

# Chapter 2 Test

2-1

## Objective Questions

b  
Understanding

1. Which of the following statements is *not* true about the atom  $^{12}_6\text{C}$ ?
- It has 6 protons in its nucleus.
  - It has 12 neutrons in its nucleus.
  - It has 6 electrons orbiting the nucleus.
  - Its atomic number is 6.
  - Its atomic weight is 12.

b  
Analysis

2. Calculate the molecular weight of ethyl alcohol,  $\text{C}_2\text{H}_5\text{OH}$ , using the information in the box at the right.
- 96
  - 46
  - 34
  - 33
  - Can't tell

$^{16}_8\text{O}$
$^{12}_6\text{C}$
$^1_1\text{H}$

c  
Recall

3. Which of the following is *not* true about enzymes?
- Enzymes are made of proteins.
  - Enzymes lower the activation energy of a reaction.
  - Enzymes increase the number of collisions in a chemical reaction.
  - Enzymes are not used up in a reaction.
  - None of the above.

b  
Recall

4. Which of the following is *not* true?
- Salts readily dissolve in water.
  - Water molecules are formed by hydrolysis.
  - Water freezes from the top down.
  - Water is a part of a dehydration reaction.
  - Water is a polar molecule.

Analysis

- Match the following choices to questions 5 through 7.
- Ionic bond
  - Covalent bond
  - Hydrogen bond

a

5. The type of bond holding  $\text{K}^+$  and  $\text{I}^-$  ions in KI.

c

6. The type of bond between molecules of water in a beaker of water.

b

7. The type of bonds holding hydrogen and oxygen atoms in the molecule  $\text{H}_2\text{O}$ .

## Analysis

Use the following choices to identify the reactions shown in questions 8 through 11. Choices may be used once, more than once, or not at all.

- Synthesis reaction
- Hydrolysis reaction
- Exchange reaction
- Reversible reaction
- Dehydration reaction

- e 8. Glucose + fructose  $\longrightarrow$  sucrose + water
- b 9. Lactose +  $\text{H}_2\text{O}$   $\longrightarrow$  glucose + galactose
- c 10.  $\text{HCl} + \text{NaHCO}_3 \longrightarrow \text{NaCl} + \text{H}_2\text{CO}_3$
- d 11.  $\text{NH}_4\text{OH} \rightleftharpoons \text{NH}_3 + \text{H}_2\text{O}$

## Recall

Use the following choices to identify the types of molecules described in questions 12 through 15. Choices may be used once, more than once, or not at all.

- Carbohydrates
- Lipids
- Nucleic acids
- Proteins
- None of the above

- b 12. Contains the alcohol glycerol.
- a 13. Composed of  $(\text{CH}_2\text{O})$  units.
- d 14. Contains  $-\text{NH}_2$  groups.
- a 15. Never contains a phosphate group.
- b 16. Which of the following statements is *not* true about the atom  $^{16}_8\text{O}$ ?
- It has 8 protons in its nucleus.
  - It has 8 electrons in its nucleus.
  - It has 8 neutrons in its nucleus.
  - Its atomic number is 8.
  - Its atomic weight is 16.

## Understanding

b  
Analysis

17. Calculate the number of moles in 92 grams of ethyl alcohol,  $\text{C}_2\text{H}_5\text{OH}$ , using the information in the box at the right.

- 1
- 2
- 3
- 4
- Can't tell

$^{16}_8\text{O}$
$^{12}_6\text{C}$
$^1_1\text{H}$

- b  
Recall
18. Which of the following statements is *not* true?
- Enzymes are made of proteins.
  - Enzymes are used up in a chemical reaction.
  - Enzymes lower the activation energy required for a reaction.
  - Enzymes increase the probability of a reaction.
  - None of the above.
- d  
Analysis
19. Which of the following pairs is mismatched?
- $\text{NaOH} \rightleftharpoons \text{Na}^+ + \text{OH}^-$  — base
  - $\text{HF} \rightleftharpoons \text{H}^+ + \text{F}^-$  — acid
  - $\text{MgSO}_4 \rightleftharpoons \text{Mg}^{2+} + \text{SO}_4^{2-}$  — salt
  - $\text{KH}_2\text{PO}_4 \rightleftharpoons \text{K}^+ + \text{H}_2\text{PO}_4^-$  — acid
  - $\text{H}_2\text{SO}_4 \rightleftharpoons 2\text{H}^+ + \text{SO}_4^{2-}$  — acid
- a  
Understanding
20. Which of the following is *not* true about the reactions listed in question 19?
- They are exchange reactions.
  - They are ionization reactions.
  - They occur when the reactants are dissolved in water.
  - They are dissociation reactions.
  - They are reversible reactions.
- Recall
- Match the following choices to questions 21 through 23.
- Ionic bond
  - Covalent bond
  - Hydrogen bond
- c
21. The type of bond between the hydrogen of one molecule and the nitrogen of another molecule.
- b
22. The type of bonds between carbon, hydrogen, and oxygen atoms in organic molecules.
- a
23. The type of bond between ions in a salt.
- Analysis
- Use the following choices to identify the reactions shown in questions 24 through 26. Choices may be used once, more than once, or not at all.
- Synthesis reaction
  - Hydrolysis reaction
  - Exchange reaction
  - Reversible reaction
  - Dehydration reaction
- a
24.  $\text{H}_2\text{O} + \text{CO}_2 \longrightarrow \text{H}_2\text{CO}_3$
- e
25. Glycine + lysine  $\longrightarrow$  dipeptide +  $\text{H}_2\text{O}$
- b
26. Sucrose +  $\text{H}_2\text{O} \longrightarrow$  glucose + fructose

## Recall

Use the following choices to identify the molecules described in questions 27 through 30. Choices may be used once, more than once, or not at all.

- Carbohydrates
- Lipids
- Proteins
- Nucleic acids
- None of the above

d

27. Structurally, ATP is most like this type of molecule.

d

28. Chemicals in genes.

c

29. Composed of a chain of amino acids.

b

30. Primary molecules making up plasma membranes in cells.

c

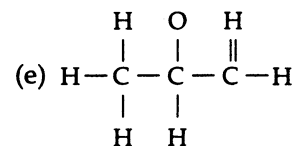
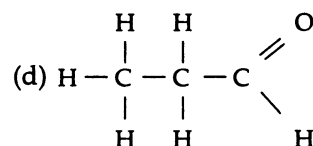
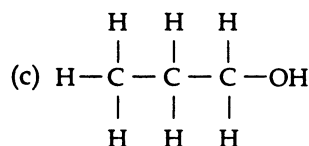
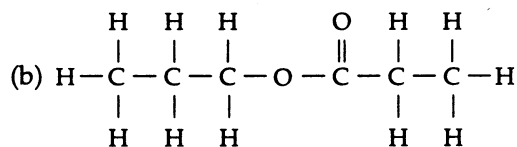
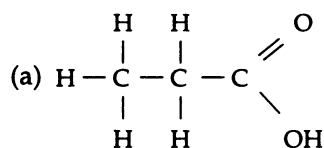
31. Oil-degrading bacteria are naturally present in the environment but cannot degrade an oil spill fast enough to avoid ecological damage. The actions of these bacteria can be speeded up by

## Recall

- Providing oil for them.
- Providing sugar as a carbon source.
- Providing nitrogen and phosphorus.
- Adding water.
- All of the above.

## Analysis

Use the following choices to answer questions 32 through 34. Choices may be used once, more than once, or not at all.



c

32. An alcohol

b

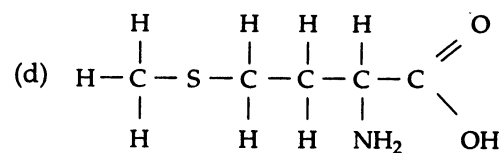
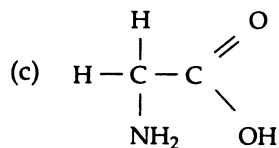
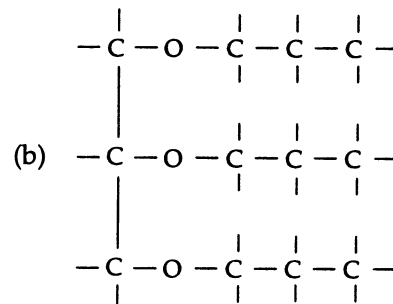
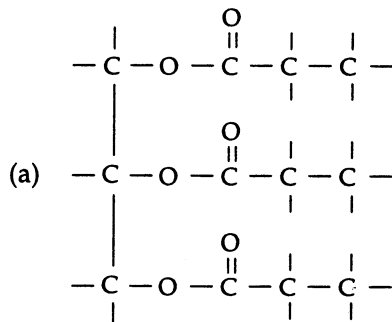
33. An ester

a

34. An organic acid

a  
Analysis

35. Archaea differ from eubacteria in the composition of the cell membrane lipids. Archaea have ether-bonded lipids shown in 1 below and eubacteria have ester-bonded lipids shown in 2 below.



- a. 1-b; 2-a  
 b. 1-b; 2-c  
 c. 1-a; 2-c  
 d. 1-c; 2-d  
 e. None of the above

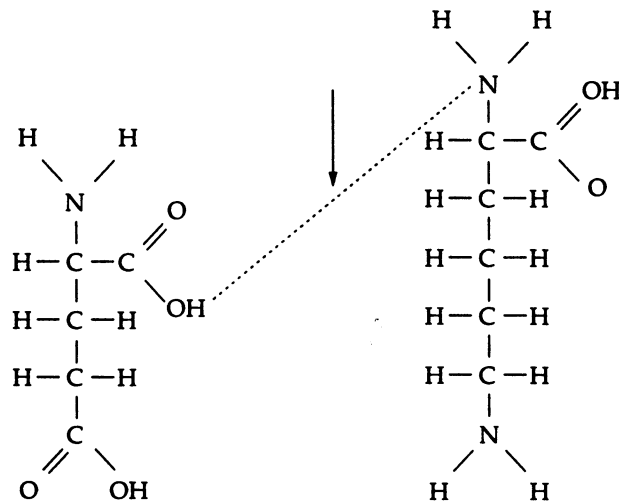
Analysis

Use the following choices to answer questions 36 and 37. Choices may be used once, more than once, or not at all.

- a. Ionic bond  
 b. Hydrogen bond  
 c. Peptide bond  
 d. Double covalent bond  
 e. None of the above

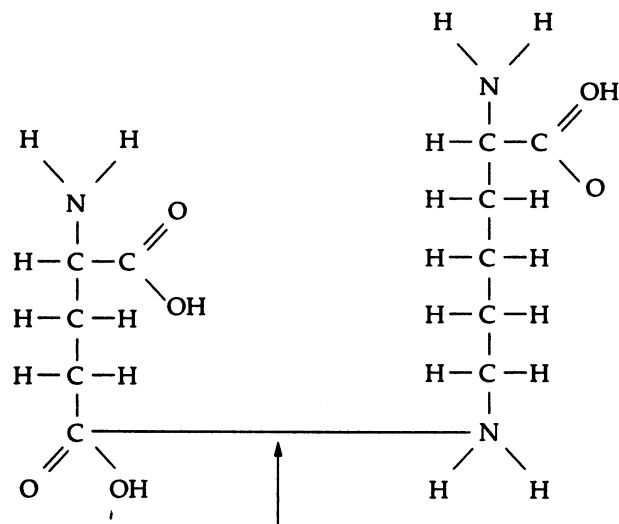
b

36. Which kind of bond is this:



c

37. Which kind of bond is this:



d  
Understanding

38. An *E. coli* culture that has been growing at 37°C is moved to 25°C. Which of the following changes must be made in its plasma membrane?
- Increase the number of phosphate groups.
  - Increase the viscosity.
  - Increase the number of saturated chains.
  - Increase the number of unsaturated chains.
  - No changes are necessary.

e  
Understanding

39. Assume *Saccharomyces cerevisiae* is grown in a nutrient medium containing the radioisotope  $^{35}\text{S}$ . After 48 hr incubation, the  $^{35}\text{S}$  would most likely be found in the *S. cerevisiae*'s
- Carbohydrates.
  - Nucleic acids.
  - Water.
  - Lipids.
  - Proteins.

a  
Understanding

40. Assume *Saccharomyces cerevisiae* is grown in a nutrient medium containing the radioisotope  $^{32}\text{P}$ . After 48 hr incubation, the  $^{32}\text{P}$  would most likely be found in the *S. cerevisiae*'s
- Plasma membrane.
  - Cell wall.
  - Water.
  - Proteins.
  - None of the above.

b  
Recall

41. Starch, dextran, glycogen, and cellulose are polymers of
- Amino acids.
  - Glucose.
  - Fatty acids.
  - Nucleic acids.
  - None of the above.

c  
Analysis

42. Which of the following is a base?
- $\text{C}_2\text{H}_5\text{COOH} \longrightarrow \text{H}^+ + \text{C}_2\text{H}_5\text{COO}^-$
  - $\text{C}_2\text{H}_5\text{OH}$
  - $\text{NaOH} \longrightarrow \text{Na}^+ + \text{OH}^-$
  - $\text{H}_2\text{O} \longrightarrow \text{H}^+ + \text{OH}^-$
  - All of the above

d  
Analysis

43. Two glucose molecules are combined to make a maltose molecule. The chemical formula for maltose is
- $\text{C}_3\text{H}_6\text{O}_3$
  - $\text{C}_6\text{H}_{12}\text{O}_6$
  - $\text{C}_{12}\text{H}_{24}\text{O}_{12}$
  - $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
  - $\text{C}_{12}\text{H}_{23}\text{O}_{10}$

d  
Understanding

44. *Desulfovibrio* bacteria can perform the following reaction:  
 $\text{S}^{6-} \rightarrow \text{S}^{2-}$   
These bacteria are
- Synthesizing sulfur.
  - Reducing sulfur.
  - Hydrolyzing sulfur.
  - Oxidizing sulfur.

c  
Analysis

45. The antimicrobial drug imidazole inhibits sterol synthesis. This would most likely interfere with
- Bacterial cell walls.
  - Fungal cell walls.
  - Eucaryotic plasma membranes.
  - Procaryotic plasma membranes.
  - Genes.