

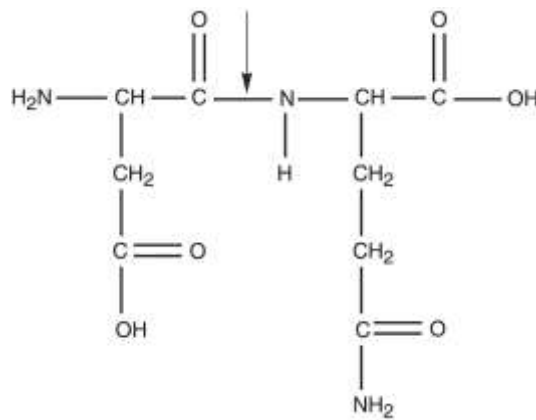
Exam

Name _____

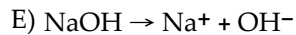
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Identify the following reaction: $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3$ 1) _____
- A) Exchange reaction
 - B) Dehydration synthesis reaction
 - C) Hydrolysis reaction
 - D) Covalent reaction
 - E) Reversible reaction
- 2) What do genes consist of? 2) _____
- A) Nucleic acids
 - B) Proteins
 - C) Carbohydrates
 - D) Lipids

Figure 2.4



- 3) What kind of bond is at the arrow in Figure 2.4? 3) _____
- A) Double covalent bond
 - B) Disulfide bridge
 - C) Ionic bond
 - D) Hydrogen bond
 - E) Peptide bond
- 4) What is the type of bond between the hydrogen of one molecule and the nitrogen of another molecule? 4) _____
- A) Disulfide bond
 - B) Covalent bond
 - C) Ionic bond
 - D) Hydrogen bond
 - E) Hydrophobic bond
- 5) Which of the following is the type of bond between molecules of water in a beaker of water? 5) _____
- A) Hydrogen bond
 - B) Ionic bond
 - C) Covalent bond
- 6) Which of the following is a base? 6) _____
- A) $\text{C}_2\text{H}_5\text{OCOOH} \rightarrow \text{H}^+ + \text{C}_2\text{H}_5\text{OCO}^-$
 - B) $\text{C}_2\text{H}_5\text{OH}$
 - C) $\text{H}_2\text{O} \rightarrow \text{H}^+ + \text{OH}^-$
 - D) H_2CO



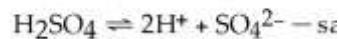
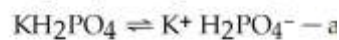
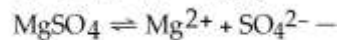
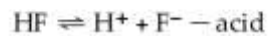
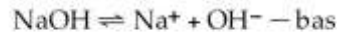
7) Which are the primary molecules making up plasma membranes in cells?

- A) Nucleic acids B) Carbohydrates C) Proteins D) Lipids

7) _____

Table 2.2

Refer to these reactions to answer the question below.



8) Which of the following statements about the reactions in Table 2.2 is false?

- A) They are dissociation reactions.
B) They occur when the reactants are dissolved in water.
C) They are exchange reactions.
D) They are reversible reactions.
E) They are ionization reactions.

8) _____

9) The antimicrobial drug imidazole inhibits sterol synthesis. This would most likely interfere with

- A) Genes.
B) Prokaryotic plasma membranes.
C) Fungal cell walls.
D) Eukaryotic plasma membranes.
E) Bacterial cell walls.

9) _____

10) Assume *Saccharomyces cerevisiae* is grown in a nutrient medium containing the radioisotope ^{35}S . After a 48-hour incubation, the ^{35}S would most likely be found in the *S. cerevisiae*'s

- A) Lipids.
B) Carbohydrates.
C) Nucleic acids.
D) Water.
E) Proteins.

10) _____

11) Which type of molecule contains $-\text{NH}_2$ groups?

- A) Protein B) Carbohydrate C) Nucleic acid D) Lipid

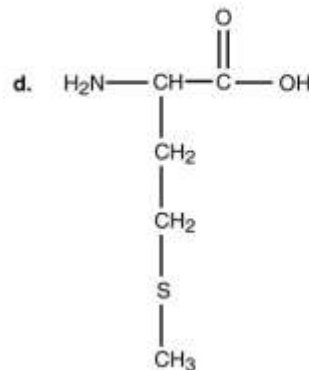
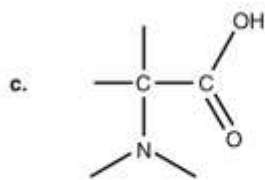
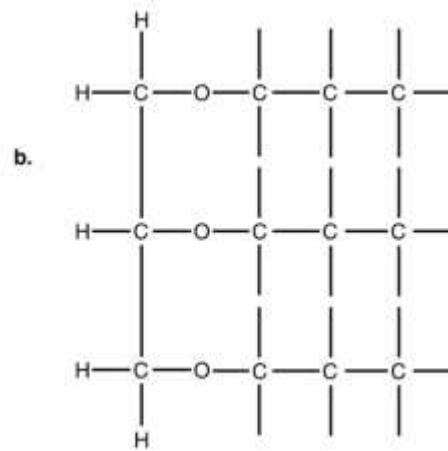
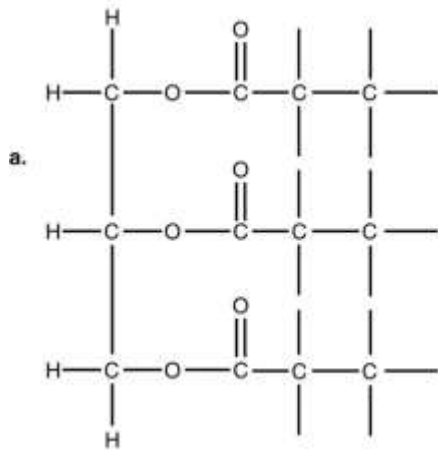
11) _____

12) Which of the following is the type of bond holding K^+ and I^- ions in KI?

- A) Covalent bond B) Ionic bond C) Hydrogen bond

12) _____

Figure 2.2



13) Use Figure 2.2 to answer the following question. Archaea differ from bacteria in the composition of the cell membrane lipids. Archaea have ether-bonded lipids, shown in part _____ of Figure 2.2, and bacteria have ester-bonded lipids, shown in part _____ of Figure 2.2.

A) b; a B) c; d C) a; d D) b; c E) d; c

14) Which type of molecule contains the alcohol glycerol?

A) Nucleic acid B) Lipid C) Carbohydrate D) Protein

15) Which of the following statements is false?

A) Water molecules are formed by hydrolysis.
 B) Water freezes from the top down.
 C) Water is a part of a dehydration reaction.
 D) Salts readily dissolve in water.
 E) Water is a polar molecule.

16) Identify the following reaction: $\text{Sucrose} + \text{H}_2\text{O} \rightarrow \text{Glucose} + \text{Fructose}$

A) Exchange reaction
 B) Dehydration synthesis reaction
 C) Covalent reaction
 D) Reversible reaction
 E) Hydrolysis reaction

17) Identify the following reaction: $\text{HCl} + \text{NaHCO}_3 \rightarrow \text{NaCl} + \text{H}_2\text{CO}_3$

A) Dehydration synthesis reaction
 B) Ionic reaction

- C) Exchange reaction
- D) Reversible reaction
- E) Hydrolysis reaction

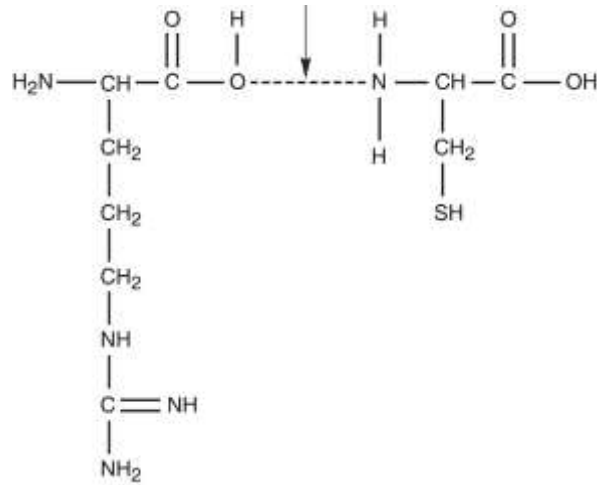
- 18) Identify the following reaction: $\text{Lactose} + \text{H}_2\text{O} \rightarrow \text{Glucose} + \text{Galactose}$ 18) _____
- A) Dehydration synthesis reaction
 - B) Ionic reaction
 - C) Hydrolysis reaction
 - D) Exchange reaction
 - E) Reversible reaction
- 19) An *E. coli* culture that has been growing at 37°C is moved to 25°C. Which of the following changes must be made in its plasma membrane? 19) _____
- A) The number of saturated chains must increase.
 - B) The number of unsaturated chains must increase.
 - C) The viscosity must increase.
 - D) The number of phosphate groups must increase.
 - E) No changes are necessary.

Table 2.1

16	12	1
8	6	1
O	C	H

- 20) Using the information in Table 2.1, calculate the molecular weight of ethanol, $\text{C}_2\text{H}_5\text{OH}$. 20) _____
- A) 33 B) 46 C) 96 D) 34 E) Can't tell
- 21) Which molecule is composed of a chain of amino acids? 21) _____
- A) Carbohydrate B) Protein C) Lipid D) Nucleic acid
- 22) Starch, dextran, glycogen, and cellulose are polymers of 22) _____
- A) Fatty acids.
 - B) Nucleic acids.
 - C) Glucose.
 - D) Acids.
 - E) Amino acids.
- 23) Identify the following reaction: $\text{Glucose} + \text{Fructose} \rightarrow \text{Sucrose} + \text{Water}$ 23) _____
- A) Reversible reaction
 - B) Dehydration synthesis reaction
 - C) Exchange reaction
 - D) Ionic reaction
 - E) Hydrolysis reaction

Figure 2.3

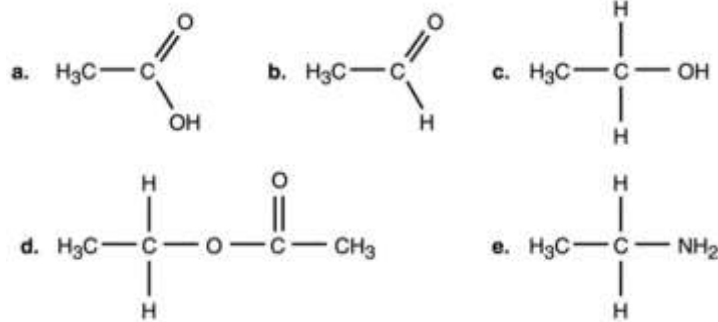


24) What kind of bond is at the arrow in Figure 2.3?

24) _____

- A) Single covalent bond
- B) Peptide bond
- C) Hydrogen bond
- D) Ionic bond
- E) Double covalent bond

Figure 2.1



25) In Figure 2.1, which is an alcohol?

25) _____

- A) a
- B) b
- C) c
- D) d
- E) e

26) Which compound in Figure 2.1 is an ester?

26) _____

- A) a
- B) b
- C) c
- D) d
- E) e

27) *Desulfovibrio* bacteria can perform the following reaction: $S^{6-} \rightarrow S^{2-}$. These bacteria are

27) _____

- A) Reducing sulfur.
- B) Oxidizing sulfur.
- C) Hydrolyzing sulfur.
- D) Synthesizing sulfur.

28) Antacids neutralize acid by the following reaction. Identify the salt. $Mg(OH)_2 + 2HCl \rightarrow MgCl_2 +$

28) _____

H₂O

- A) HCl
- B) H₂O
- C) Mg(OH)₂
- D) MgCl₂
- E) None of the above

29) Oil-degrading bacteria are naturally present in the environment but cannot degrade an oil spill fast enough

to avoid 29)
 ecological
 damage.
 How can
 the
 actions
 of these
 bacteria
 be sped
 up?

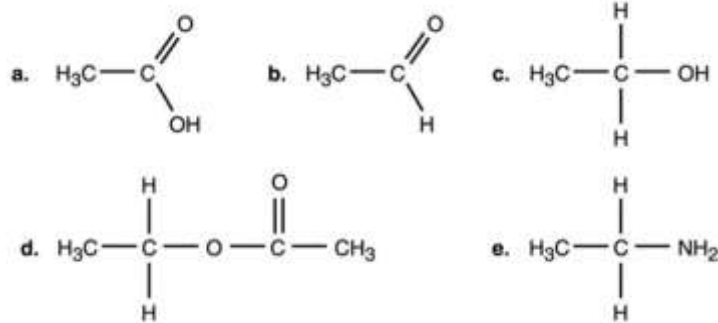
- A) Add NaCl.
- B) Provide oil for them.
- C) Provide sugar as a carbon source.
- D) Add water.
- E) Provide nitrogen and phosphorus.

30) What is the type of bond between ions in salt?

- A) Covalent bond
- B) Hydrogen bond
- C) Ionic bond

30) _____

Figure 2.1



31) Which compound in Figure 2.1 is an organic acid?

- A) a
- B) b
- C) c
- D) d
- E) e

31) _____

32) What is the type of bond holding hydrogen and oxygen atoms in the H₂O molecule?

- A) Covalent bond
- B) Ionic bond
- C) Hydrogen bond

32) _____

33) Which type of molecule is composed of (CH₂O) units?

- A) Nucleic acid
- B) Protein
- C) Lipid
- D) Carbohydrate

33) _____

34) Two glucose molecules are combined to make a maltose molecule. What is the chemical formula for maltose?

- A) C₆H₁₂O₆
- B) C₁₂H₂₄O₁₂
- C) C₃H₆O₃
- D) C₁₂H₂₃O₁₀
- E) C₁₂H₂₂O₁₁

34) _____

35) What is the type of bond between carbon, hydrogen, and oxygen atoms in organic molecules?

- A) Covalent bond
- B) Hydrogen bond
- C) Ionic bond

35) _____

- 36) Structurally, ATP is most like which type of molecule? 36) _____
 A) Protein B) Carbohydrate C) Nucleic acid D) Lipid
- 37) _____
 Which of the following statements about the atom $^{12}_6\text{C}$ is false?
 A) It has 6 protons in its nucleus.
 B) Its atomic weight is 12.
 C) Its atomic number is 6.
 D) It has 6 electrons orbiting the nucleus.
 E) It has 12 neutrons in its nucleus.
- 38) Assume *Saccharomyces cerevisiae* is grown in a nutrient medium containing the radioisotope ^{32}P . 38) _____
 After a 48-hour incubation, the ^{32}P would most likely be found in the *S. cerevisiae*'s
 A) Carbohydrates.
 B) Water.
 C) Plasma membrane.
 D) Cell wall.
 E) Proteins.
- 39) Which type of molecule *NEVER* contains a phosphate group? 39) _____
 A) Lipid B) Carbohydrate C) Protein D) Nucleic acid
- 40) Identify the following reaction: Glycine + Lysine \rightarrow Dipeptide + H_2O 40) _____
 A) Reversible reaction
 B) Hydrolysis reaction
 C) Dehydration synthesis reaction
 D) Exchange reaction
 E) Covalent reaction
- 41) Identify the following reaction: $\text{NH}_4\text{OH} \rightleftharpoons \text{NH}_3 + \text{H}_2\text{O}$ 41) _____
 A) Ionic reaction
 B) Reversible reaction
 C) Exchange reaction
 D) Dehydration synthesis reaction
 E) Hydrolysis reaction
- 42) Which of the following pairs is mismatched? 42) _____
 A) $\text{MgSO}_4 \rightleftharpoons \text{Mg}^{2+} + \text{SO}_4^{2-}$ – salt
 B) $\text{KH}_2\text{PO}_4 \rightleftharpoons \text{K}^+ + \text{H}_2\text{PO}_4^-$ – acid
 C) $\text{HF} \rightleftharpoons \text{H}^+ + \text{F}^-$ – acid
 D) $\text{H}_2\text{SO}_4 \rightleftharpoons 2\text{H}^+ + \text{SO}_4^{2-}$ – acid
 E) $\text{NaOH} \rightleftharpoons \text{Na}^+ + \text{OH}^-$ – base
- 43) The following chemical reaction is used to remove chlorine from water. What type of reaction is it? 43) _____
 $\text{HClO} + \text{Na}_2\text{SO}_3 \rightarrow \text{Na}_2\text{SO}_4 + \text{HCl}$
 A) Dehydration synthesis reaction
 B) Reversible synthesis reaction
 C) Hydrolysis synthesis reaction
 D) Exchange synthesis reaction
 E) Ionic synthesis reaction

44)

16

8

Which of the following statements about the atom $^{16}_8\text{O}$ is false?

- A) It has 8 neutrons in its nucleus.
- B) Its atomic weight is 16.
- C) Its atomic number is 8.
- D) It has 8 electrons in its nucleus.
- E) It has 8 protons in its nucleus.

44) _____

Table 2.1

16	12	1
^8O	^6C	^1H

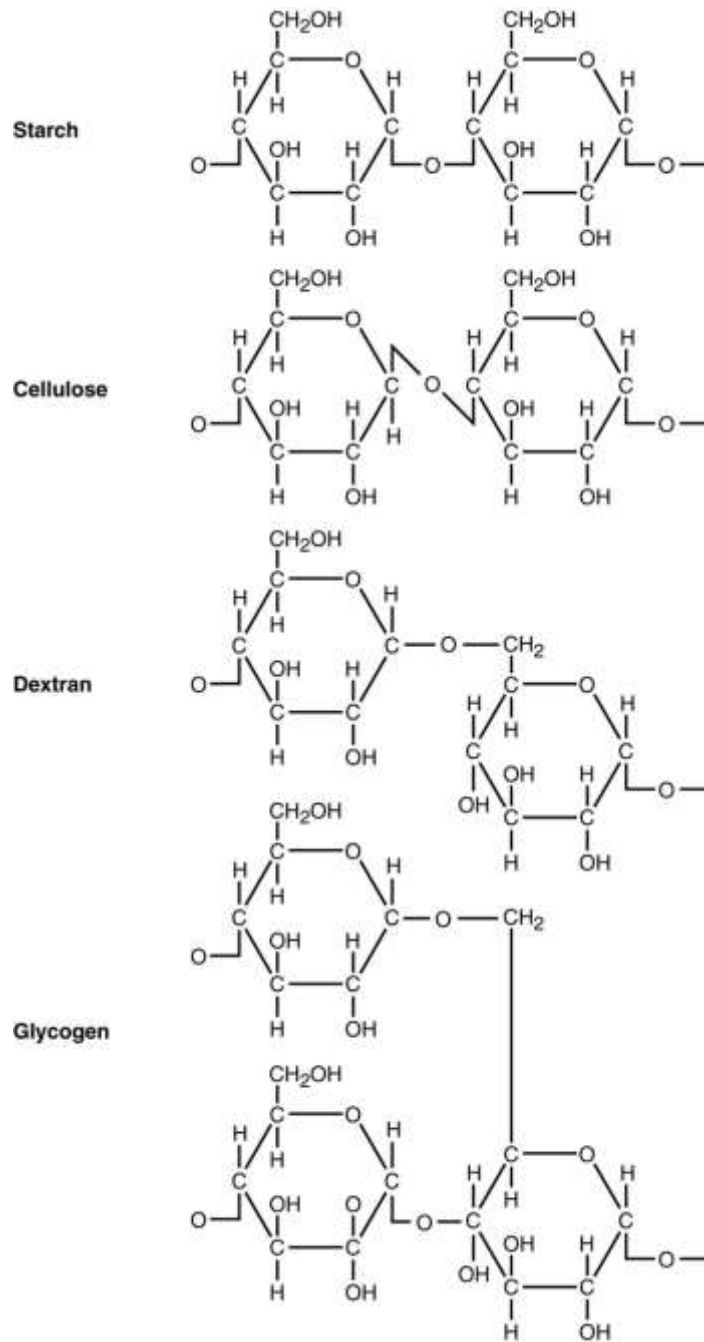
45) Using the information in Table 2.1, calculate the number of moles in 92 grams of ethanol, $\text{C}_2\text{H}_5\text{OH}$.

- A) 1
- B) 2
- C) 3
- D) 4
- E) Can't tell

45) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

Figure 2.5



46) Use Figure 2.5 to answer the following question. Starch, cellulose, dextran, and glycogen are polysaccharides. How are they similar? To what are their different properties due? Why can't an enzyme that hydrolyzes starch degrade cellulose?

47) Describe how the properties of phospholipids make these molecules well suited for plasma membranes.

- 1) A
- 2) A
- 3) E
- 4) D
- 5) A
- 6) E
- 7) D
- 8) C
- 9) D
- 10) E
- 11) A
- 12) B
- 13) A
- 14) B
- 15) A
- 16) E
- 17) C
- 18) C
- 19) B
- 20) B
- 21) B
- 22) C
- 23) B
- 24) C
- 25) C
- 26) D
- 27) B
- 28) D
- 29) E
- 30) C
- 31) A
- 32) A
- 33) D
- 34) E
- 35) A
- 36) C
- 37) E
- 38) C
- 39) B
- 40) E
- 41) B
- 42) B
- 43) D
- 44) D
- 45) B
- 46)
- 47)