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5) Explain the concepts of normal microbiota and transient microbiota and discuss the effect of their pathogenicity.

Section: 1.1

Bloom's Taxonomy: Evaluating

ASMcue Outcome: 5.4

Learning Outcome: 1.2

Global Outcome: 8

***Microbiology: An Introduction, 14e* (Tortora et al.)**

**Chapter 2 Chemical Principles**

2.1 Multiple Choice Questions

1) Which is the **false** statement about the atom  $^{12}_6\text{C}$ ?

- A) It has 6 protons in its nucleus.
- B) It has 12 neutrons in its nucleus.
- C) It has 6 electrons orbiting the nucleus.
- D) Its atomic number is 6.
- E) Its atomic weight is 12.

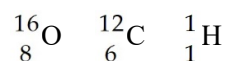
Answer: B

Section: 2.1

Bloom's Taxonomy: Understanding

Learning Outcome: 2.1

2) Table 2.1



Using the information in Table 2.1, calculate the molecular weight of ethanol,  $\text{C}_2\text{H}_5\text{OH}$ .

- A) 96
- B) 46
- C) 34
- D) 33
- E) The answer cannot be determined.

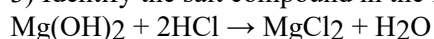
Answer: B

Section: 2.1

Bloom's Taxonomy: Applying

Learning Outcome: 2.1

3) Identify the salt compound in the following equation:



- A)  $\text{Mg}(\text{OH})_2$
- B)  $\text{HCl}$
- C)  $\text{MgCl}_2$
- D)  $\text{H}_2\text{O}$

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E) None of the answers is correct.  
Answer: C  
Section: 2.4  
Bloom's Taxonomy: Understanding  
Learning Outcome: 2.5

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4) All following statements are true about water, **except**:

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

Answer: B

Section: 2.4

Bloom's Taxonomy: Recall

Learning Outcome: 2.4

5) What is the chemical bond between  $K^+$  and  $I^-$  ions in KI?

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

Answer: A

Section: 2.2

Bloom's Taxonomy: Recall

Learning Outcome: 2.2

6) What is the chemical bond between molecules of water?

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

Answer: C

Section: 2.2

Bloom's Taxonomy: Understanding

Learning Outcome: 2.2

7) What is the chemical bond between hydrogen and oxygen atoms  $H_2O$  molecule?

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

Answer: B

Section: 2.2

Bloom's Taxonomy: Recall

Learning Outcome: 2.2

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8) The chemical reaction in which  $\text{Glucose} + \text{Fructose} \rightarrow \text{Sucrose} + \text{Water}$  is a \_\_\_\_\_.

- A) dehydration synthesis reaction
- B) hydrolysis reaction
- C) exchange reaction
- D) reversible reaction
- E) ionic reaction

Answer: A

Section: 2.5

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.7

9) The chemical reaction in which  $\text{Lactose} + \text{H}_2\text{O} \rightarrow \text{Glucose} + \text{Galactose}$  is a \_\_\_\_\_.

- A) dehydration synthesis reaction
- B) hydrolysis reaction
- C) exchange reaction
- D) reversible reaction
- E) ionic reaction

Answer: B

Section: 2.5

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.7

10) The chemical reaction in which  $\text{HCl} + \text{NaHCO}_3 \rightarrow \text{NaCl} + \text{H}_2\text{CO}_3$  is a \_\_\_\_\_.

- A) dehydration synthesis reaction
- B) hydrolysis reaction
- C) exchange reaction
- D) reversible reaction
- E) ionic reaction

Answer: C

Section: 2.3

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.3

11) The chemical reaction in which  $\text{NH}_4\text{OH} \rightleftharpoons \text{NH}_3 + \text{H}_2\text{O}$  is a \_\_\_\_\_.

- A) dehydration synthesis reaction
- B) hydrolysis reaction
- C) exchange reaction
- D) reversible reaction
- E) ionic reaction

Answer: D

Section: 2.3

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.3

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12) Which type of molecule contains the alcohol glycerol?

- A) Carbohydrate
- B) Phospholipids
- C) DNA
- D) Protein

Answer: B

Section: 2.5

Bloom's Taxonomy: Recall

Learning Outcome: 2.7

13) Which type of molecule is composed of (CH<sub>2</sub>O) units?

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

Answer: A

Section: 2.5

Bloom's Taxonomy: Recall

Learning Outcome: 2.8

14) Which type of molecule contains the functional group of NH<sub>2</sub>?

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

Answer: D

Section: 2.5

Bloom's Taxonomy: Recall

Learning Outcome: 2.10

15) Which type of molecule does not contain the functional group of phosphate?

- A) Triglycerides
- B) Phospholipid
- C) Nucleic acid
- D) ATP

Answer: A

Section: 2.5

Bloom's Taxonomy: Understanding

Learning Outcome: 2.9

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16) How many covalent bonds can be formed between Mg and H in  $\text{MgH}_2$  for both atoms to achieve the full complement of electrons in their outermost energy shells?

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

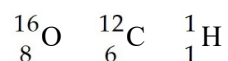
Answer: B

Section: 2.2

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.2

17) Table 2.1



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) The answer cannot be determined.

Answer: B

Section: 2.2

Bloom's Taxonomy: Applying

Learning Outcome: 2.2

18) All statements about protein structure are true, **except**:

- A) The primary structure is formed by covalent bonding between amino acid subunits.
- B) Secondary structures are formed only from hydrogen bonds.
- C) Tertiary structures are formed only from covalent bonds.
- D) Quaternary structures involved multiple polypeptides.

Answer: C

Section: 2.5

Bloom's Taxonomy: Understanding

Learning Outcome: 2.10

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19) Which of the following chemical reaction is identified **incorrectly**?

- A)  $\text{NaOH} \rightleftharpoons \text{Na}^+ + \text{OH}^-$  is a base.  
B)  $\text{HF} \rightleftharpoons \text{H}^+ + \text{F}^-$  is an acid.  
C)  $\text{Mg}_2\text{SO}_4 \rightleftharpoons \text{Mg}^{2+} + \text{SO}_4^{2-}$  is a salt.  
D)  $\text{KH}_2\text{PO}_4 \rightleftharpoons \text{K}^+ + \text{H}_2\text{PO}_4^-$  is an acid.  
E)  $\text{H}_2\text{SO}_4 \rightleftharpoons 2\text{H}^+ + \text{SO}_4^{2-}$  is an acid.

Answer: D

Section: 2.4

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.5

20) Table 2.2

- $\text{NaOH} \rightleftharpoons \text{Na}^+ + \text{OH}^-$  is a base.  
 $\text{HF} \rightleftharpoons \text{H}^+ + \text{F}^-$  is an acid.  
 $\text{MgSO}_4 \rightleftharpoons \text{Mg}^{2+} + \text{SO}_4^{2-}$  is a salt.  
 $\text{KH}_2\text{PO}_4 \rightleftharpoons \text{K}^+ + \text{H}_2\text{PO}_4^-$  is an acid.  
 $\text{H}_2\text{SO}_4 \rightleftharpoons 2\text{H}^+ + \text{SO}_4^{2-}$  is an acid.

Which is the **false** statement about the chemical reactions in Table 2.2?

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

Answer: A

Section: 2.4

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.3

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21) What is the type of weak bond between the hydrogen of one molecule and the nitrogen of another molecule, where the two don't actively share an electron?

- A) Ionic bond
- B) Covalent bond
- C) Hydrogen bond
- D) Disulfide bond
- E) Hydrophobic bond

Answer: C

Section: 2.2

Bloom's Taxonomy: Recall

Learning Outcome: 2.2

22) \_\_\_\_\_ occur when carbon, hydrogen, and oxygen atoms share electrons with each other?

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

Answer: B

Section: 2.2

Bloom's Taxonomy: Recall

Learning Outcome: 2.2

23) What is the type of chemical bond between ions in a compound of salt?

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

Answer: A

Section: 2.2

Bloom's Taxonomy: Recall

Learning Outcome: 2.2

24) A scientist wants to perform a test that will indicate whether a nucleic acid sample is composed of either RNA or DNA. Testing for the presence of which of the following is most appropriate in this situation?

- A) Phosphate
- B) Nitrogen
- C) Guanine
- D) Uracil
- E) Thymine

Answer: D

Section: 2.5

Bloom's Taxonomy: Understanding

Learning Outcome: 2.11



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25) Structurally, ATP must be present in \_\_\_\_\_.

- A) carbohydrate
- B) lipid
- C) protein
- D) nucleic acid

Answer: D

Section: 2.5

Bloom's Taxonomy: Understanding

Learning Outcome: 2.12

26) What do genes consist of?

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

Answer: D

Section: 2.5

Bloom's Taxonomy: Recall

Learning Outcome: 2.11

27) \_\_\_\_\_ is composed of a chain of amino acids?

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

Answer: C

Section: 2.5

Bloom's Taxonomy: Recall

Learning Outcome: 2.10

28) Which are the primary chemical compounds found in plasma membranes?

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

Answer: B

Section: 2.5

Bloom's Taxonomy: Recall

Learning Outcome: 2.9

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29) The antimicrobial drug imidazole inhibits sterol synthesis. This would most likely interfere with the structure or function of \_\_\_\_\_.

- A) bacterial cell walls
- B) fungal cell walls
- C) eukaryotic plasma membranes
- D) prokaryotic plasma membranes
- E) genes

Answer: C

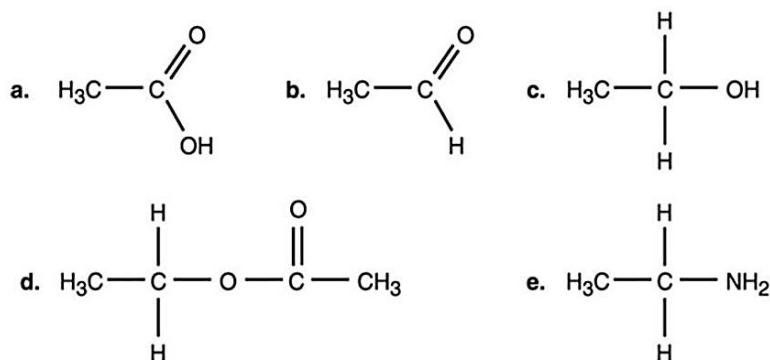
Section: 2.5

Bloom's Taxonomy: Analyzing

ASMcue Outcome: 3.4

Learning Outcome: 2.9

Figure 2.1



30) Which compound in Figure 2.1 is an alcohol?

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

Answer: C

Section: 2.5

Bloom's Taxonomy: Analyzing

Learning Outcome: 2.7