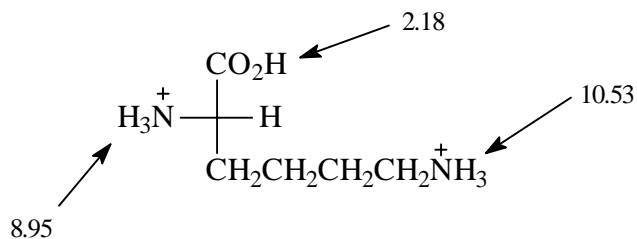
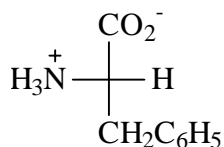


1. The pK_a 's of the acidic hydrogens of lysine are shown below. What is the isoelectric point of lysine?



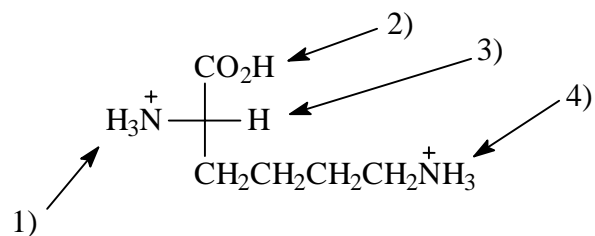
- A) 2.18
 B) 5.56
 C) 6.36
 D) 9.74

2. The Fischer projection shown below denotes a _____ amino acid which has the _____ configuration.



- A) D, S
 B) D, R
 C) L, S
 D) L, R

3. In strongly acidic solution L-lysine is primarily a dication as shown below. As the pH is raised, which proton is lost to form the monocation?

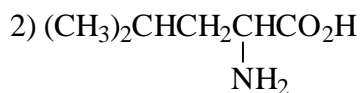
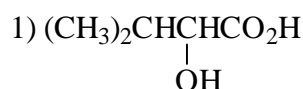
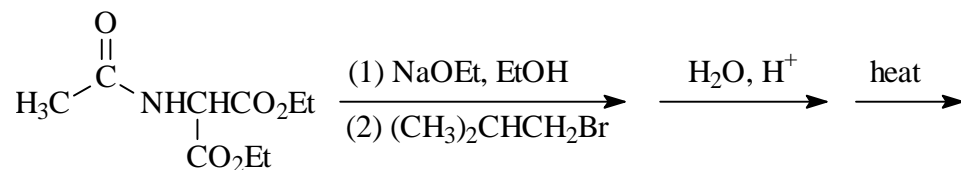


- A) is 1
 B) is 2
 C) is 3
 D) is 4

4. What is the total number of different tripeptides which can result from three different L-amino acids?
- A) three
 B) four
 C) six
 D) nine

5. A pentapeptide was found to contain the amino acids ala, gly, met, phe, and ser. Partial hydrolysis of the pentapeptide gave the dipeptides gly-ser, met-phe, ala-gly, and ser-met. What is the sequence of the pentapeptide?
- A) gly-ser-met-phe-ala
 B) gly-ser-met-ala-phe
 C) ala-gly-ser-phe-met
 D) ala-gly-ser-met-phe

6. Which one of the following is the final product of the reaction sequence shown below?

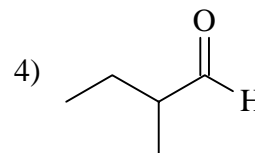
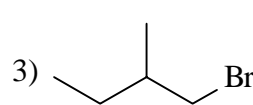
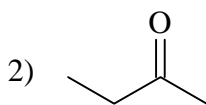
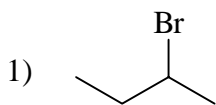
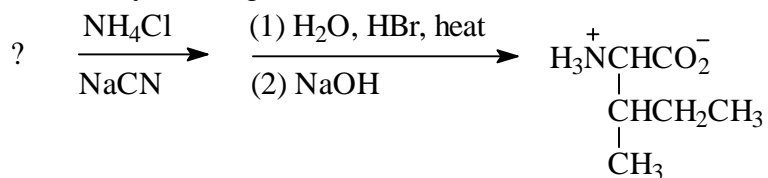


- A) is 1
 B) is 2
 C) is 3
 D) is 4

7. The peptide linkage in proteins and peptides is planar and has restricted rotation about the carbon-nitrogen bond because:
- A) the peptide bond has partial double bond character.
 B) hydrogen bonding requires a planar arrangement and restricts bond rotation.
 C) the steric hindrance of the large side chains.
 D) the carbonyl is predominately in the enol form.

8. Two cysteine side chains of a polypeptide are often connected to each other by a(an):
- ionic bond
 - hydrogen bond
 - disulfide bond
 - peptide bond

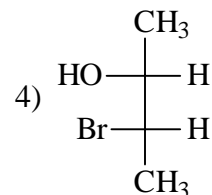
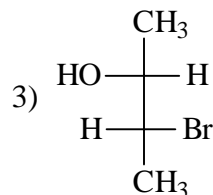
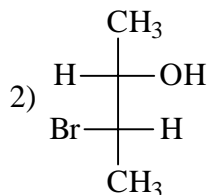
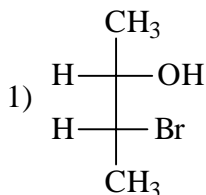
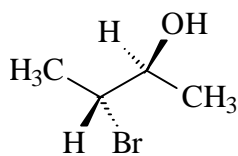
9. Identify the missing starting reagent needed in the Strecker synthesis of isoleucine.
(Assume you will get all the stereoisomers of isoleucine.)



- is 1
- is 2
- is 3
- is 4

10. Which one of the following reagents is used for the visual detection of amino acids?
- Sanger's reagent
 - dicyclohexylcarbodiimide (DCCI)
 - ninhydrin
 - phenyl isothiocyanate

11. Which of the following Fischer projections corresponds to the compound shown below?



- A) is 1
- B) is 2
- C) is 3
- D) is 4

12. A disaccharide is determined to be a nonreducing sugar. Acid-catalyzed hydrolysis of the disaccharide gives only D-glucose. What information does this tell you about how the two glucose units are linked in the disaccharide?

- A) Each of the two glucose units are linked C-1 to C-1.
- B) One of the glucose units uses C-1 and it links to the other unit which uses either C-2, C-3, C-4, or C-6.
- C) Each of the two glucose units are linked via any carbons except for C-1.
- D) The two units must both have β linkages.

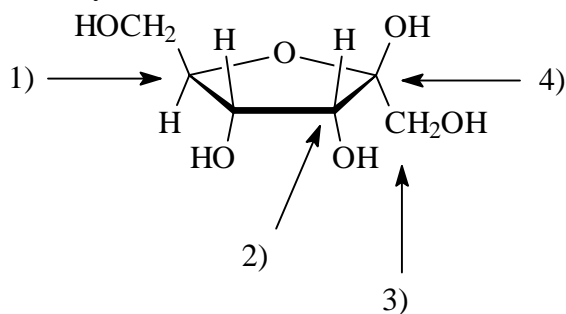
13. How many stereoisomeric aldohexoses are there?

- A) four
- B) eight
- C) sixteen
- D) eighteen

14. Which one of the following is not true concerning sucrose?

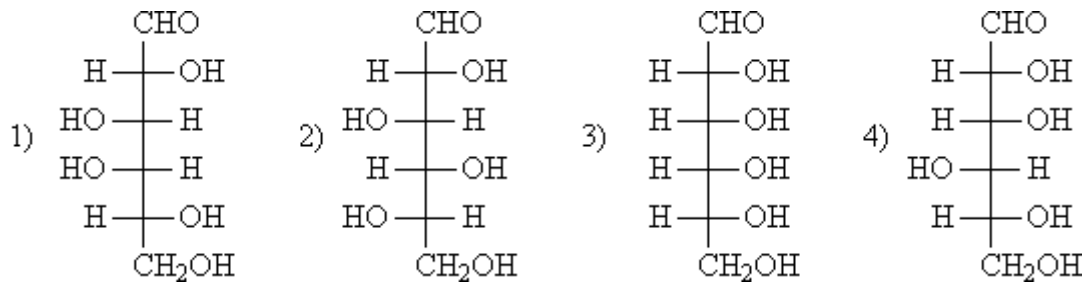
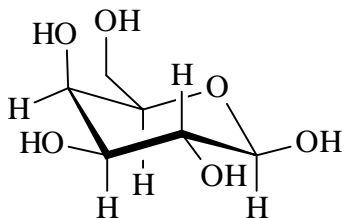
- A) Sucrose is a disaccharide.
- B) Sucrose is a reducing sugar.
- C) Acid-catalyzed hydrolysis of sucrose gives D-glucose and D-fructose.
- D) Sucrose does not undergo mutarotation.

15. Identify the anomeric carbon in the following carbohydrate.



- A) is 1
- B) is 2
- C) is 3
- D) is 4

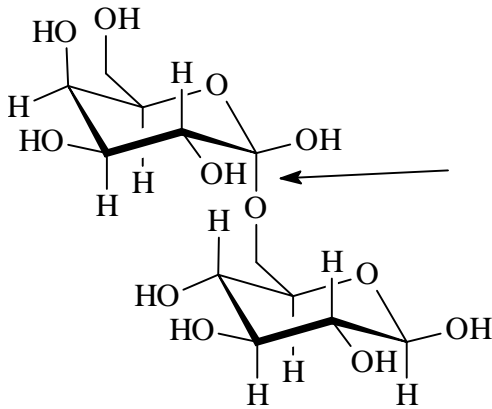
16. Which of the following is the open-chain form of the pyranose structure shown below?



- A) is 1
- B) is 2
- C) is 3
- D) is 4

17. The principal difference between amylose (from starch) and cellulose is:
- A) amylose has exclusively $\alpha(1,4)$ -linked glucose and cellulose has exclusively $\beta(1,4)$ -linked glucose.
 - B) amylose has exclusively $\alpha(1,6)$ -linked glucose and cellulose has exclusively $\beta(1,4)$ -linked glucose.
 - C) amylose has $\alpha(1,4)$ -linked glucose with $\alpha(1,6)$ branches and cellulose has exclusively $\beta(1,4)$ -linked glucose.
 - D) amylose has exclusively $\alpha(1,4)$ -linked glucose and cellulose has $\beta(1,4)$ -linked glucose with $\alpha(1,6)$ branches.

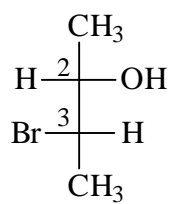
18. How would the glycosidic linkage indicated by the arrow be described for the following disaccharide?



- A) $\alpha(1,5)$
- B) $\alpha(1,6)$
- C) $\alpha(2,6)$
- D) $\beta(1,6)$

19. Which one of the following is not true concerning D-glucose.
- A) D-Glucose is a reducing sugar.
 - B) D-Glucose readily forms cyclic hemiacetals.
 - C) D-Glucose is optically active.
 - D) D-Glucose is a ketose.

20. What are the configurations of carbons 2 and 3 in the Fischer projection below.



- A) 2R, 3R
- B) 2R, 3S
- C) 2S, 3R
- D) 2S, 3S

Answer Key

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