

CHAPTER 2 SELF-QUIZ

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1. False: Polymers such as nylon are formed from monomer subunits that may be identical or may be different.
2. True
3. True
4. False: Amino acids contain a carbon atom attached to a carboxyl group and an amino group.
5. False: Starch and cellulose are polysaccharides of the monosaccharide glucose; sucrose is a disaccharide of glucose and fructose.
6. (d)
7. (d)
8. (b)
9. (e)
10. (c)
11. (d)
12. (b)
13. (b)
14. (a)
15. (c)

CHAPTER 2 REVIEW

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Understanding Concepts

1. $\text{CH}_2=\text{CH}_2\text{CN}$
2.

$$\begin{array}{c} \text{O} \qquad \qquad \text{O} \\ \parallel \qquad \qquad \parallel \\ [-\text{OCHC}-\text{OCHC}-] \\ | \qquad \qquad | \\ \text{CH}_3 \qquad \text{CH}_3 \end{array}$$
3. (a) Crosslinking restores the polymer strands to their original position, after any stretching or other deformation; this makes the polymer elastic.
(b) For crosslinking to occur, a monomer must be able to form bonds other than the bonds forming the polymer chain itself; that is, it must have an additional functional group (e.g., double bond, hydroxyl group, carboxyl group), other than the two involved in the polymer linkages, to link with another polymer chain.
4. (a) There will be hydrogen bonding between the hydroxyl group and the carbonyl group, both intrachain and interchain. The molecule may have a helical structure.
(b) There will be little bonding interaction within the same chain, although the molecules can form crosslinkages between chains from addition reactions of the double bond. The polymer may have a strong elastic structure.
(c) There will be hydrogen bonding between the amino group and the carbonyl group, both intrachain and interchain. The molecule may have a helical structure.
5. (Model-building exercise)
6. (a) (Model-building exercise)
(b) This compound will be a condensation polymer. The carboxyl groups can react in condensation reactions with a monomer with two hydroxyl groups or two amino groups. There are no double bonds to form an addition polymer.