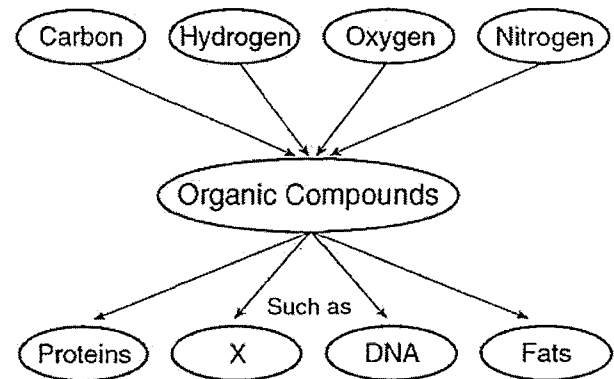


Name:

Topic Three:
Biochemistry, Respiration and Photosynthesis

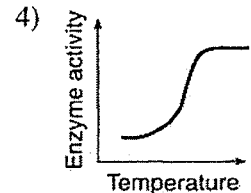
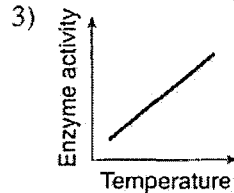
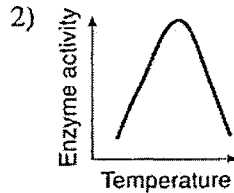
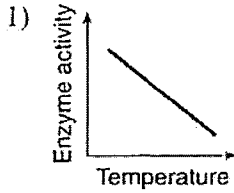
- Which statement describes starches, fats, proteins, and DNA?
 - They are used to store genetic information.
 - They are complex molecules made from smaller molecules.
 - They are used to assemble larger inorganic materials.
 - They are simple molecules used as energy sources.
- Most organisms contain
 - organic compounds, only
 - inorganic compounds, only
 - both organic and inorganic compounds
 - neither organic nor inorganic compounds
- Water is classified as an inorganic compound because it
 - does not contain carbon
 - does not contain nitrogen
 - contains hydrogen
 - contains oxygen
- All chemical breakdown processes in cells directly involve
 - reactions that are controlled by catalysts
 - enzymes that are stored in mitochondria
 - the production of catalysts in vacuoles
 - enzymes that have the same genetic base sequence
- All cells of an organism are engaged in many different chemical reactions. This fact is best supported by the presence in each cell of thousands of different kinds of
 - enzymes
 - nuclei
 - chloroplasts
 - organelles
- Which statement describes all enzymes?
 - They control the transport of materials.
 - They provide energy for chemical reactions.
 - They affect the rate of chemical reactions.
 - They absorb oxygen from the environment.
- Which part of a molecule provides energy for life processes?
 - carbon atoms
 - oxygen atoms
 - chemical bonds
 - inorganic nitrogen

- Enzyme molecules normally interact with substrate molecules. Some medicines work by blocking enzyme activity in pathogens. These medicines are effective because they
 - are the same size as the enzyme
 - are the same size as the substrate molecules
 - have a shape that fits into the enzyme
 - have a shape that fits into all cell receptors
- In plants, simple sugars are *least* likely to be
 - linked together to form proteins
 - broken down into carbon dioxide and water
 - used as a source of energy
 - stored in the form of starch molecules
- What substance could be represented by the letter X in the diagram below?

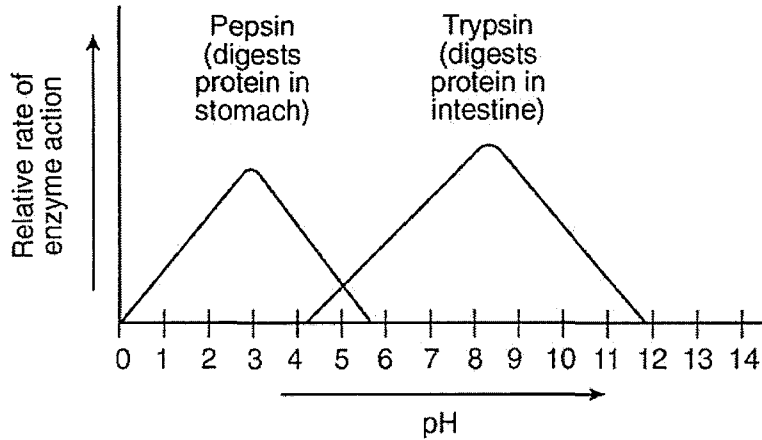


- carbohydrates
 - ozone
 - carbon dioxide
 - water
- Most of the starch stored in the cells of a potato is composed of molecules that originally entered these cells as
 - enzymes
 - simple sugars
 - amino acids
 - minerals
 - The function of most proteins depends primarily on the
 - type and order of amino acids
 - environment of the organism
 - availability of starch molecules
 - nutritional habits of the organism

13. Enzymes have an optimum temperature at which they work best. Temperatures above and below this optimum will decrease enzyme activity. Which graph best illustrates the effect of temperature on enzyme activity?



Base your answers to questions 14 and 15 on the graph below and your knowledge of biology.



14. Neither enzyme works at a pH of

- 1) 1 2) 5 3) 3 4) 13

15. Pepsin works best in which type of environment?

- 1) acidic, only 3) neutral
2) basic, only 4) sometimes acidic, sometimes basic

16. Energy from organic molecules can be stored in ATP molecules as a direct result of the process of

- 1) cellular respiration 3) diffusion
2) cellular reproduction 4) digestion

17. When organisms break the bonds of organic compounds, the organisms can

- 1) use the smaller molecules to plug the gaps in the cell membrane to slow diffusion
2) use the energy obtained to digest molecules produced by respiration that uses oxygen
3) obtain energy or reassemble the resulting materials to form different compounds
4) excrete smaller amounts of solid waste materials during vigorous exercise

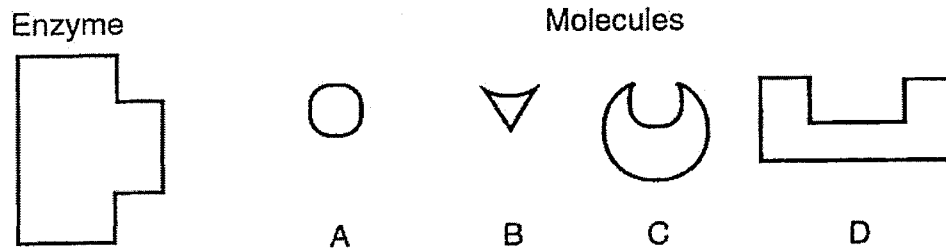
18. In what way are photosynthesis and cellular respiration similar?

- 1) They both occur in chloroplasts.
2) They both require sunlight.
3) They both involve organic and inorganic molecules.
4) They both require oxygen and carbon dioxide. inorganic produce

19. Starch molecules present in a maple tree are made from materials that originally entered the tree from the external environment as

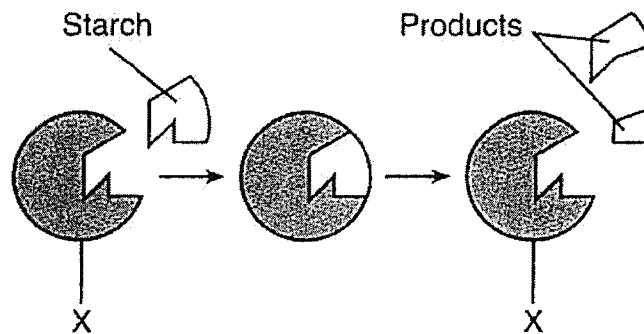
- 1) enzymes 3) amino acids
2) simple sugars 4) inorganic compounds

Base your answers to questions 20 and 21 on the diagram below that represents a human enzyme and four types of molecules present in a solution in a flask.



20. State what would most likely happen to the rate of reaction if the temperature of the solution in the flask were increased gradually from 10°C to 30°C.
21. Which molecule would most likely react with the enzyme? Why?

Base your answers to questions 22 and 23 on the diagram below, which represents stages in the digestion of a starch, and on your knowledge of biology.



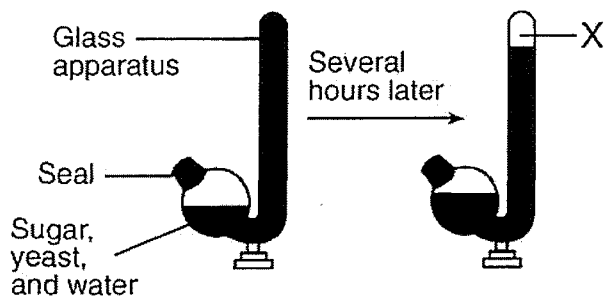
22. The structure labeled X most likely represents
- 1) an antibody
 - 2) a receptor molecule
 - 3) an enzyme
 - 4) a hormone
23. The products would most likely contain
- 1) simple sugars
 - 2) fats
 - 3) amino acids
 - 4) minerals

24.

Some internal environmental factors may interfere with the ability of the enzyme responsible for converting starch into glucose to function efficiently.

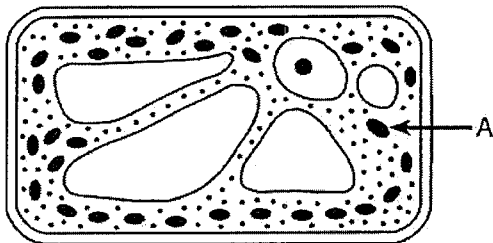
Identify *two* internal environmental factors that directly influence the rate of this enzymes action.

25. An investigation was carried out and the results are shown below. Substance X resulted from a metabolic process that produces ATP in yeast (a single-celled fungus).



Which statement best describes substance X?

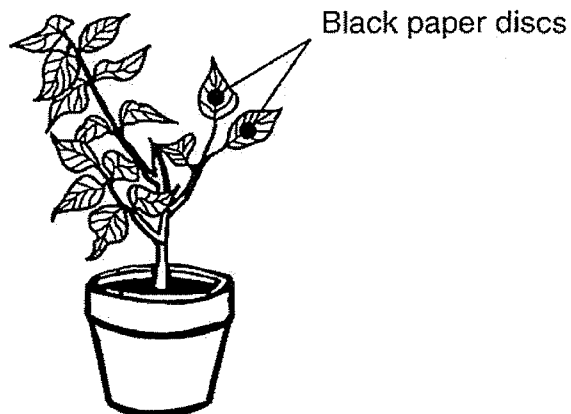
- 1) It is oxygen released by protein synthesis.
 - 2) It is glucose that was produced in photosynthesis.
 - 3) It is starch that was produced during digestion.
 - 4) It is carbon dioxide released by respiration.
26. The diagram below represents an autotrophic cell.



For the process of autotrophic nutrition, the arrow labeled A would most likely represent the direction of movement of

- 1) carbon dioxide, water, and solar energy
- 2) oxygen, glucose, and solar energy
- 3) carbon dioxide, oxygen, and heat energy
- 4) glucose, water, and heat energy

27. The diagram below represents the setup for an experiment. Two black paper discs are opposite each other on both sides of each of two leaves.



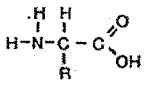
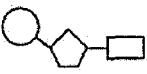
This experimental setup would most likely be used to show that

- 1) glucose is necessary for photosynthesis
- 2) protein is a product of photosynthesis
- 3) light is necessary for photosynthesis
- 4) carbon dioxide is a product of photosynthesis

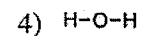
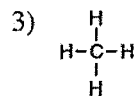
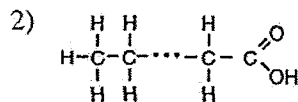
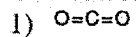
28. In some land plants, guard cells are found only on the lower surfaces of the leaves. In some water plants, guard cells are found only on the upper surfaces of the leaves. Explain how guard cells in both land and water plants help maintain homeostasis. In your answer be sure to:

- identify one function regulated by the guard cells in leaves
- explain how guard cells carry out this function
- give one possible evolutionary advantage of the position of the guard cells on the leaves of land plants

Base your answers to questions 29 through 31 on the chart below and on your knowledge of biology.

Class of Substance	Basic Unit of Structure	One Possible Function	Examples
A		B	C
Carbohydrate	D	Structural component of cell walls	E
F	G	Structural component of cell membranes	Fats, waxes
H		Protein synthesis	I

29. Which belongs in section G ?



30. In which section of the chart do nucleic acids belong?

1) F

2) B

3) H

4) D

31. In which section of the chart do the substances starch and glycogen belong?

1) A

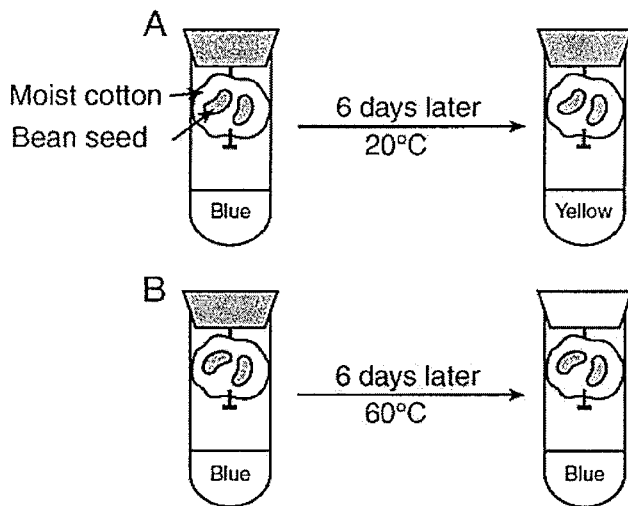
2) E

3) C

4) I

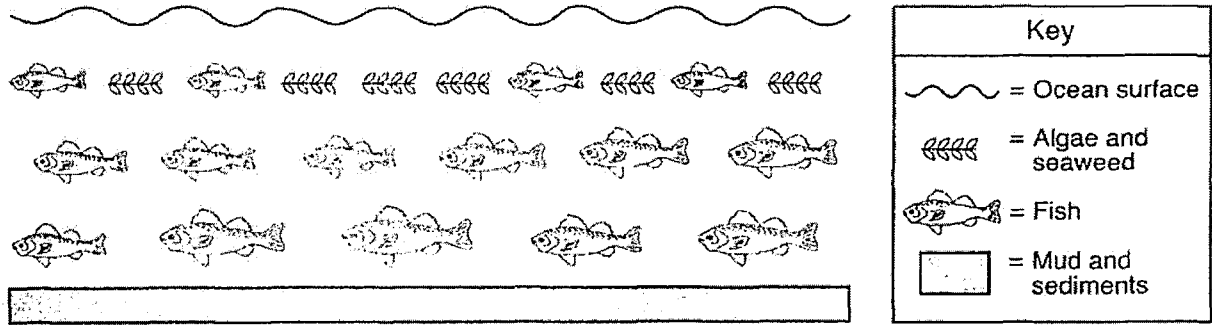
Base your answers to questions 32 and 33 on the information and diagram below and on your knowledge of biology.

Two test tubes, *A* and *B*, were set up as shown in the diagram below. Bromthymol blue, which turns from blue to yellow in the presence of carbon dioxide, was added to the water at the bottom of each tube before the tubes were sealed. The tubes were maintained at the temperatures shown for six days. (Average room temperature is 20°C.)



32. Identify the life process responsible for the change in tube *A*.
33. Explain how the temperature difference could lead to the different results in tubes *A* and *B* after six days.

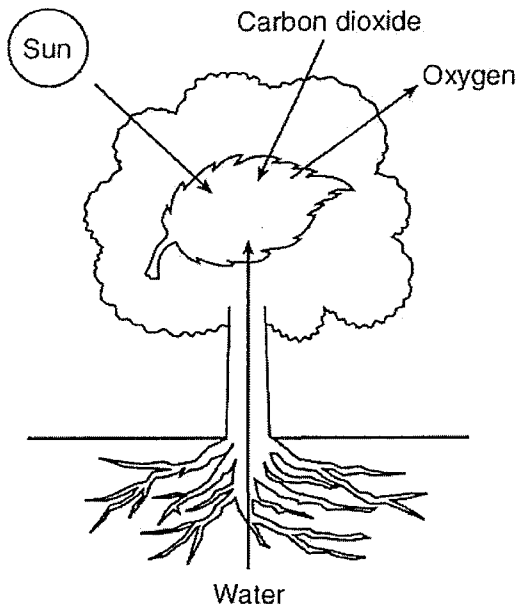
34. An ecosystem is represented below.



The organisms represented as algae and seaweed are found in the area shown due to which factor?

- 1) pH 2) sediment 3) light intensity 4) colder temperature

35. The diagram below represents events associated with a biochemical process that occurs in some organisms.



Which statement concerning this process is correct?

- 1) The process represented is respiration and the primary source of energy for the process is the Sun.
- 2) The process represented is photosynthesis and the primary source of energy for the process is the Sun.
- 3) This process converts energy in organic compounds into solar energy which is released into the atmosphere.
- 4) This process uses solar energy to convert oxygen into carbon dioxide.