Biology Milestone: Unit 2 Topics (Energy Transformations)

Multiple Choice
Identify the choice that best completes the statement or answers the question.

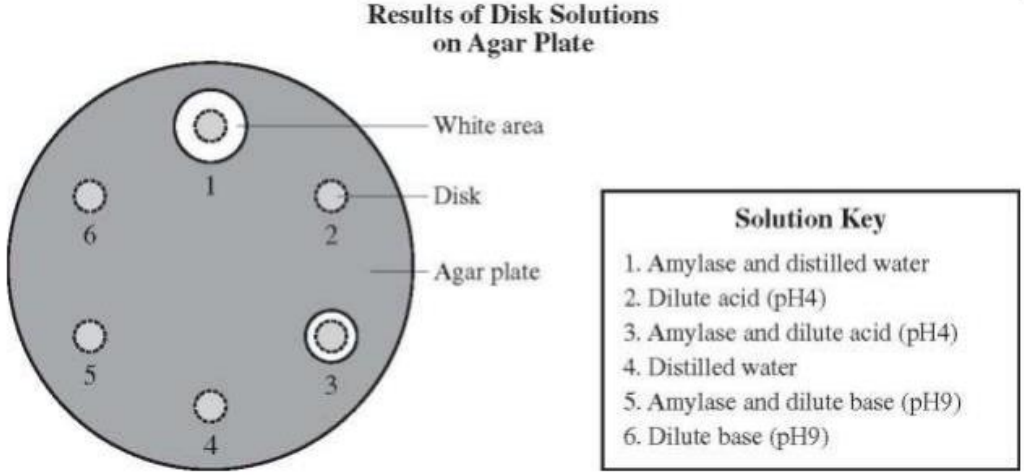
____ 1. Population density is found by dividing the number of organisms in an ecosystem by the total area of the ecosystem. If 50 square meters of an ecosystem are surveyed and 5 rabbits are sighted, what is the estimated population density of the rabbits?

a. 1 rabbit per 5 square meters
b. 1 rabbit per 10 square meters
c. 0.5 rabbit per square meter
d. 0.1 rabbit per 5 square meters

____ 2. A student investigated the effects of the enzyme amylase on starch digestion. The student followed this procedure:

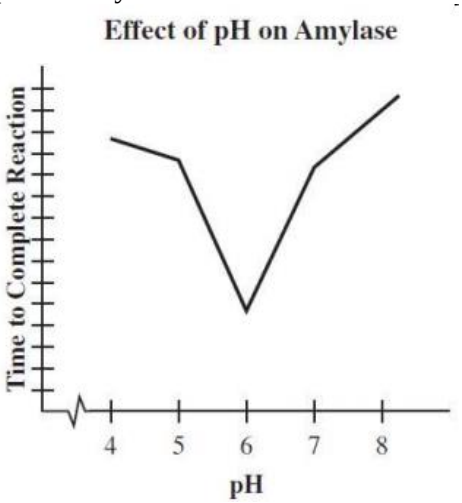
• Soak a different paper disk in one of six solutions.
• Place the disks on an agar plate containing starch.
• Store the agar plate at 37°C for one hour.
• Flood the agar plate with iodine and then drain.
• Observe the results.

A white area around a disk indicates starch digestion. The student's results are shown in this diagram. Which conclusion about the enzyme amylase do the student's results support?



a. Iodine destroys amylase.
b. Amylase does not digest starch
c. Amylase works best in basic solutions.
d. The action of amylase is sensitive to pH.

____ 3. Amylase is an enzyme in saliva that catalyzes the digestion of starch. Based on the graph, what is the optimal pH for amylase?

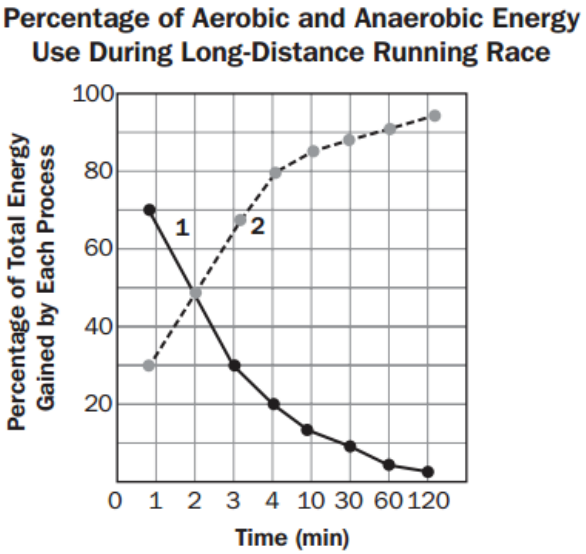


a. 5
b. 6
c. 7
d. 8

____ 4. The human body contains nitrogen (N_2) as part of amino acids, ATP, DNA, and RNA. The atmosphere is about 79% nitrogen, but humans cannot use nitrogen in its atmospheric form. How is atmospheric nitrogen made available for use in the human body?

a. Plants absorb nitrogen after it is changed to useable compounds by the radiant energy of the Sun.
b. Rainwater dissolves the nitrogen gas in the air and makes it available to plants and animals.
c. Humans have special enzymes in their lungs to make nitrogen gas useable.
d. Bacteria change nitrogen gas to useable compounds that can be absorbed by plants.

____ 5. A scientist studied the energy contribution of different types of cellular respiration to a runner during an endurance running event. The scientist then created the graph shown from the data collected. Which conclusion can be made regarding the mechanisms for obtaining energy in Line 1 and Line 2?



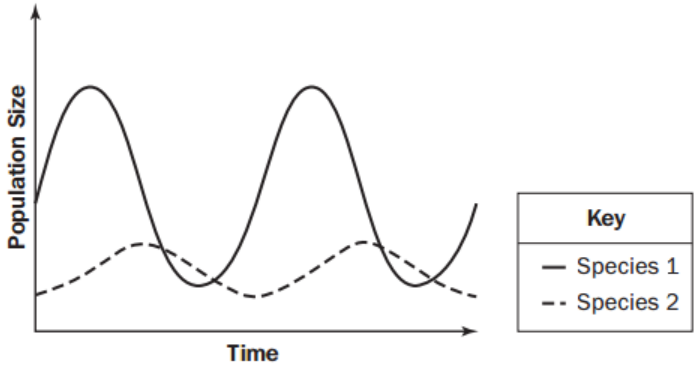
a. ATP is obtained through aerobic respiration for Line 1 while anaerobic respiration occurs for Line 2.

b. ATP is obtained through anaerobic respiration for Line 1 while aerobic respiration occurs for Line 2.

c. Line 1 shows energy is obtained through production of glucose molecules while Line 2 shows energy obtained through the production of protein molecules.

d. Line 1 shows energy is obtained through the production of fat molecules while Line 2 shows energy obtained through the production of carbohydrate molecules.

____ 6. The graph shows the changes in population size of two species that live in the same habitat. Which conclusion can be made regarding the species?



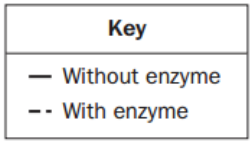
a. Species 1 is a predator of Species 2.

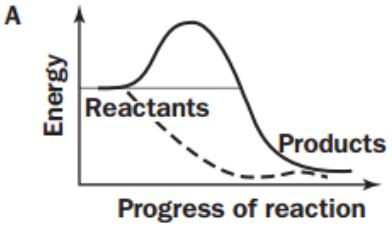
b. Species 2 is a predator of Species 1.

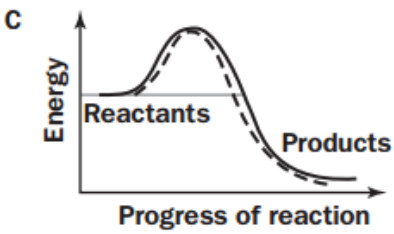
c. Species 1 and 2 have a mutualistic relationship.

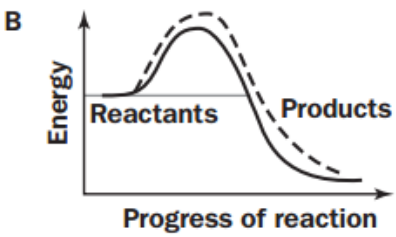
d. Species 1 and 2 have a commensalistic relationship.

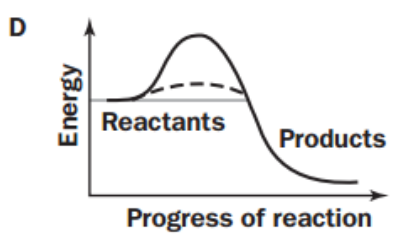
____ 7. Which graph shows the most effective enzyme reduction of the amount of required activation energy?



a.


c.


b.


d.


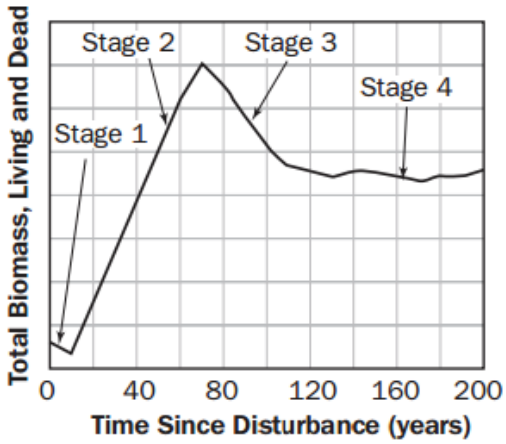
____ 8. Scientists conducted an experiment to determine how different wavelengths of light affected photosynthesis. They used two groups of the same plants. The leaves of Group 1 were covered with transparent green plastic. The leaves of Group 2 were not covered with any plastic. The results show that the plants photosynthesized best when their leaves were not
covered in any plastic.
Which hypothesis do the results support?

a. If leaves are uncovered, then their chloroplasts will produce more oxygen than the leaves that are covered in green plastic.
b. If leaves are covered in green plastic, then their mitochondria will absorb more carbon dioxide than the mitochondria of uncovered leaves.
c. If leaves are uncovered, then their chloroplasts will release more carbon dioxide than the chloroplasts of leaves covered in green plastic.
d. If leaves are covered in green plastic, then their mitochondria will produce more oxygen than the leaves that are uncovered.

____ 9. Energy is transferred between trophic levels in a food pyramid. If 150,000 joules of sunlight are captured by plants, how much energy is transferred to secondary consumers?

a. 150 joules
b. 1,500 joules
c. 15,000 joules
d. 150,000 joules

____ 10. Over many years, scientists study a community in an area after a volcanic eruption and create a graph like the one shown. Which conclusion can be made regarding the cause of Stage 4?



a. Stage 4 occurred because this period is necessary for populations to increase.

b. Stage 4 occurred because energy input and output within populations remained balanced.

c. Stage 4 occurred because populations in the community have plenty of resources to grow.

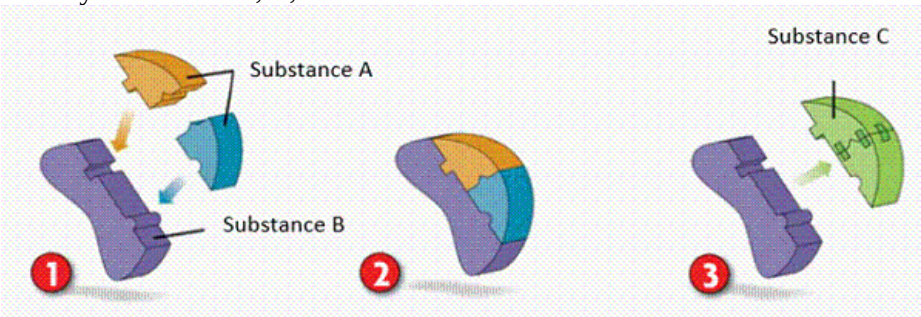
d. Stage 4 occurred because populations have reached a climax in which not enough resources exist to sustain growth.

____ 11. Enzymes are catalysts because...

I. They slow down the rate of chemical reactions
II. They speed up the rate of chemical reactions
III. They lower the activation energy of a chemical reaction

a. I only
b. II only
c. I and III only
d. II and III only

____ 12. Identify substances A, B, and C in this chemical reaction.



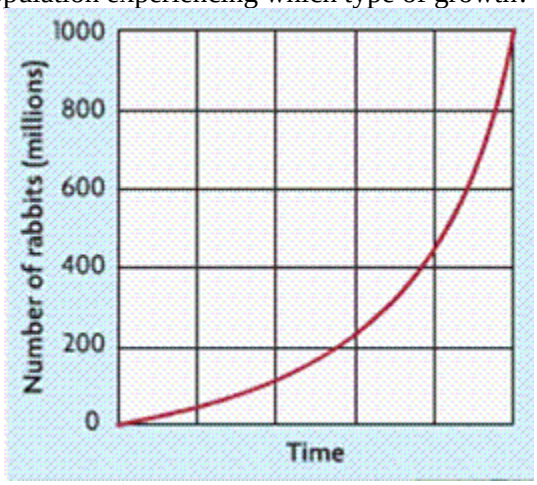
a. A= Enzyme
B= Substrate
C= Product

b. A= Enzyme
B= Product
C= Substrate

c. A= Substrate
B= Enzyme
C= Product

d. A= Product
B= Enzyme
C= Substrate

____ 13. The graph below represents a population experiencing which type of growth?



Retrieved from *Georgia Biology* by McDougal & Littell

a. Exponential growth with no limiting factors
b. Logistical growth with limiting factors
c. Decline growth with limiting factors
d. Gradual growth with no limiting factors

____ 14. In the Sahara desert, which of the following is a density dependent limiting factor?
a. temperature
b. amount of water
c. genetic disease
d. flood

____ 15. The mistletoe plant steals nutrients and water from the tree on which its growing. The tree is harmed by the mistletoe by losing valuable resources. Which of the following best describes the interactions between the mistletoe and tree?
a. mutualism
b. commensalism
c. parasitism
d. competition

____ 16. What are the inputs (reactants) of photosynthesis?

I. Water
II. Sunlight
III. Oxygen
IV. CO_2

a. II & III
b. I, II, & IV
c. I, III, & IV
d. III only

____ 17. Which organism would be placed at the <u>bottom</u> of the biomass pyramid for this specific environment?

Bush leaves → frog → snake → wolf

a. bush leaves
b. frog
c. snake
d. wolf

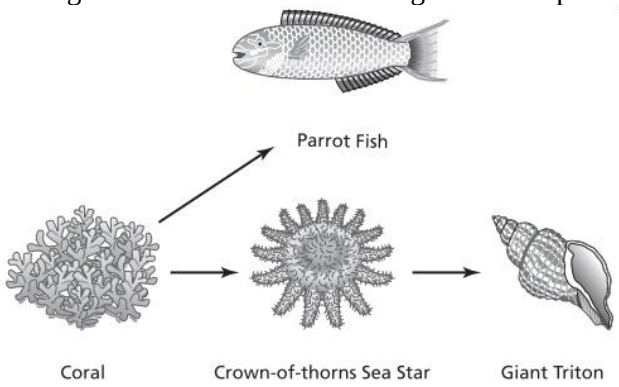
____ 18. How are cellular respiration and photosynthesis almost opposite processes?

a. Photosynthesis releases energy, and cellular respiration stores energy
b. Photosynthesis removes carbon dioxide from the atmosphere, and cellular respiration puts it back
c. Photosynthesis removes oxygen from the atmosphere, and cellular respiration puts it back
d. Respiration removes carbon dioxide and oxygen and releases energy

____ 19. What would happen to an animal cell if its mitochondria were removed?

a. the cell would not be able to produce ATP
b. the cell would not be able to produce sugar
c. the cell would divide uncontrolably
d. the cell would produce more amino acids

____ 20. The diagram below shows the feeding relationship between 4 different organisms in a coral reef ecosystem.



Humans sometimes kill Giant Triton in order to collect their attractive spiral shell. If humans kill most of the Giant Tritons in a coral reef, the coral reef population will most likely

a. decrease due to a decrease in the parrot fish population
b. increase due to an increase in the parrot fish population
c. increase due to a decrease in the Crown-of-Thorns Sea Star population
d. decrease due to an increase in the Crown-of-Thorns Sea Start population

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Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 1
2. ANS: D PTS: 1
3. ANS: B PTS: 1
4. ANS: D PTS: 1
5. ANS: B PTS: 1
6. ANS: B PTS: 1
7. ANS: D PTS: 1
8. ANS: A PTS: 1
9. ANS: B PTS: 1
10. ANS: B PTS: 1
11. ANS: D PTS: 1
12. ANS: C PTS: 1
13. ANS: A PTS: 1
14. ANS: B PTS: 1
15. ANS: C PTS: 1
16. ANS: B PTS: 1
17. ANS: A PTS: 1
18. ANS: B PTS: 1
19. ANS: A PTS: 1
20. ANS: D PTS: 1