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

4. $CH_3—CH_2—O—CH_2—CH_3$

5. $CH_3—O—CH_2—CH_2—CH_3$

6. $CH_3—O—\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\diagup\!\diagdown}}CH$

34 $c = \dfrac{1\text{ g}}{100\text{ mL}} = 0{,}01\text{ g/mL}$

$[\alpha] = \dfrac{\alpha}{l \cdot c} = \dfrac{1{,}33}{2 \cdot 0{,}01} = 66{,}5°$

35 **c.** < **a.** < **b.** < **d.**

36 **a.** < **d.** < **c.** < **b.**

37 **b.** < **d.** < **c.** < **a.**

38 **a2.** < **a1.** < **a3.**; **b2.** < **b3.** < **b1.**

39 **a.** eteri; **b.** esteri; **c.** alchini; **d.** alogenuri

40 **a.** ammine; **b.** alogenuri alchilici; **c.** chetoni; **d.** acidi carbossilici; **e.** esteri; **f.** aldeidi

41 **a.** $CH_3—CH_2—CH_2—CH_2—OH$
b. $CH_3—CH_2—O—CH_3$
c. $CH_3—CH_2—CHO$
d. $CH_3—CH_2—CO—CH_3$

42 **a.**; **b.**; **d.**

43 **a.**; **c.**

44 **a.** $CH_3—\overset{+}{C}H_2$

b. $CH_3—\overset{+}{C}H—CH_3$

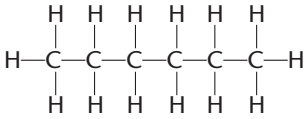
c. $CH_3—\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C^+}}}}$

45 **a.** (E); **b.** (E); **c.** (N); **d.**(E)

TEST YOURSELF

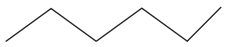
46 **a.** sp^2; **b.** sp^2; **c.** sp^3; **d.** sp^2

47 **a.** Lewis

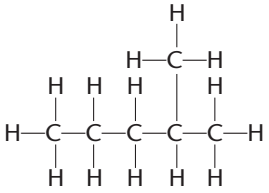


rational

topologic



b. Lewis



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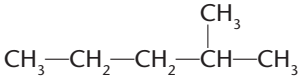
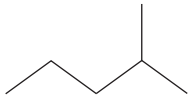
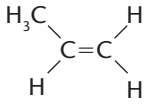


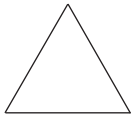
topologic



48

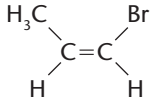


propene

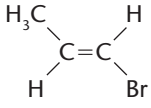


cyclopropane

50



cis



trans

49 **a.** amides; **b.** ethers; **c.** alkynes; **d.** aldehydes

VERSO L'UNIVERSITÀ

51 C **52** D **53** A **54** C

VERSO L'ESAME

OSSERVA E CLASSIFICA

56 Coltello e forchetta non sono l'uno l'immagine speculare dell'altro; le altre coppie sono immagini speculari ma la saliera e la pepiera e le lenti a contatto destra e sinistra sono sovrapponibili, per cui sono oggetti chirali solo gli occhi, le ali di farfalla e il paio di scarpe.

57 Sono isomeri strutturali, in particolare isomeri di catena, poiché presentano la stessa formula molecolare ma differiscono nella connettività degli atomi di carbonio.

58 Sono isomeri strutturali, in particolare isomeri di gruppo funzionale, poiché presentano la stessa formula molecolare ma differiscono nel tipo di gruppo funzionale.

IPOTIZZA E ARGOMENTA

59 Il più solubile in ambiente acquoso è l'1-propanolo, poiché è in grado di formare legami a idrogeno con l'acqua.

60 Entrambi i composti sono in grado di formare legami a idrogeno con l'acqua, ma l'1-pentanolo è più solubile in acqua poiché la sua catena idrocarburica idrofobica è più corta rispetto a quella dell'1-ottanolo.

61 Si usa l'etanolo. La classe chimica di un composto e la sua reattività sono determinate principalmente dal gruppo funzionale: metanolo ed etanolo hanno in comune un gruppo alcolico e sono pertanto appartenenti alla stessa classe chimica (alcoli).

ANALIZZA E IPOTIZZA

62 Miscele:
a. 50% A + 50% B: nessuna attività ottica (racemo);
b. 25% A + 75% B: levogira;
c. 25% B + 75% A: destrogira.

ANALIZZA E DEDUCI

63 L'organicazione è un processo di riduzione: nell'anidride carbonica il numero di ossidazione del carbonio è massimo (+4), mentre nei composti organici è ridotto.