

Biology High School

For Standardized Scholastic Tests

EST2-ACT2 Biology

Coursework

2024-2025

Dr. Mohamed Kabbany

Chapter 1

Cellular and Molecular Biology

Lesson 1.2

Biochemistry

EST/ACT- Practice

Q1

1. A solution with a pH of 2 is _____ times more acidic than one with a pH of 5.

(A) 3

(B) 10

(C) 100

(D) 1,000

(E) 10,000



Q2

All of the following are correct about enzymes EXCEPT

- (A) the mechanism by which enzymes work is known as lock and key
- (B) they are proteins
- (C) they denature at high temperatures
- (D) they are assisted by vitamins and minerals
- (E) enzymes are not normally degraded during a reaction



Q3

All of the following are correct about water EXCEPT

- (A) water is a molecule
- (B) there is little attraction between water molecules
- (C) the covalent bonds between oxygen and hydrogen are polar or unbalanced
- (D) the reason that water and lipids do not mix is because water is a polar molecule while lipids are nonpolar
- (E) water has a relatively high heat of vaporization because of strong intermolecular attractions



Q4

Which is NOT a characteristic of water?

- (A) Water has a high specific heat.
- (B) Water has a high heat of vaporization.
- (C) Water exhibits strong cohesion tension.
- (D) Water is less dense than ice.
- (E) Water is known as a universal solvent



Q5

The pH of blood in humans

- (A) is lowest at birth and gradually increases with age up to a maximum level
- (B) is different for men and women
- (C) varies with the activity level of the individual
- (D) is highest at birth and gradually decreases to a minimum level
- (E) is normally 7.4 and resists change at all times



Q6

Which of the following is NOT a carbohydrate?

(A) Glucose

(B) Lactose

(C) Insulin

(D) Starch

(E) Sucrose



Q7

Which of the following is NOT a polysaccharide?

(A) Cellulose

(B) Glycogen

(C) Chitin

(D) Glycerol

(E) Starch



Q8

Which of the following is **Not** correctly matched?

(A) Proteins—nucleotides

(B) Proteins—amino acids

(D) Lipids—glycerol

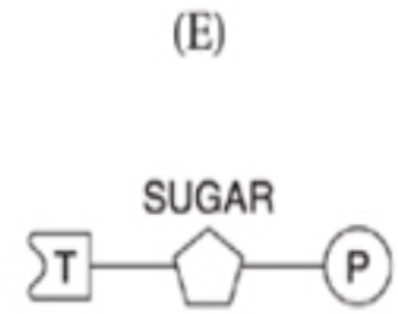
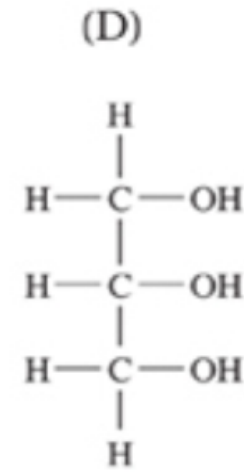
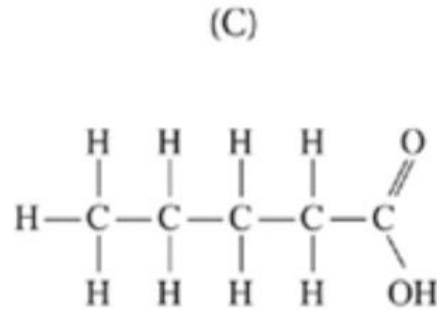
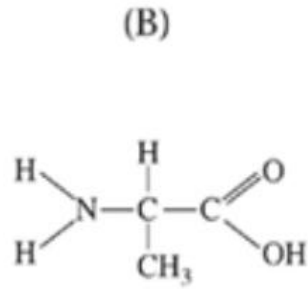
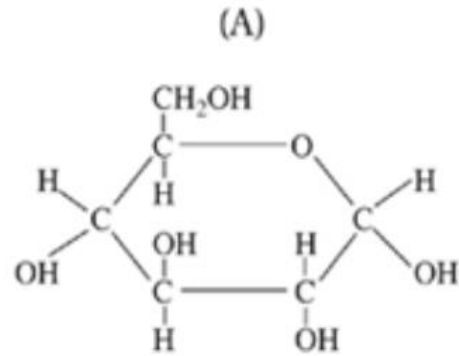
(C) Carbohydrates—glucose

(E) None of the above is correctly matched.



Q9

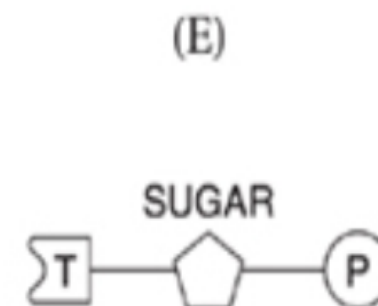
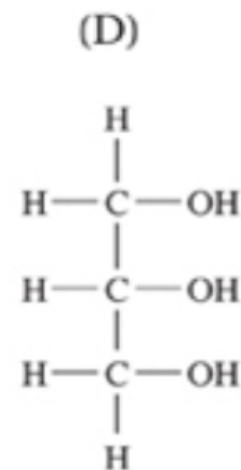
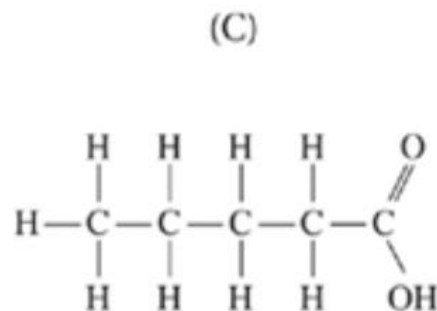
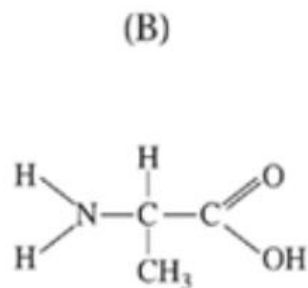
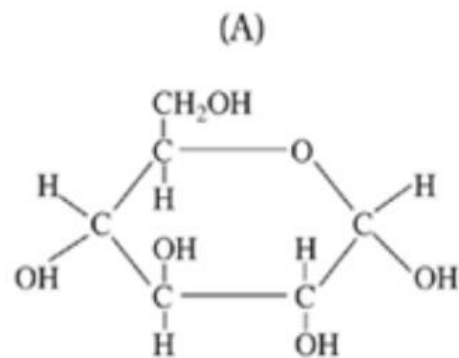
Choose from these structural formulas below.



This is a monosaccharide



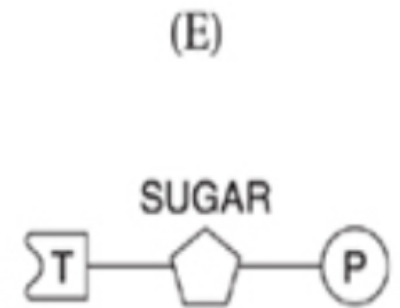
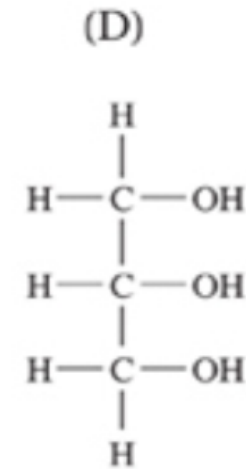
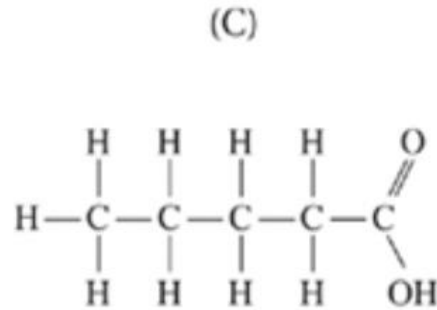
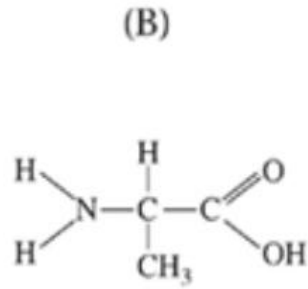
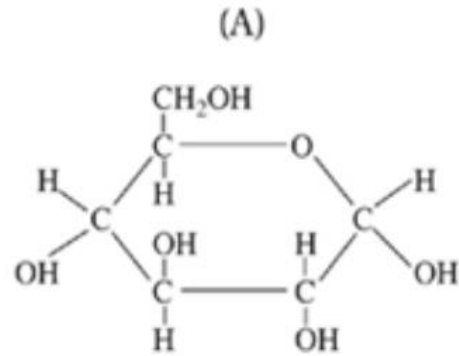
Q10 Choose from these structural formulas below.



This is necessary for growth and repair of tissue.



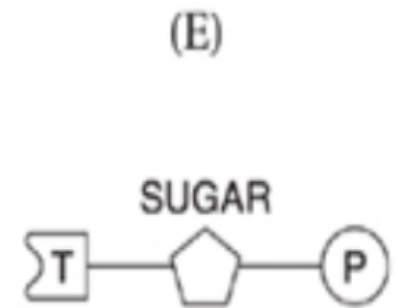
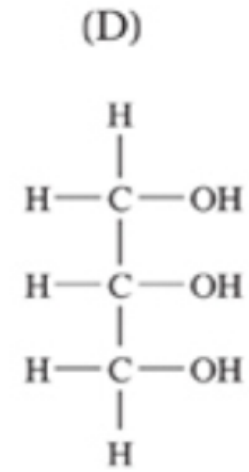
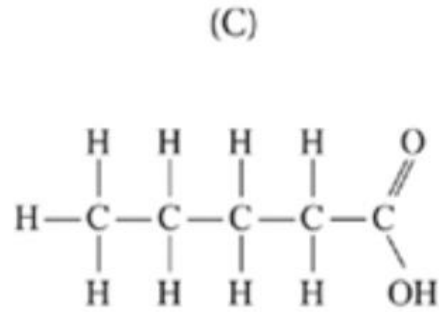
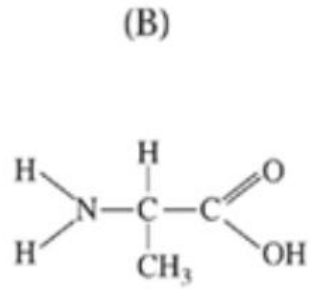
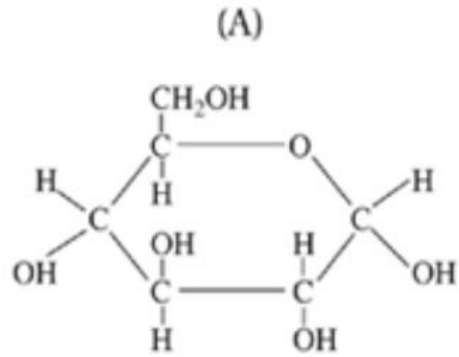
Q11 Choose from these structural formulas below.



This combines with fatty acids to form lipids



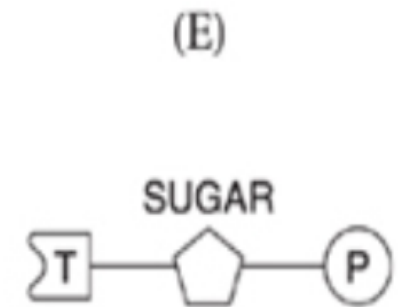
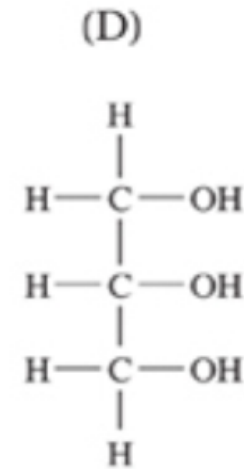
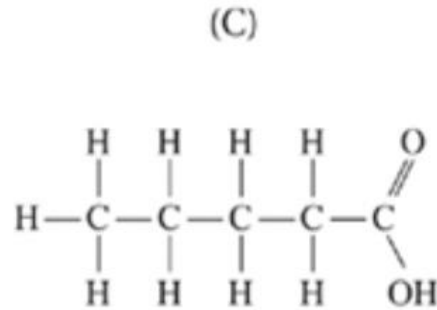
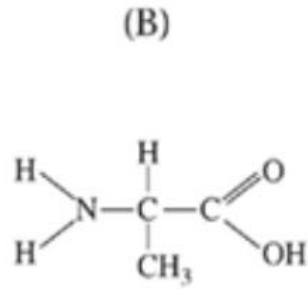
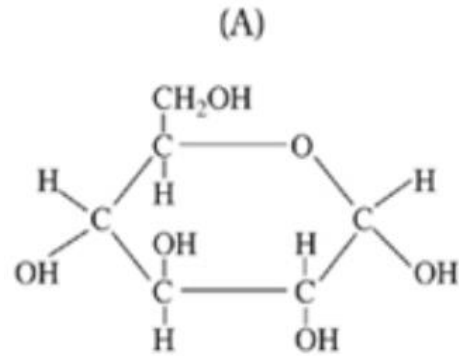
Q12 Choose from these structural formulas below.



This is used as a quick energy source.



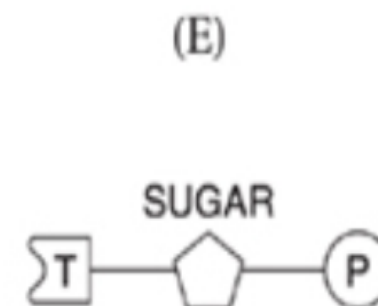
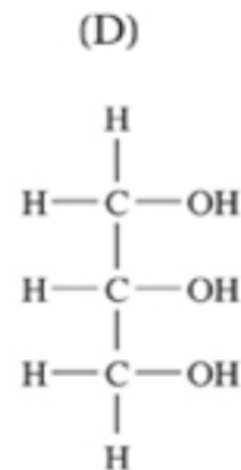
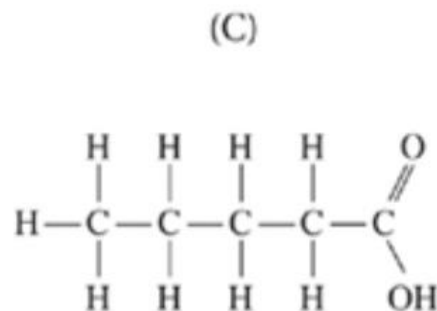
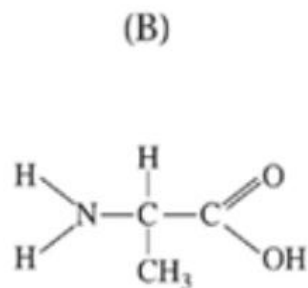
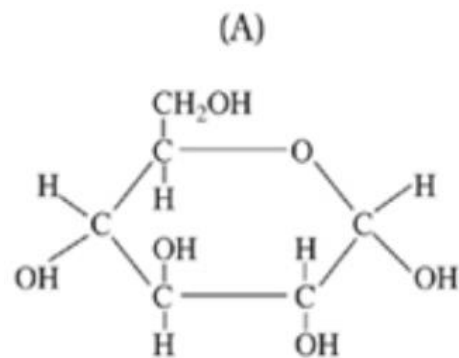
Q13 Choose from these structural formulas below.



This is linked to cardiovascular disease



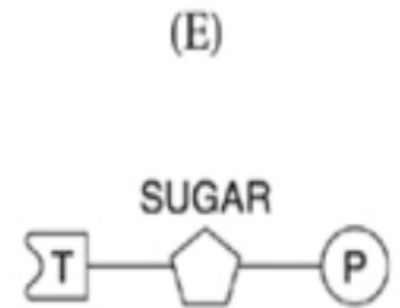
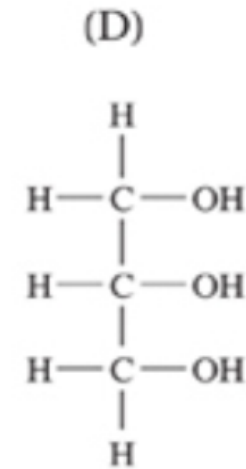
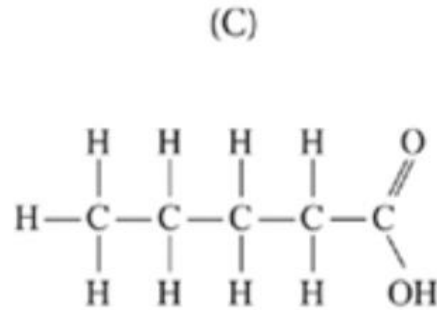
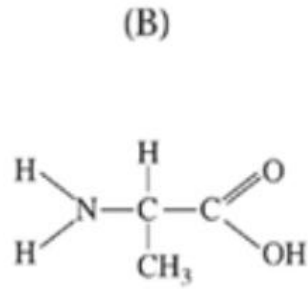
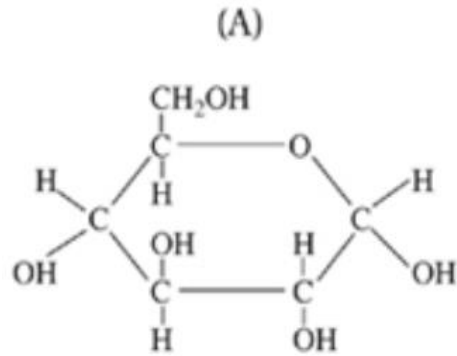
Q14 Choose from these structural formulas below.



This is an important part of any protein



Q15 Choose from these structural formulas below.



This consists of a sugar, a phosphate, and a nitrogenous base.



Q16

Match the description to the property of water.

- (A) Water exhibits strong cohesion tension.
- (B) Water has a high heat of vaporization.
- (C) Water has a high specific heat.
- (D) Ice is less dense than water.
- (E) Water is a universal solvent.

Water moves up tall trees because this is true



Q17

Match the description to the property of water.

- (A) Water exhibits strong cohesion tension.
- (B) Water has a high heat of vaporization.
- (C) Water has a high specific heat.
- (D) Ice is less dense than water.
- (E) Water is a universal solvent.

Sweating is a cooling process because of this characteristic of water.



Q18

Match the description to the property of water.

- (A) Water exhibits strong cohesion tension.
- (B) Water has a high heat of vaporization.
- (C) Water has a high specific heat.
- (D) Ice is less dense than water.
- (E) Water is a universal solvent.

Fish can live through the winter in a lake that has ice floating on the surface.



Q19

Isotopes differ from each other only in

- (A) the number of electrons
- (B) the number of protons
- (C) the number of neutrons
- (D) how they react chemically
- (E) the size of the atom



Q20

All of the following are correct about enzymes EXCEPT

- (A)enzymes are organic catalysts
- (B)enzymes lower the energy of activation
- (C)enzymes are assisted by cofactors
- (D)enzymes are affected by changes in temperature but not changes in pH
- (E)enzymes are larger than the substrates they work on



Q21

A polysaccharide found in plants whose function is storage is

(A)starch

(B)glycogen

(C)chitin

(D)glucagon

(E)cellulose



Q22

Enzymes function because of their particular shape or conformation. Which level of protein structure is most *directly* responsible for the shape of a protein?

- (A) Primary
- (B) Secondary
- (C) Tertiary
- (D) Quaternary
- (E) Cannot be determined



Q23

The radioisotope I-131 is used to diagnose and treat diseases of the

(A)brain

(B)thyroid

(C)pancreas

(D)lungs

(E)stomach



Q24

Which of the following particles is negatively charged?

- A. electron
- B. isotope
- C. neutron
- D. proton



Q25

Isotopes are created by a change in the number of what particle of an atom?

- A. electrons
- B. neutrons
- C. protons
- D. ions



Q26

Identify the proteins that speed up the rate of chemical reactions.

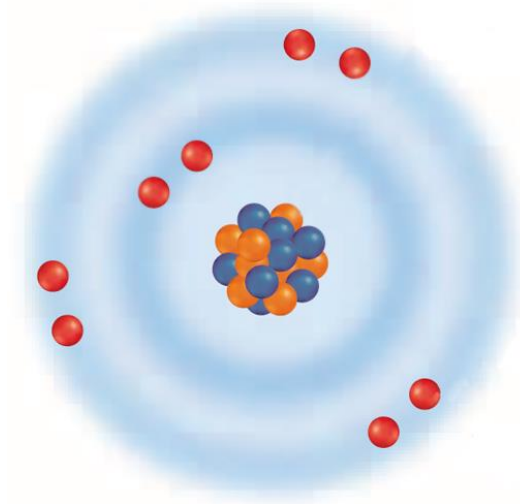
- A. substrates
- B. enzymes
- C. ions
- D. reactants



Q27

What particles are in an atom's nucleus?

- A. neutrons and electrons
- B. protons and electrons
- C. protons and neutrons



Q28

What causes the overall charge of an atom to be zero?

- A. an equal number of protons and neutrons
- B. an equal number of protons and electrons
- C. an equal number of neutrons and electrons



Q29

What type of substance is water?

- A. a compound
- B. an element
- C. an isotope
- D. a mixture



Q30

What provides the energy for all living processes?

- A. chemical bonds
- B. ionic compounds
- C. radioactive isotopes
- D. van der Waals forces



Q31

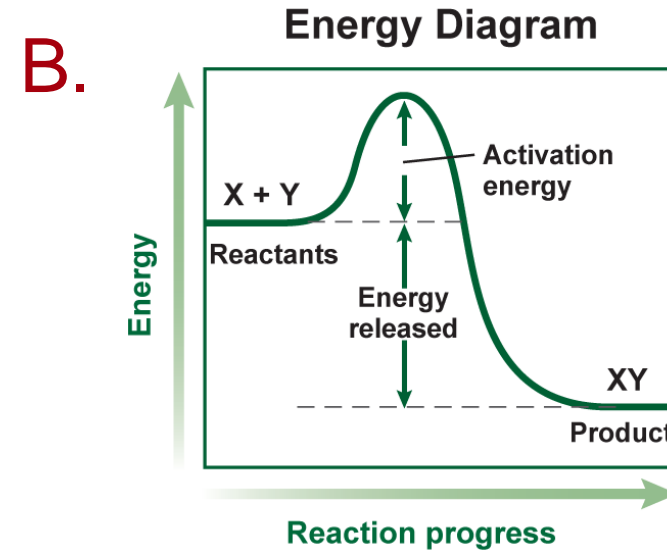
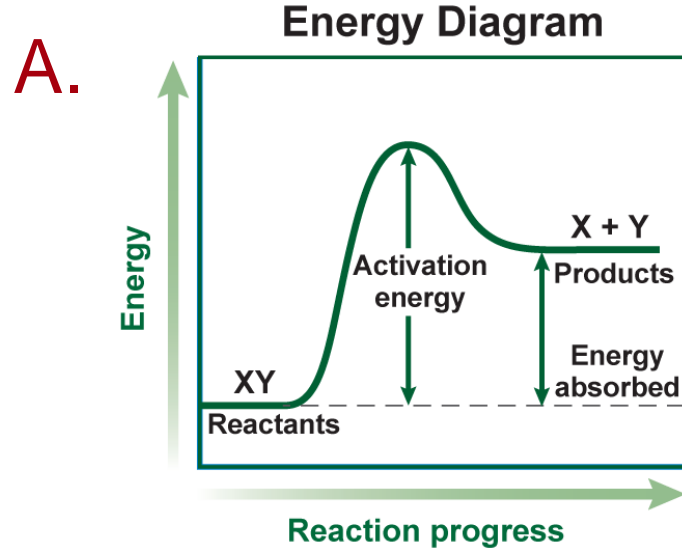
Which is a chemical reaction?

- A. a match burning
- B. salt dissolving
- C. water boiling
- D. gasoline evaporating



Q32

Which chemical reaction is endothermic?



Q33

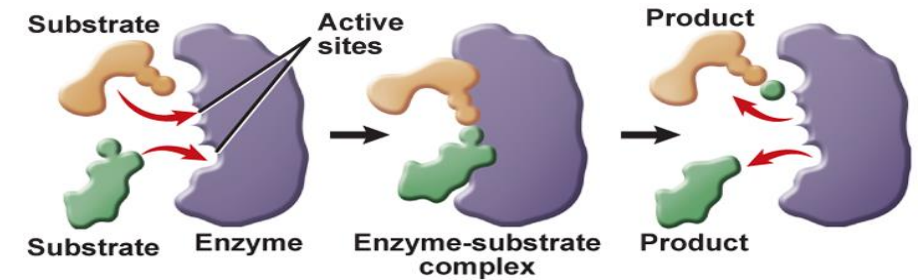
How does an enzyme increase the rate of a chemical reaction?

- A. It acts as a reactant.
- B. It reduces the amount of heat produced.
- C. It increases the amount of product.
- D. It lowers the activation energy.



Q34

What occurs at the active site in the enzyme substrate complex?



- A- Lock and key like fitness.
- B- Induced fit hypothesis
- C- Increase in activation energy of the reaction



Q34

Why is water able to dissolve a wide variety of solutes?

- A. It acts as a catalyst.
- B. Its pH is neutral.
- C. It is a polar molecule.
- D. It is an ionic compound.



Q36

What type of bonds attracts water molecules to each other and to other substances?

- A. covalent bonds
- B. double bonds
- C. hydrogen bonds
- D. ionic bonds



Q37

Which ion, when released in water, causes a solution to be basic?

- A. Cl^-
- B. OH^-
- C. H^+
- D. Na^+



Q38

What is the name for a substance that keeps the pH in cells within the 6.5 to 7.5 pH range?

- A. alkali
- B. antacid
- C. buffer
- D. neutralizer



Q39

Which element do almost all biological molecules contain?

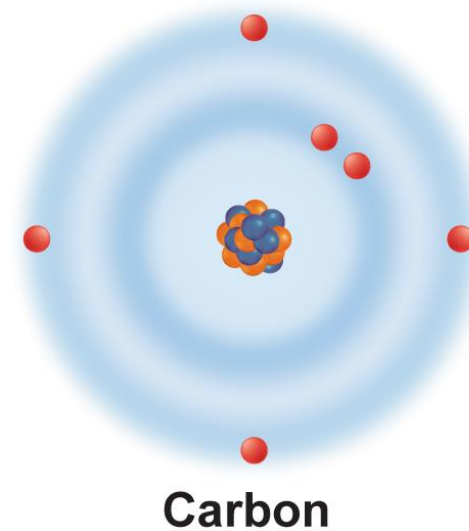
- A. carbon
- B. nitrogen
- C. phosphorus
- D. sodium



Q40

How many covalent bonds can carbon form with other atoms?

- A. 1
- B. 2
- C. 4
- D. 8



Q41

What type of biological molecule is an enzyme?

- A. hormone
- B. nucleic acid
- C. protein
- D. steroid



Q42

What are fats, oils, and waxes composed of?

- A. lipids
- B. nucleotides
- C. polypeptides
- D. sugars



Q43

What are the monomers that make up proteins?

- A. amino acids
- B. fatty acids
- C. glycerols
- D. nucleotides



Q44

Which biological molecule transports substances between cells?

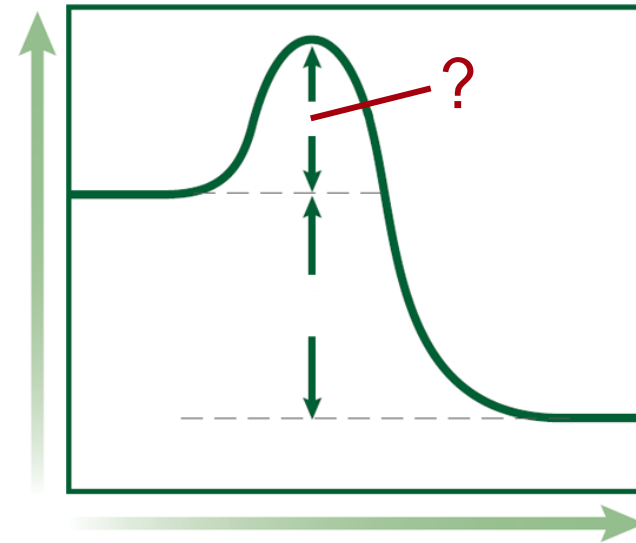
- A. carbohydrate
- B. lipid
- C. nucleic acid
- D. protein



Q45

Look at the following figure. Determine what the upward curve represents.

- A. activation energy
- B. reactants
- C. products
- D. enzymes



Q46

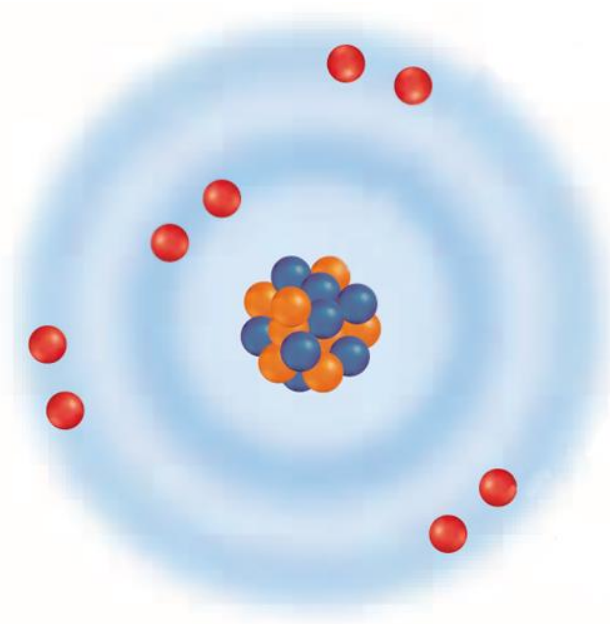
Look at the energy levels in the atom. What is the maximum number of electrons energy level two can hold?

A. 2

B. 4

C. 6

D. 8



Q47

Explain why chemical equations must be balanced.

A- to verify law of conservation of energy

B- to verify law of conservation of mass

C- to verify law of conservation of charge



Q48

Which is a result of van der Waals forces?

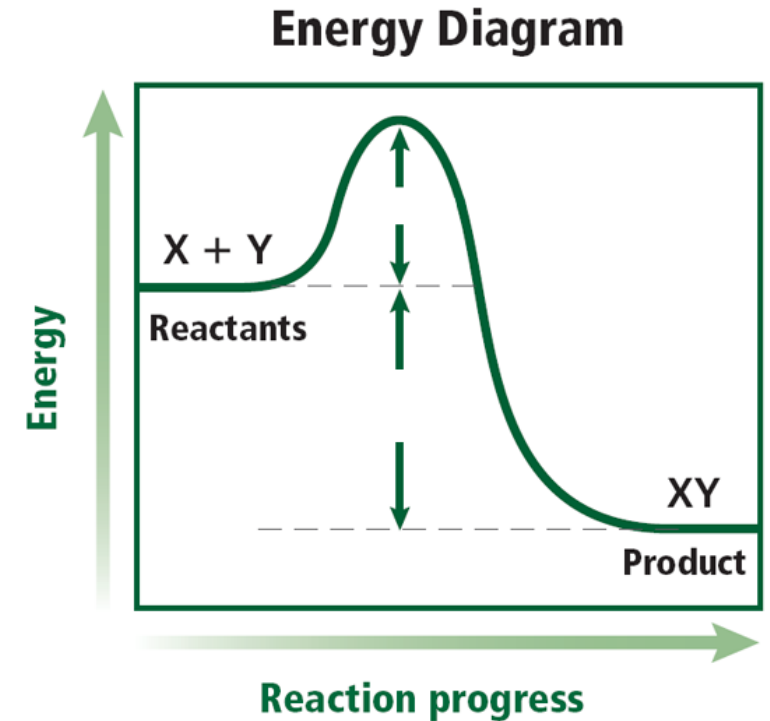
- A. atoms sharing electrons
- B. table salt dissolving in water
- C. ionic compounds forming crystals
- D. water molecules forming droplets



Q49

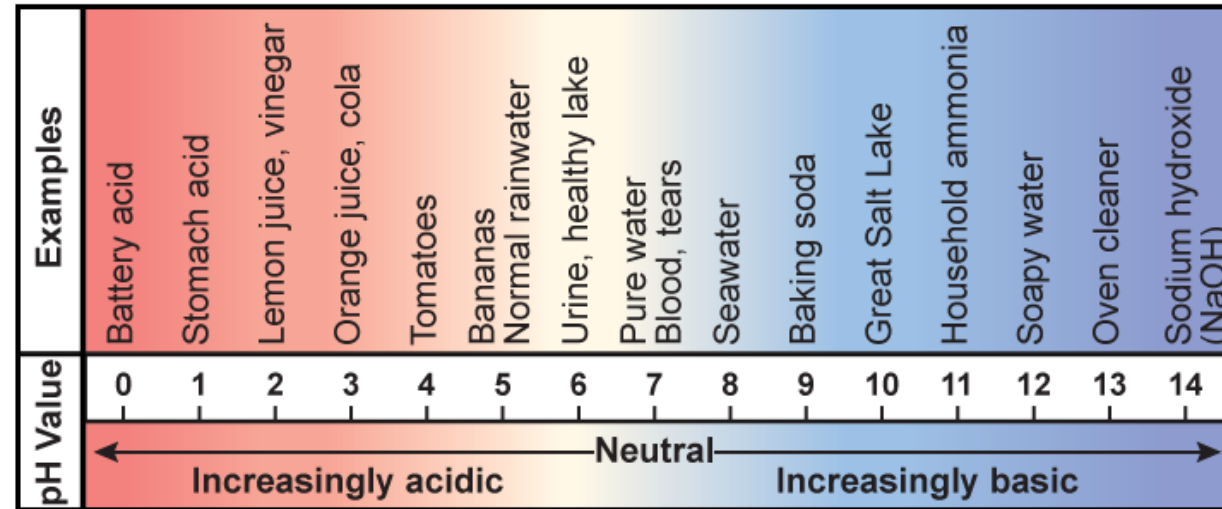
What is true of this chemical reaction?

- A. Energy is not needed to start the chemical reaction.
- B. Heat and/or light energy are released in this reaction.
- C. The activation energy is greater than the energy released.
- D. The energy of the products and the reactants is the same.



Q50

Which fruit contains a higher concentration of hydrogen ions?



A. tomatoes

B. bananas



Q51

What do cellulose and chitin have in common?

- A. They are energy-storing polymers.
- B. They are found in the cells of animals.
- C. They are structural polysaccharides.
- D. They are composed of repeating sucrose units.



Q52

Which polysaccharide stores energy in muscle and liver tissue?

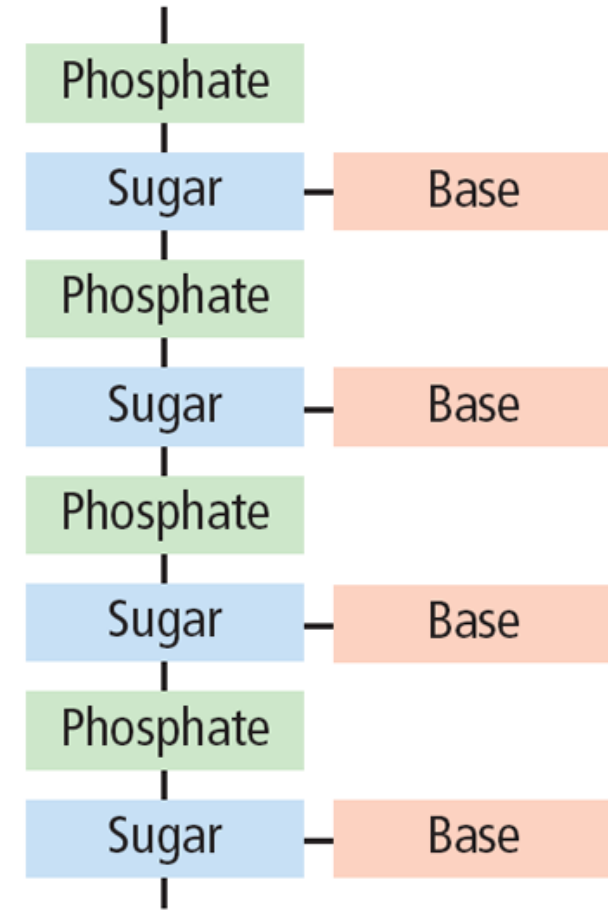
- A. gluten
- B. glycogen
- C. starch
- D. sucrolose



Q53

What is the function of this biological macromolecule?

- A. communicate signals between cells
- B. produce vitamins and hormones
- C. provide support and protection
- D. store and transmit genetic information



Q54

Which is a characteristic of all lipids?

- A. They are saturated triglycerides.
- B. They do not dissolve in water.
- C. They are liquid at room temperature.
- D. They store less energy than carbohydrates.

