

# Problem Set

Max MSS  
Key

2. Organic compounds, unlike inorganic compounds, contain

- (A) hydrogen
- (B) oxygen
- (C) nitrogen
- (D) sulfur
- (E) carbon

organic = carbon

3. The bonding of two amino acid molecules to form a portion of a protein chain involves

- (A) the addition of a water molecule
- (B) the release of a water molecule
- (C) the addition of a nitrogen atom
- (D) the release of a carbon dioxide molecule
- (E) an increase in activation energy

dehydration  
synthesis

Which of the following statements about enzymes is NOT true?

- (A) Enzymes are almost always proteins.
- (B) Enzyme activity is affected by changes in pH.
- (C) Enzymes increase the rate of reaction.
- (D) Enzymes increase the activation energy.
- (E) Enzymes do not change the free energy of products.

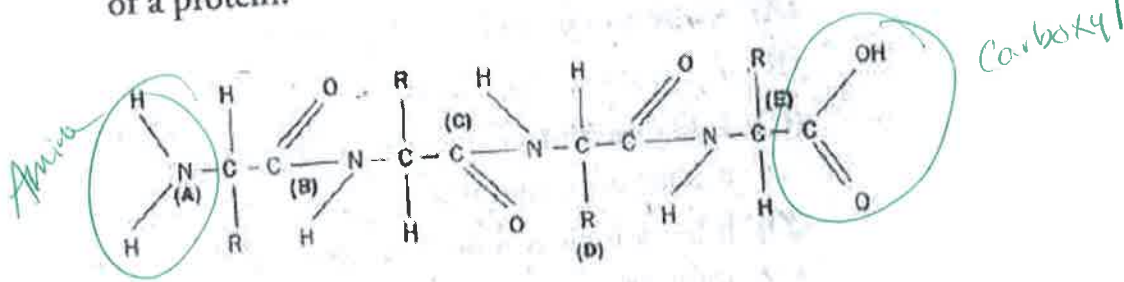
Enzymes  
lower  
a.e.

12. Which is NOT a characteristic of proteins?

- (A) Can function as enzymes
- (B) Contain peptide bonds
- (C) Are important in cell signaling
- (D) May be used as an energy source
- (E) Contain nitrogenous bases

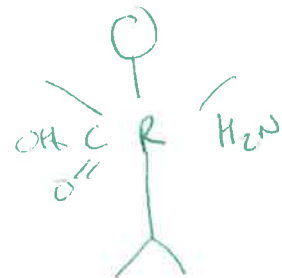
Not on cellular level

Questions 17-20 refer to the following diagram showing the polypeptide structure of a protein.



17. Indicates the carboxyl group of an amino acid

19. Indicates an amine group of an amino acid



1. Prokaryotic and eukaryotic cells share which of the following features?

- (A) A plasma membrane
- (B) Complex flagella (9 + 2)
- (C) Membrane-bound organelles
- (D) A membrane-bound nucleus
- (E) Linear chromosomes made of DNA and protein

All cells have plasma memb

3. Which of the following has a cell wall?

- (A) Animal cell
- (B) Plant cell
- (C) Some bacteria
- (D) B and C
- (E) A and B

All plants, some bac.

4. Which of the following is a typical component of the plasma membrane of a eukaryotic cell?

- (A) DNA
- (B) mRNA
- (C) tRNA
- (D) Cholesterol
- (E) Actin

Keeps membrane fluid



Which of the following organelles translates the DNA code into proteins?

- (A) Chloroplast
- (B) Ribosome**
- (C) Lysosome
- (D) Nucleolus
- (E) Vacuole

B

easy Q

17. A mature plant cell can be distinguished from other eukaryotic cells because it has

- (A) energy-producing mitochondria
- (B) a rough endoplasmic reticulum
- (C) chloroplasts**
- (D) a large central vacuole
- (E) a membrane-bound nucleus

D

Some protists have chloroplasts, but large, central vac is unique

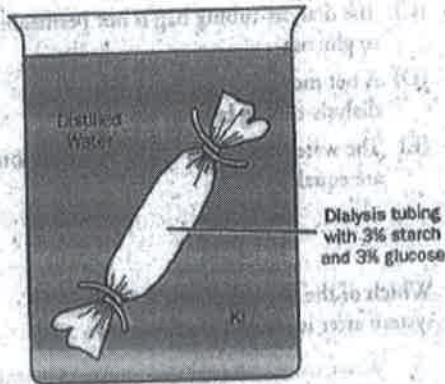
9. Which of the following cells would most likely have the greatest concentration of densely packed mitochondria?

- (A) A yeast cell in S phase of the cell cycle
- (B) A xylem cell in old wood of a tree
- (C) An oxygenated red blood cell
- (D) A smooth muscle cell in the diaphragm**
- (E) A sensory nerve cell in the inner ear

D

does the most CR

Questions 12-14 refer to the figure below in which a dialysis-tubing bag is filled with a mixture of 3 percent starch and 3 percent glucose and placed in a beaker of distilled water with KI indicator. After one hour, the solution inside the dialysis bag has turned a dark blue, while the solution in the beaker has remained clear.



12. Which of the following is an accurate conclusion that can be made only from the observed results?
- (A) The dialysis-tubing bag weighs less.
- (B) Glucose has not diffused across the dialysis-tubing membrane.
- C** (C) The dialysis-tubing bag is selectively permeable.
- (D) A net movement of water into the beaker has occurred.
- (E) The water potential in the beaker is greater than in the bag.

Indicator turns blue in presence of starch sugar, has moved into bag

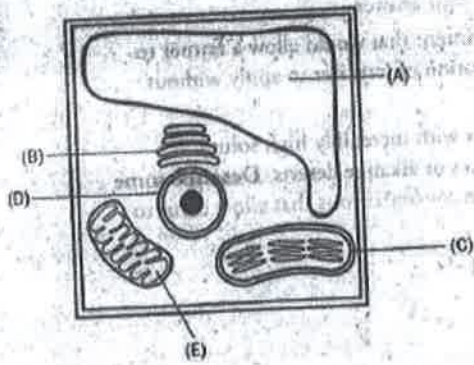
11. Which of the following could be identified by the presence of ribosomes, simple flagell and a cell wall, along with the absence of membrane-bound organelles?

- (A) An amoeba
- (B) A bacterium**
- (C) A muscle cell
- (D) An algae
- (E) A virus

No memb bound organelles

14. Which of the following best describes the system after it reaches equilibrium?
- (A) Water will have a net movement into the dialysis-tubing bag.
- (B) The osmotic pressure inside the dialysis-tubing bag will be the same as the osmotic pressure in the surrounding solution.**
- (C) KI will have a net movement into the dialysis-tubing bag.
- (D) Glucose will have a net movement out of the dialysis-tubing bag.
- (E) The solution inside of the dialysis-tubing bag will have the same starch concentration as the surrounding solution.

Questions 18-20 refer to the figure below of a plant cell. Match each term to the correct label.



- 18. Chloroplast C
- 19. Mitochondrion E
- 20. Central vacuole A

### Review Questions

For questions 1-4, please use the following answer choices:

- A. Cell wall
- B. Mitochondrion
- C. Ribosome
- D. Lysosome
- E. Golgi apparatus

1. This organelle is present in plant cells, but not animal cells.

1. A - cell wall

2. D - lysosome

3. B - mito

4. C - ribosome

2. Absence of enzymes from this organelle can lead to storage diseases such as Tay-Sachs disease.

3. This organelle is the host for the Krebs cycle and oxidative phosphorylation of respiration.

4. This organelle is synthesized in the nucleolus of the cell.

Do in partners



5. Which of the following best describes the fluid mosaic model of membranes?

- A. The membrane consists of a phospholipid bilayer with proteins of various lengths and sizes located on the exterior portions of the membrane.
- B. The membrane consists of a phospholipid bilayer with proteins of various lengths and sizes located in the interior of the membrane.
- C. The membrane is composed of a phospholipid bilayer with proteins of uniform lengths and sizes located in the interior of the membrane.
- D. The membrane contains a phospholipid bilayer with proteins of various lengths and sizes interspersed among the phospholipids.
- E. The membrane consists of a phospholipid bilayer with proteins of uniform length and size interspersed among the phospholipids.



6. Which of the following types of cell transport requires energy?

- A. The movement of a particle across a selectively permeable membrane down its concentration gradient *diff*
- B. The movement of a particle across a selectively permeable membrane against its concentration gradient *AT*
- C. The movement of water down its concentration gradient across selectively permeable membranes *osm.*
- D. The movement of a sodium ion from an area of higher concentration to an area of lower concentration *cat diff*
- E. The movement of a particle across a selectively permeable membrane with the assistance of the membrane's transport proteins *fac diff*

7. Which of the following structures is present in prokaryotic cells?

- A. Nucleus
- B. Mitochondria
- C. Cell wall
- D. Golgi apparatus
- E. Lysosome

D

B

C

description of an organelle's function?

- A. *Chloroplast*: the site of photosynthesis and energy production in plant cells
- B. *Peroxisome*: organelle that produces hydrogen peroxide as a by-product of reactions involved in the breakdown of fatty acids, and detoxification of alcohol in the liver
- C. *Golgi apparatus*: structure to which proteins, lipids, and other macromolecules are sent to be modified by the addition of sugars and other molecules to form glycoproteins
- D. *Rough endoplasmic reticulum*: membrane-bound organelle lacking ribosomes on its cytoplasmic surface, involved in lipid synthesis, detoxification, and carbohydrate metabolism
- E. *Nucleus*: the control center in eukaryotic cells, which acts as the site for replication, transcription, and posttranscriptional modification of RNA

RER has ribosomes

9. The destruction of which of the following would most cripple a cell's ability to undergo cell division?

- A. Microfilaments
- B. Intermediate filaments
- C. Microtubules
- D. Actin fibers
- E. Keratin fibers

C

Matching Column\*

- 1. Produces ATP
- 2. Produces proteins
- 3. Packages and secretes substances
- 4. Contains hydrolytic enzymes
- 5. Directly assists with cell division

- (A) Golgi apparatus
- (B) Microtubules
- (C) Rough endoplasmic reticulum
- (D) Mitochondria
- (E) Lysosomes

6. Which of the following is *not* normally found in a plant cell?

- (A) mitochondria
- (B) endoplasmic reticulum
- (C) plastids
- (D) centrioles

7. Which of the following is *present* in a prokaryote cell?

- (A) mitochondria
- (B) ribosomes
- (C) endoplasmic reticulum

D

B

- 1. D
- 2. C
- 3. A
- 4. E
- 5. B



12. Smooth E.R. carries out all of the following activities EXCEPT

- (A) lipid production
- (B) detoxification
- (C) connects rough E.R. to the Golgi
- (D) produces RNA

13. An animal cell in a hypertonic solution would

- (A) swell
- (B) swell and exhibit turgor
- (C) exhibit plasmolysis — shrink
- (D) shrink and then swell



Water exits

~~(C) amoeboid movement~~

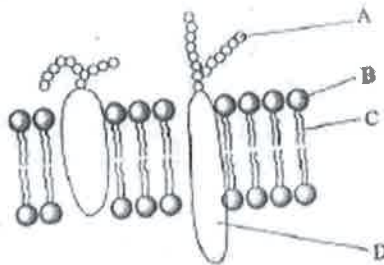
17. Which of the following best characterizes the structure of the plasma membrane?

- (A) rigid and unchanging
- (B) rigid but varying from cell to cell
- (C) fluid but unorganized
- (D) very active

~~DE not edited~~

Questions 19-21

The following questions refer to the figure below, which shows the plasma membrane.



19. Identify the hydrophilic portion of a lipid molecule. **B**

20. Identify the proteins involved in transport. **D**

21. Identify the structure involved in cell-to-cell communication. **A**

- C
- (A) They activate G-protein in the cytoplasm of the cell.
  - (B) They bind to steroid messengers on the surface of a cell.
  - (C) They belong to a class of plasma membrane receptors that exhibit enzyme activity.
  - (D) They allow for the passage of ions such as  $\text{Na}^+$  ions through the plasma membrane of a cell.
- use

25. Which of the following is correct about signal transduction pathways?

- C
- (A) Signal transduction pathways are found only in the cells of the most complex animals.
  - (B) Signal transduction pathways have evolved recently along with the development of enlarged brain size in mammals.
  - (C) In the signal transduction pathway, a single molecule can stimulate the release of thousands of molecules of product within a cell.
  - (D) Signal transduction pathways are unique in that receptors that stimulate the pathway are located only on the surface of a plasma membrane.
- cascade

or water

7. All of the following statements are correct about enzymes EXCEPT

- A
- (A) they raise the energy of activation of all reactions
  - (B) they enable reactions to occur at a relatively low temperature
  - (C) they remain unchanged during a reaction
  - (D) they are often located within the plasma membrane of the cell
- they lower the act. E

more acidic than a solution with pH 7.

9. Which of the following can be used to determine the rate of an enzyme-catalyzed reaction?

- (A) the rate of substrate formed
- (B) the decrease in temperature in the system
- (C) the rate of enzyme used up
- (D) the rate of substrate used up

substrate  $\rightarrow$  products

10. Which of the following best describes the reaction shown below?

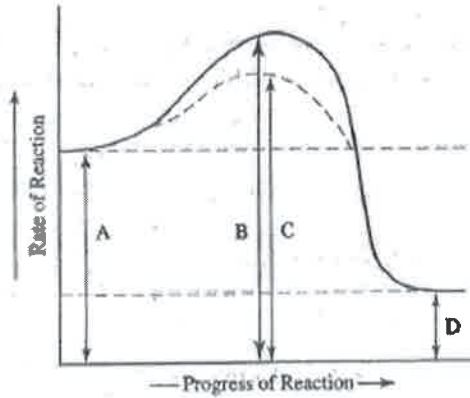


- (A) hydrolysis
- (B) an exergonic reaction
- (C) an endergonic reaction
- (D) catabolism

makes  $\Sigma$  (anabolism)

### Questions 11-12

The graph below demonstrates two chemical reactions. One is catalyzed by an enzyme, one is not.



11. Which letter shows the energy of activation for the enzyme-catalyzed reaction?

- (A) A
- (B) B
- (C) C
- (D) D

12. Which letter shows the potential energy of the product?

- (A) A
- (B) B
- (C) C
- (D) D

# What questions do you still have?

Cliffs pgs 40-41 (Key 42) calls

25 - 27 (Key 28)