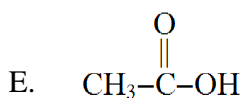
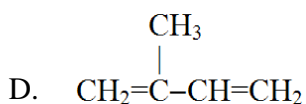
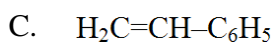
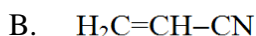


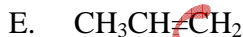
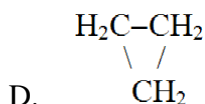
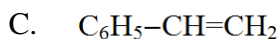
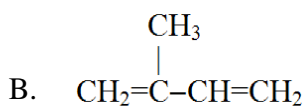
Chapter 25 Synthetic and Natural Organic Polymers

Student: _____

1. Which one of these molecules could *not* serve as a monomer for an addition polymer?



2. Polystyrene results from the polymerization of



3. The segment $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2-$ represents the polymer named

A. polybutylene.

B. polyhexene.

C. polypropylene.

D. polystyrene.

E. polyethylene.

4. The segment
$$\begin{array}{ccccccc} & & -\text{CH}_2\text{CH} & \text{CH}_2\text{CH} & \text{CH}_2\text{CH}- & & \\ & & | & | & | & & \\ & & \text{CH}_3 & \text{CH}_3 & \text{CH}_3 & & \end{array}$$
 represents the polymer named

- A. polybutylene.
- B. polyvinyl chloride.
- C. polypropylene.
- D. polystyrene.
- E. polyethylene.

5. The segment
$$\begin{array}{ccccccc} & & -\text{CH}_2\text{CH} & \text{CH}_2\text{CH} & \text{CH}_2\text{CH}- & & \\ & & | & | & | & & \\ & & \text{Cl} & \text{Cl} & \text{Cl} & & \end{array}$$
 represents the polymer named

- A. polybutylene.
- B. polyvinyl chloride.
- C. polypropylene.
- D. polystyrene.
- E. polyethylene.

6. A protein is

- A. a polysaccharide.
- B. a saturated ester of glycerol.
- C. one of the units making up a nucleic acid.
- D. a polymer of amino acids.
- E. an aromatic hydrocarbon.

7. Polyacrylonitrile, characterized by the
$$\begin{array}{c} -\text{CH}_2\text{CH}- \\ | \\ \text{CN} \end{array}$$
 repeating unit, is made from which of these monomers?

- A. $\text{CH}_3\text{CH}_2\text{CN}$
- B. $\text{HOCH}_2\text{CH}_2\text{CH}_3$
- C. $\text{CH}_3\text{CH}=\text{CHCN}$
- D. $\text{CH}_2=\text{CHCN}$
- E. $\text{CH}_2=\text{CNCH}_3$

8. A polymer made in a polymerization reaction that produces small molecules (such as water) as well as the polymer is classified as a/an _____ polymer.

- A. addition
- B. natural
- C. condensation
- D. elimination
- E. copolymer

9. The monomer used to prepare polyvinyl chloride (PVC) is

- A. $\text{CH}_2=\text{CH}_2$
- B. $\text{CH}_3\text{CH}_2\text{Cl}$
- C. $\text{CH}_2=\text{CCl}_2$
- D. $\text{CH}_2=\text{CHCl}$
- E. $\text{CF}_2=\text{CF}_2$

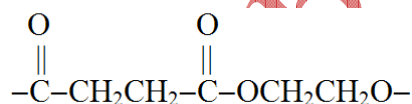
10. The polymer formed from the monomer $\text{CH}_2=\text{CH}-\text{CN}$ is

- A. $\begin{array}{c} (-\text{CH}_2\text{CH}-)_n \\ | \\ \text{CN} \end{array}$
- B. $(-\text{CH}_2=\text{CHCN}-)_n$
- C. $(-\text{CH}_2=\text{CH}=\text{CN}-)_n$
- D. $\begin{array}{c} (-\text{CH}_2=\text{CH}-)_n \\ | \\ \text{CN} \end{array}$

11. Which one of these materials is a *copolymer*?

- A. Styrene-butadiene
- B. polyvinyl chloride
- C. polypropylene
- D. poly-*cis*-isoprene
- E. polyethylene

12. What type of polymer is represented by the following repeating segment?

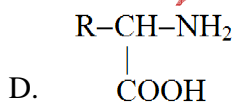
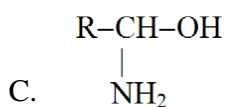
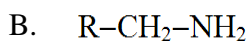
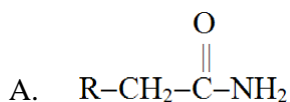


- A. polyamide
- B. polyester
- C. polyether
- D. polyolefin
- E. polyethylene

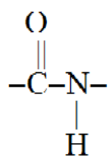
13. An *amino acid* is a compound that contains at least

- A. one amino group and one amide group.
- B. two amino groups and one carboxylic acid group.
- C. one hydroxyl group and one methyl group.
- D. one carboxylic acid group and one amino group.
- E. one methyl group and one amide group.

14. A *peptide bond* (also called an *amide bond*) joins two amino acids together. What atoms are linked by this bond?
- A. C — O
 - B. C — H
 - C. C — N
 - D. N — S
 - E. S — C
15. Which one of these elements is *not* found in proteins?
- A. S
 - B. P
 - C. C
 - D. O
 - E. N
16. An *essential* amino acid is one that
- A. must be included in the diet.
 - B. contains no sulfur.
 - C. occurs in all types of proteins.
 - D. is necessary for vitamin production.
 - E. the body can synthesize.
17. Which one of these choices is the general structural formula of an amino acid?



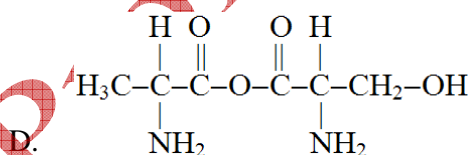
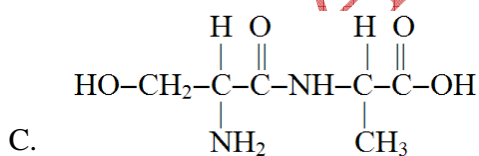
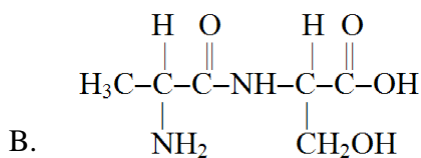
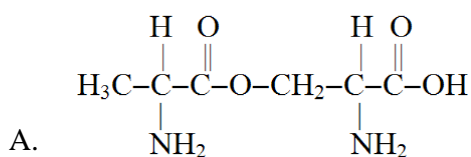
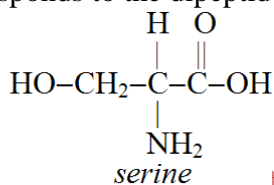
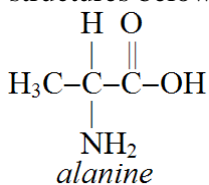
18. The functional group



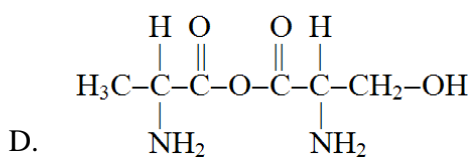
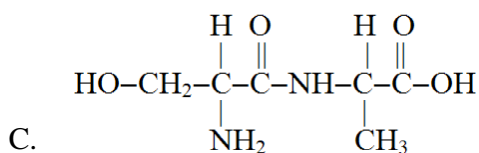
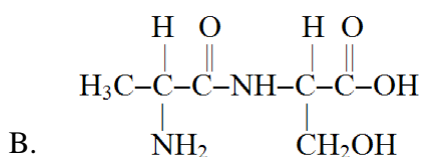
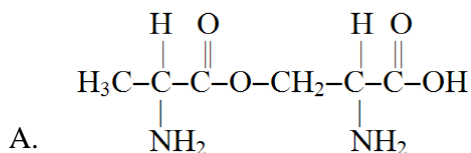
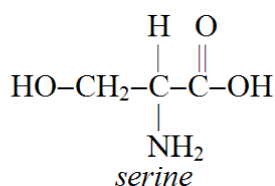
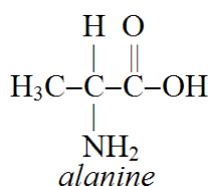
found in proteins is called a (an)

- A. amide.
- B. carboxylic acid.
- C. amine.
- D. amino acid.
- E. dipeptide.

19. Which of the structures below corresponds to the dipeptide alanylserine? Note the following structures:



20. Which of the structures below corresponds to the dipeptide serylalanine? Note the following structures:



21. Which of these choices is *not* an intermolecular force that affects the structure of a protein?

- A. hydrogen bond
- B. dispersion force
- C. adhesive force
- D. ionic force
- E. dipole-dipole force

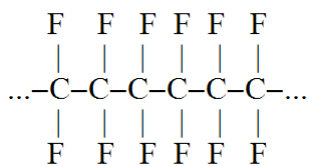
22. The *secondary structure* of a protein is the

- A. configuration of those parts of the chain stabilized by a regular pattern of covalent bonds between C and O groups of the backbone of the chain.
- B. configuration of those parts of the chain stabilized by a regular pattern of hydrogen bonds between CO and NH groups of the backbone of the chain.
- C. specific order of amino acids in the chain.
- D. overall three-dimensional structure of the molecule.
- E. overall arrangement of several polypeptide chains into one functional unit.

23. A protein that has been *reversibly denatured* has
- A. temporarily lost part or all of its secondary or tertiary structure.
 - B. temporarily lost part or all of its primary structure.
 - C. been genetically modified due to errors in the nucleotides in the parent DNA.
 - D. temporarily lost its amino acid residues.
 - E. temporarily lost the hydrogen bonding between nitrogenous bases.
24. Which of these molecules is a product of the hydrolysis of DNA?
- A. acetic acid
 - B. glucose
 - C. adenine
 - D. ribose
 - E. water
25. Phosphorus is an essential mineral element. It is an important atom in which one of the following?
- A. amino acids
 - B. proteins
 - C. polyethylene
 - D. nylon
 - E. DNA
26. The backbone of a strand of nucleic acid consists of
- A. phosphate units only.
 - B. phosphate and sugar units.
 - C. polyester.
 - D. phosphate, sugar, and nitrogen base units.
 - E. sugar units only.
27. Which choice contains all three molecular units found in nucleotides?
- A. phosphate, sugar, amino acid
 - B. amino acid, nitrogen-containing base, sugar
 - C. carboxylic acid, sugar, protein
 - D. phosphate, nitrogen-containing base, sugar
 - E. sugar, amino acid, protein
28. Which choice lists both the sugar and the nitrogen base that are a part of RNA but are not a part of DNA?
- A. deoxyribose and thymine
 - B. ribose and deoxyribose
 - C. ribose and uracil
 - D. uracil and thymine
 - E. ribose and thymine

29. Which one of these molecules is part of the make-up of *both* DNA and RNA?
- A. deoxyribose
 - B. ribose
 - C. phosphate
 - D. thymine
 - E. uracil
30. Which nitrogen base is found in RNA but not in DNA?
- A. adenine
 - B. cytosine
 - C. guanine
 - D. thymine
 - E. uracil
31. Cysteine and methionine are unique among the twenty amino acids essential to living organisms in that they
- A. are chiral.
 - B. contain an aromatic ring.
 - C. do not form dipolar ions.
 - D. contain sulfur.
 - E. cannot join with other amino acids to form peptides.
32. The β -pleated sheet configuration of proteins
- A. is relatively inelastic.
 - B. never occurs in nature.
 - C. is structurally weak.
 - D. contains no peptide bonds.
 - E. does not involve hydrogen bonds to other proteins.
33. Oxalic acid, HOOC-COOH , is the simplest acid that has two carboxylic acid groups. Write an equation and show the structure of a polyester that might be made from oxalic acid and ethylene glycol, $\text{HO-CH}_2\text{-CH}_2\text{-OH}$

34. Draw the structural formula of the monomer that would be used to prepare the following polymer (Teflon):



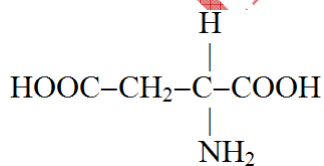
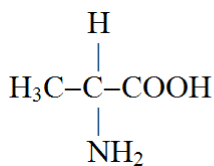
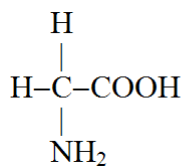
35. The monomer used to prepare polyvinyl chloride (PVC) is $\text{CHCl}=\text{CHCl}$.

True False

36. The primary structure of a protein refers to the unique amino acid sequence of the polypeptide chain.

True False

37. The following amino acids all have *nonpolar* side chains.



True False

38. Both DNA and RNA have double-helical structures.

True False

39. Hemoglobin, with its attached heme group, is an example of a *conjugated* protein.

True False

Chapter 25 Synthetic and Natural Organic Polymers **Key**

- 1.E
2.C
3.E
4.C
5.B
6.D
7.D
8.C
9.D
10.A
11.A
12.B
13.D
14.C
15.B
16.A
17.D
18.A
19.B
20.C
21.C
22.B
23.A
24.C
25.E
26.B
27.D

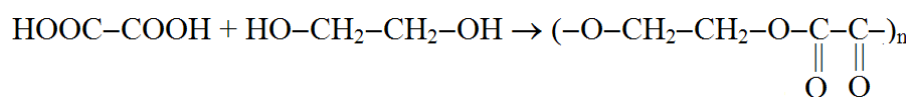
28.C

29.C

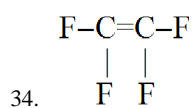
30.E

31.D

32.A



33.



34.

35.FALSE

36.TRUE

37.FALSE

38.FALSE

39.TRUE

Prof. Abdullah M. Asiri