

1. Which of the following statements is a correct definition for a Brønsted-Lowry acid?

- A. Proton acceptor
- B. Electron pair donor
- C. Electron pair acceptor
- D. Proton donor**

Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy Gradable: automatic Section: 02.01

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

2. Which of the following statements about a Brønsted-Lowry base is true?

- A. The net charge may be zero, positive, or negative.
- B. All Brønsted-Lowry bases contain a lone pair of electrons or a  $\pi$  bond.**
- C. All Brønsted-Lowry bases contain a proton.
- D. The net charge may be zero or positive.

Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy Gradable: automatic Section: 02.01

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

3. Which of the following compounds is both a Brønsted-Lowry acid and base?



**I**

**II**

**III**

**IV**

- A. I, II
- B. I, III**
- C. II, IV
- D. I, IV

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.01

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

4. Which of the following species cannot act as both a Brønsted-Lowry acid and base?

- A.  $\text{HCO}_3^-$
- B.  $\text{HSO}_4^-$
- C.  $\text{HO}^-$**
- D.  $\text{H}_2\text{PO}_4^-$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply Difficulty: Easy  
Gradable: automatic Section: 02.01

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

5. Which of the following species is not a Brønsted-Lowry base?

- A.  $\text{BF}_3$**
- B.  $\text{NH}_3$
- C.  $\text{H}_2\text{O}^{3-}$
- D.  $\text{PO}_4^{3-}$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply Difficulty: Easy  
Gradable: automatic Section: 02.01

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

6. Which of the following statements about Brønsted-Lowry acids and bases is true?

- A. Loss of a proton from a base forms its conjugate acid.
- B. Loss of a proton from an acid forms its conjugate base.**
- C. Gain of a proton by an acid forms its conjugate base.
- D. Brønsted-Lowry acid-base reactions always result in the transfer of a proton from a base to an acid.

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply Difficulty: Easy  
Gradable: automatic Section: 02.01

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

7. Which of the following species is the conjugate base of methanol,  $\text{CH}_3\text{OH}$ ?

- A.  $\text{CH}_3\text{OH}_2^+$
- B.  $\text{CH}_3\text{O}^-$
- C.  $\text{CH}_3^-$
- D.  $\text{CH}_4$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.01  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

8. Which of the following species is the conjugate base of the hydronium ion,  $\text{H}_3\text{O}^+$ ?

- A.  $\text{H}_3\text{O}$
- B.  $\text{H}_2\text{O}^-$
- C.  $\text{H}_2\text{O}$
- D.  $\text{HO}^-$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.01  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

9. Which of the following species is the conjugate acid of ammonia,  $\text{NH}_3$ ?

- A.  $\text{H}_4\text{N}$
- B.  $\text{H}_3\text{N}^+$
- C.  $\text{H}_2\text{N}^-$
- D.  $\text{H}_4\text{N}^+$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.01  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

10. Which is the conjugate acid in the following reaction?



- A. I
- B. II
- C. III
- D. IV

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.02  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

11. Which is the conjugate base in the following reaction?



- A. I
- B. II
- C. III
- D. IV

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.02  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

12. Which is the conjugate acid in the following reaction?



- A. I  
B. II  
C. III  
D. IV

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.02  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

13. Which is the conjugate base in the following reaction?



- A. I  
B. II  
C. III  
D. IV

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.02  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

14. Which of the following statements about acid strength is true?

- A. The stronger the acid, the further the equilibrium lies to the left.  
B. The stronger the acid, the smaller the  $K_a$ .  
C. The stronger the acid, the larger the  $pK_a$ .  
D. The stronger the acid, the smaller the  $pK_a$ .

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic:  $pK_a$   
Topic: Acids and Bases

15. Which of the following compounds is the strongest acid?



- A. I  
B. II  
C. III  
D. IV

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic:  $pK_a$   
Topic: Acids and Bases

16. Which of the following compounds is the strongest acid?

- A.  $\text{CH}_3\text{OH}$   
B.  $\text{BrCH}_2\text{OH}$   
C.  $\text{CH}_3\text{NH}_2$   
D.  $\text{CH}_3\text{Cl}$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic:  $pK_a$   
Topic: Acids and Bases

17. Which of the following compounds is the weakest acid?

- A. HF
- B. HCl
- C. HBr
- D. HI

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic: pKa  
Topic: Acids and Bases

18. Which of the following compounds is the weakest acid?

- A. H<sub>2</sub>S
- B. PH<sub>3</sub>
- C. HCl
- D. SiH<sub>4</sub>

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic: pKa  
Topic: Acids and Bases

19. Which of the following species is the strongest base?

- A. HO<sup>-</sup>
- B. H<sub>2</sub>N<sup>-</sup>
- C. CH<sub>3</sub>COO<sup>-</sup>
- D. Cl<sup>-</sup>

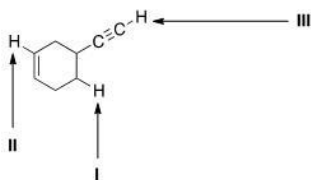
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Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic: pKa  
Topic: Acids and Bases

20. Which of the following ranks the compounds in order of increasing basicity, putting the least basic first?

- A. CH<sub>3</sub>NH<sub>2</sub> < CH<sub>3</sub>OH < CH<sub>4</sub>
- B. CH<sub>3</sub>OH < CH<sub>3</sub>NH<sub>2</sub> < CH<sub>4</sub>
- C. CH<sub>4</sub> < CH<sub>3</sub>NH<sub>2</sub> < CH<sub>3</sub>OH
- D. CH<sub>4</sub> < CH<sub>3</sub>OH < CH<sub>3</sub>NH<sub>2</sub>

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic: pKa  
Topic: Acids and Bases

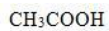
21. Consider the following molecule with protons labeled, I-III. Rank these protons in order of decreasing acidity, putting the most acidic first.



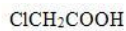
- A. I > II > III
- B. I > III > II
- C. III > II > I
- D. III > I > II

Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section: 02.03  
Subtopic: Acid strength of functional groups  
Subtopic: Factors affecting acid strength  
Subtopic: pKa  
Topic: Acids and Bases

22. Rank the following compounds in order of increasing acidity, putting the least acidic first.



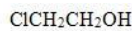
**I**



**II**



**III**



**IV**

- A.  $\text{III} < \text{I} < \text{IV} < \text{II}$   
 B.  $\text{III} < \text{IV} < \text{I} < \text{II}$   
 C.  $\text{II} < \text{I} < \text{IV} < \text{III}$   
 D.  $\text{III} < \text{I} < \text{II} < \text{IV}$

Bloom's Level: 3. Apply

Difficulty: Medium

Gradable: automatic

Section: 02.03

Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa

Topic: Acids and Bases

23. Rank the following compounds in order of increasing acidity, putting the least acidic first.



**I**



**II**



**III**



**IV**

- A.  $\text{I} < \text{IV} < \text{III} < \text{II}$   
 B.  $\text{I} < \text{III} < \text{IV} < \text{II}$   
 C.  $\text{II} < \text{III} < \text{IV} < \text{I}$   
 D.  $\text{II} < \text{IV} < \text{III} < \text{I}$

Bloom's Level: 3. Apply

Difficulty: Medium

Gradable: automatic

Section: 02.03

Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa

Topic: Acids and Bases

24. Rank the following compounds in order of decreasing acidity, putting the most acidic first.



**I**



**II**



**III**



**IV**

- A.  $\text{IV} > \text{II} > \text{III} > \text{I}$   
 B.  $\text{III} > \text{II} > \text{IV} > \text{I}$   
 C.  $\text{I} > \text{II} > \text{IV} > \text{III}$   
 D.  $\text{III} > \text{IV} > \text{II} > \text{I}$

Bloom's Level: 3. Apply

Difficulty: Medium

Gradable: automatic

Section: 02.03

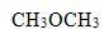
Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa

Topic: Acids and Bases

25. Rank the following compounds in order of decreasing acidity, putting the most acidic first.



**I**



**II**



**III**



**IV**

- A.  $\text{IV} > \text{II} > \text{III} > \text{I}$   
 B.  $\text{IV} > \text{III} > \text{II} > \text{I}$   
 C.  $\text{III} > \text{IV} > \text{II} > \text{I}$   
 D.  $\text{III} > \text{IV} > \text{I} > \text{II}$

Bloom's Level: 3. Apply

Difficulty: Medium

Gradable: automatic

Section: 02.03

Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa

Topic: Acids and Bases

26. Rank the following conjugate bases in order of increasing basicity, putting the least basic first.



- A. II < I < III  
 B. II < III < I  
 C. I < II < III  
 D. I < III < II

Bloom's Level: 3. Apply

Difficulty: Medium

Gradable: automatic

Section: 02.03

Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa Topic: Acids and Bases

27. Rank the following conjugate bases in order of decreasing basicity, putting the most basic first.



- A. II > I > III  
 B. I > II > III  
 C. III > I > II  
 D. III > II > I

Bloom's Level: 3. Apply

Difficulty: Medium

Gradable: automatic

Section: 02.03

Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa Topic: Acids and Bases

28. Which of the following is the strongest base?

- A.  $\text{CH}_3\text{COCH}_3$   
 B.  $\text{CH}_3\text{COOH}$   
 C.  $\text{NH}_3$   
 D.  $\text{H}_2\text{O}$

Accessibility: Keyboard Navigation

Bloom's Level: 3. Apply Difficulty:

Medium Gradable: automatic

Section: 02.03

Subtopic: Acid strength of functional groups

Subtopic: Factors affecting acid strength

Subtopic: pKa Topic: Acids and Bases

29. What is the direction of equilibrium when acetylene ( $\text{C}_2\text{H}_2$ ) reacts with  $\text{H}_2\text{N}^-$  in an acid-base reaction?



- A. Left  
 B. Right  
 C. Neither  
 D. Cannot be determined

Bloom's Level: 3. Apply

Difficulty: Easy

Gradable: automatic

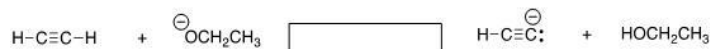
Section: 02.04

Subtopic: Factors affecting acid strength Subtopic:

Predicting acid/base reaction equilibrium Topic:

Acids and Bases

30. What is the direction of equilibrium when acetylene ( $\text{C}_2\text{H}_2$ ) reacts with ethoxide ( $\text{CH}_3\text{CH}_2\text{O}^-$ ) in an acid-base reaction?



- A. Left  
B. Right  
C. Neither  
D. Cannot be determined

Bloom's Level: 3. Apply

Difficulty: Easy

Gradable: automatic

Section: 02.04

Subtopic: Factors affecting acid strength

Predicting acid/base reaction equilibrium

Topic: Acids and Bases

31. Which of the following statements explains why  $\text{H}_2\text{O}$  is a stronger acid than  $\text{CH}_4$ ?

- A.  $\text{H}_2\text{O}$  can form hydrogen bonds while  $\text{CH}_4$  cannot.  
B.  $\text{H}_2\text{O}$  forms a less stable conjugate base,  $\text{HO}^-$ .  
C.  $\text{CH}_4$  forms a more stable conjugate base,  $\text{CH}_3^-$ .  
D.  $\text{H}_2\text{O}$  forms a more stable conjugate base,  $\text{HO}^-$ .

Accessibility: Keyboard Navigation

Bloom's Level: 3. Apply Difficulty:

Easy Gradable: automatic Section:

02.05

Subtopic: Factors affecting acid strength

Topic: Acids and Bases

32. Which of the following statements explain why  $\text{HBr}$  is a stronger acid than  $\text{HF}$ ?

- A.  $\text{Br}^-$  is more stable than  $\text{F}^-$  because  $\text{Br}^-$  is larger than  $\text{F}^-$ .  
B.  $\text{Br}^-$  is less stable than  $\text{F}^-$  because  $\text{Br}^-$  is larger than  $\text{F}^-$ .  
C.  $\text{Br}^-$  is more stable than  $\text{F}^-$  because  $\text{Br}^-$  is less electronegative than  $\text{F}^-$ .  
D.  $\text{Br}^-$  is less stable than  $\text{F}^-$  because  $\text{Br}^-$  is less electronegative than  $\text{F}^-$ .

Accessibility: Keyboard Navigation

Bloom's Level: 3. Apply Difficulty:

Easy Gradable: automatic Section:

02.05

Subtopic: Factors affecting acid strength

Topic: Acids and Bases

33. Which of the following compounds has the lowest  $\text{pK}_a$ ?

- A.  $\text{H}_2\text{O}$   
B.  $\text{H}_2\text{S}$   
C.  $\text{NH}_3$   
D.  $\text{CH}_4$

Accessibility: Keyboard Navigation

Bloom's Level: 3. Apply

Difficulty: Easy

Gradable: automatic

Section: 02.03

Subtopic:  $\text{pK}_a$

Topic: Acids and Bases

34. Which of the following concepts can be used to explain the difference in acidity between acetic acid ( $\text{CH}_3\text{COOH}$ ) and ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ )?

- A. Hybridization  
B. Electronegativity  
C. Resonance  
D. Size

Accessibility: Keyboard Navigation

Bloom's Level: 3. Apply Difficulty:

Easy Gradable: automatic Section:

02.05

Subtopic: Factors affecting acid strength

Topic: Acids and Bases

35. Which of the following concepts can be used to explain the difference in acidity between acetylene ( $\text{C}_2\text{H}_2$ ) and ethylene ( $\text{C}_2\text{H}_4$ )?

- A. Size  
B. Resonance  
C. Inductive effect  
D. Hybridization

Accessibility: Keyboard Navigation

Bloom's Level: 3. Apply Difficulty:

Easy Gradable: automatic Section:

02.05

Subtopic: Factors affecting acid strength

Topic: Acids and Bases

36. Which of the following concepts can be used to explain the difference in acidity between ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ ) and 2-fluoroethanol ( $\text{FCH}_2\text{CH}_2\text{OH}$ )?

- A. Size
- B. Inductive effect**
- C. Resonance
- D. Hybridization

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply Difficulty:  
Easy Gradable: automatic Section:  
02.05

Subtopic: Factors affecting acid strength  
Topic: Acids and Bases

37. Rank the following compounds in order of decreasing acidity, putting the most acidic first.



**I**



**II**



**III**

- A.  $\text{I} > \text{II} > \text{III}$
- B.  $\text{III} > \text{II} > \text{I}$**
- C.  $\text{II} > \text{III} > \text{I}$
- D.  $\text{III} > \text{I} > \text{II}$

Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section: 02.05  
Subtopic: Factors affecting acid strength  
Topic: Acids and Bases

38. Which of the following statements about Lewis acids is true?

- A. Lewis acids are proton donors.
- B. Lewis acids are proton acceptors.
- C. Lewis acids are electron pair donors.
- D. Lewis acids are electron pair acceptors.**

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy Gradable:  
automatic Section: 02.06

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

39. Which of the following statements about Lewis bases is true?

- A. Lewis bases are electron pair acceptors.
- B. Lewis bases are electron pair donors.**
- C. Lewis bases are proton donors.
- D. Lewis bases are proton acceptors.

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy Gradable:  
automatic Section: 02.06

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

40. Which of the following is a Lewis acid but not a Brønsted-Lowry acid?

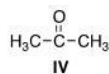
- A.  $\text{CH}_3\text{OH}$
- B.  $\text{H}_2\text{O}$
- C.  $\text{CH}_3\text{COOH}$
- D.  $\text{BF}_3$**

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply Difficulty:  
Easy Gradable: automatic Section:  
02.06

Subtopic: Acid/Base definitions  
Topic: Acids and Bases



41. Which of the following species can be both Lewis acid and Lewis base?



- A. I, III, IV  
 B. I, II, IV  
 C. II, III, IV  
 D. I, II, III

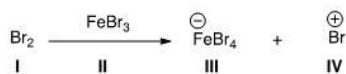
Bloom's Level: 3. Apply  
 Difficulty: Easy  
 Gradable: automatic  
 Section: 02.06  
 Subtopic: Acid/Base definitions  
 Topic: Acids and Bases

42. What is the correct classification of the following compound?  
 $\text{CH}_3\text{-O-CH}_3$

- A. Brønsted-Lowry acid and Lewis acid  
 B. Brønsted-Lowry base and Lewis base  
 C. Brønsted-Lowry base  
 D. Lewis base

Accessibility: Keyboard Navigation  
 Bloom's Level: 3. Apply  
 Difficulty: Easy  
 Gradable: automatic  
 Section: 02.06  
 Subtopic: Acid/Base definitions  
 Topic: Acids and Bases

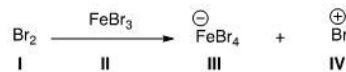
43. Identify the Lewis acid in the following reaction.



- A. I  
 B. II  
 C. III  
 D. IV

Bloom's Level: 3. Apply  
 Difficulty: Easy  
 Gradable: automatic  
 Section: 02.06  
 Subtopic: Acid/Base definitions  
 Topic: Acids and Bases

44. Identify the Lewis base in the following reaction.



- A. I  
 B. II  
 C. III  
 D. IV

Bloom's Level: 3. Apply  
 Difficulty: Easy  
 Gradable: automatic  
 Section: 02.06  
 Subtopic: Acid/Base definitions  
 Topic: Acids and Bases

45. Which of the following compounds is *not* a Lewis acid?

- A.  $\text{AlCl}_3$
- B.  $\text{HCl}$
- C.  $\text{H}_2\text{O}$
- D.  $\text{CBr}_4$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply Difficulty:  
Easy Gradable: automatic Section:  
02.06

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

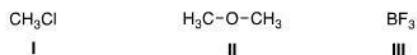
46. What is the role of methylchloride ( $\text{CH}_3\text{Cl}$ ) in the following reaction?



- A. Lewis acid
- B. Lewis base
- C. Brønsted-Lowry acid
- D. Brønsted-Lowry base

Bloom's Level: 3. Apply  
Difficulty: Easy  
Gradable: automatic  
Section: 02.06  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

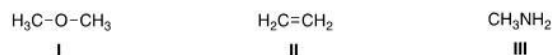
47. What is the electrophilic site in the following compounds?



- A. I = Carbon; II = carbon; III = boron.
- B. I = Chlorine; II = carbon; III = boron.
- C. I = Carbon; II = oxygen; III = boron.
- D. I = Carbon; II = carbon; III = fluorine.

Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section: 02.06  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

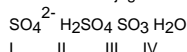
48. What is the nucleophilic site in the following compounds?



- A. I = Hydrogen; II =  $\pi$  electrons in bond; III = nitrogen.
- B. I = Oxygen; II = carbon; III = nitrogen.
- C. I = Hydrogen; II = carbon; III = carbon.
- D. I = Oxygen; II =  $\pi$  electrons in bond; III = nitrogen.

Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section: 02.06  
Subtopic: Acid/Base definitions  
Topic: Acids and Bases

49. What is the conjugate base of  $\text{HSO}_4^-$ ?

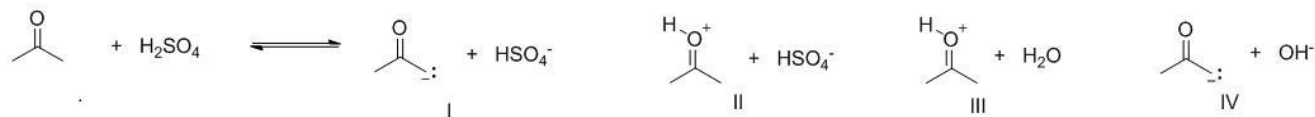


- A. I
- B. II
- C. III
- D. IV

Accessibility: Keyboard Navigation  
Bloom's Level: 4. Analyze  
Difficulty: Medium Gradable:  
automatic Section: 02.06

Subtopic: Acid/Base definitions  
Topic: Acids and Bases

50. What are the products of the following proton transfer reaction?



- A. I  
B. II  
C. III  
D. IV

*Bloom's Level: 4, Analyze*

**Difficulty: Medium**

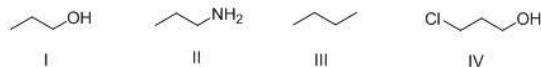
*Gradable: automatic*

Section: 02.04

**Subtopic: Predicting acid/base reaction equilibrium**

*Topic: Acids and Bases*

51. What is the correct rank of the following compounds in order of increasing acidity?



- A. I > II > III > IV  
B. IV > III > II > I  
**C. IV > I > II > III**  
D. III > I > IV > II

*Bloom's Level: 4. Analyze*

*Difficulty: Hard*

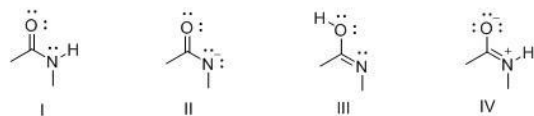
*Gradable: automatic*

Section: 02.05

*Subtopic: Factors affecting acid strength*

*Topic: Acids and Bases*

52. Consider the following structures I-IV. Which two species represent a conjugate acid-base pair?



- A. I and II  
B. I and III  
C. I and IV  
D. II and III

*Bloom's Level: 4. Analyze*

*Difficulty: Medium*

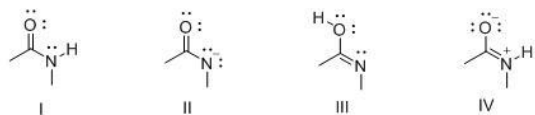
Gradable: automatic

Section: 02.02

*Subtopic: Acid/Base definitions*

Topic: Acids and Bases

53. Consider the following structures I-IV. Which two species represent resonance structures?



- A. I and II  
B. I and III  
**C. I and IV**  
D. II and IV

*Bloom's Level: 4. Analyze*

*Difficulty: Medium*

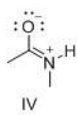
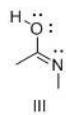
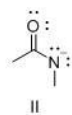
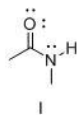
*Difficulty: Medium*  
*Gradable: automatic*

Section: 02 02

Section: 02.02  
Subtopic: Acid/Base definitions

**Tonic:** Acids and Bases

54. Consider the following structures I-IV. Which two species represent constitutional isomers?



- A. I and II
- B. I and III**
- C. I and IV
- D. II and IV

Bloom's Level: 4. Analyze  
 Difficulty: Medium  
 Gradable: automatic  
 Section: 02.02  
 Subtopic: Acid/Base definitions  
 Topic: Acids and Bases

