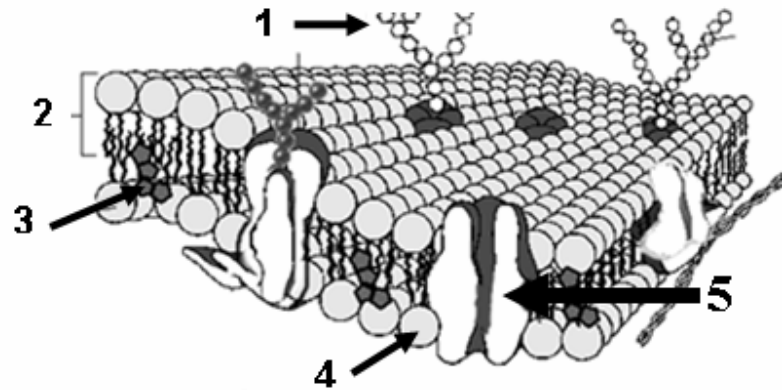




**Multiple Choice Questions: Choose the most appropriate answer and shade the letter corresponding to the correct answer on the computerized answer sheet.**

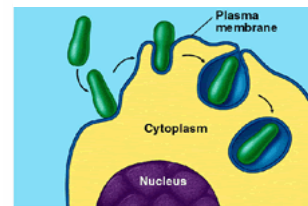
\*\*\*\*\*

Refer to the following figure to answer questions 1 to 3



1. Which component is possibly involved in cell-cell recognition?  
 \*A. 1.    B. 2.    C. 3.    D. 4.    E. 5.
2. The component that is considered “fluidity buffer” for the whole structure is .....  
 A. 1.    B. 2.    \*C. 3.    D. 4.    E. 5.
3. What is **INCORRECT** about 5?  
 A. It transports small polar solutes.  
 B. Its function does not require energy.  
 C. It is a transmembrane protein  
 D. Its inside part is hydrophilic.  
 \*E. It is a carrier protein.

4. The figure shown demonstrates .....  
 \*A. phagocytosis.    B. exocytosis.    C. pinocytosis.  
 D. receptor-mediated endocytosis.    E. A and B.



5. Which of the following describes the nature of a plasma membrane?  
 A. It is a phospholipid bilayer between two layers of proteins.  
 B. It is one layer of phospholipids with integral and attached proteins.  
 C. It is two layers of proteins between two phospholipid layers.  
 \*D. It is a phospholipid bilayer with integral and attached proteins.  
 E. It is a phospholipid bilayer with one layer of attached proteins.
6. Membrane fluidity in animal cells is affected by .....  
 A. presence of cholesterol.    B. unsaturated fatty acids.  
 C. temperature.    \*D. A, B, and C.    E. none of the above.
7. Which of the following is(are) electrogenic pump(s)?  
 A. Na<sup>+</sup>/K<sup>+</sup> pump.    B. Glucose pump.    C. H<sup>+</sup> pump.  
 D. A, B, and C.    \*E. Only A and C.
8. Nonpolar small hydrocarbons, CO<sub>2</sub> and O<sub>2</sub> cross the membrane by .....  
 A. active transport.    \*B. simple diffusion.    C. facilitated diffusion.  
 D. bulk transport.    E. none of the above.
9. What would happen if an animal cell is placed in a hypertonic environment?  
 A. The cell becomes plasmolyzed.    B. The cell becomes turgid.  
 \*C. The cell loses H<sub>2</sub>O to its environment.    D. The cell gains H<sub>2</sub>O.  
 E. H<sub>2</sub>O flows at the same rate in both directions across the plasma membrane.

10. Diffusion of an ion across plasma membrane is generally controlled by .....

- A. membrane voltage. B. concentration gradient of ions.  
 C. presence of protein channels. \*D. A, B, and C. E. B and C only.

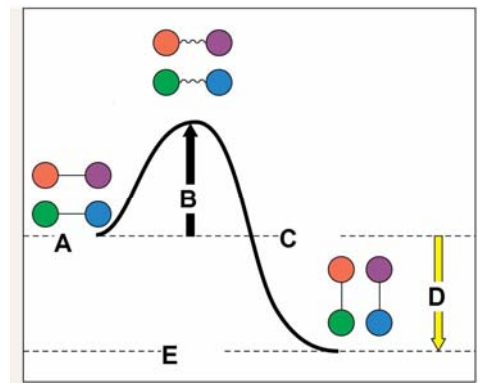
11. Sucrose- $H^+$  cotransporter transports sucrose into the cell .....

- A. down its concentration gradient. B. down its electrochemical gradient.  
 \*C. against its concentration gradient. D. against its electrochemical gradient.  
 E. by passive diffusion.

12. The transfer of free energy from exergonic reaction to endergonic reaction is best called .....

- A. feedback inhibition B. competitive inhibition \*C. energy coupling  
 D. cooperativity E. allosteric regulation

Refer to the figure to answer the following questions 13-15.



13. The rate of the reaction is determined by .....

- A. \*B. C. D. E.

14. The change in free energy is indicated by .....

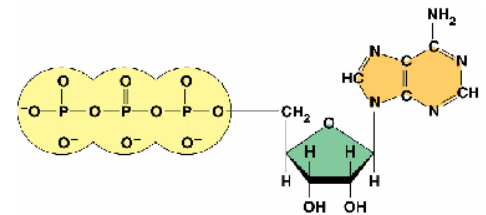
- A. B. C. \*D. E.

15. This reaction .....

- A. is endergonic reaction. \*B. is spontaneous.  
 C. requires energy. D. is nonspontaneous.  
 E. none of the above

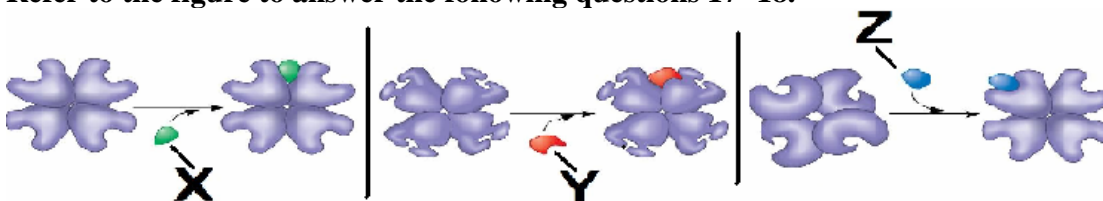
Refer to the figure to answer the following question 16.

16. Which statement(s) is(are) correct concerning the molecule shown in the figure?



- A. Serves as the main energy shuttle in the cell.  
 B. Drives endergonic reaction in the cell by the enzymatic transfer of the phosphate group to specific reactants.  
 C. It is regenerated from ADP and phosphate in an exergonic reaction.  
 \*D. A and B are correct.  
 E. A, B, and C are correct.

Refer to the figure to answer the following questions 17 -18.



17. The type of enzymatic regulation shown in the figure is called .....

- A. feedback inhibition. B. competitive inhibition. C. irreversible inhibition.  
 \*D. allosteric regulation. E. none of the above.

18. The active form(s) of the enzyme(s) is (are) stabilized by .....

- A. X only. B. Y only C. Z only \*D. X and Z only E. X, Z and Y

19. An organic nonprotein helper of an enzyme molecule is called .....

- A. prosthetic group. B. allosteric regulator. \*C. coenzyme. D.  $Mg^+$ . E. activator.

**20. Induced fit means .....**

- A. the binding of the substrate doesn't depend on the shape of the active site.
- B. some enzymes become denatured when activators bind to the substrate.
- C. a noncompetitive inhibitor can compete with the substrate for the active site.
- \*D. the binding of the substrate changes the shape of the enzyme's active site slightly.
- E. the regulatory site creates a microenvironment ideal for the reaction.

Refer to the figure to answer the following questions 21-23.

**21. Which show(s) the kind of inhibition that can be overcome by increasing the concentration of substrate?**

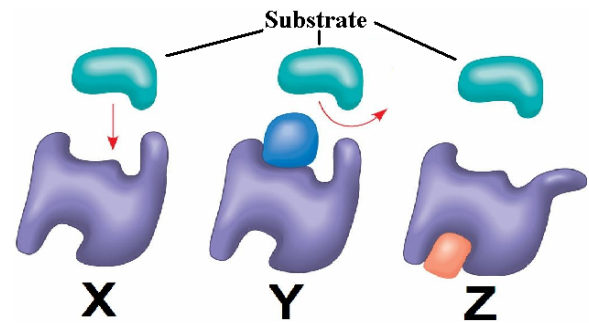
- A. X only      \*B. Y only      C. Z only
- D. X and Y      E. Y and Z

**22. Non-competitive inhibition is represented by .....**

- A. X only      B. Y only      \*C. Z only
- D. X and Y      E. Y and Z

**23. Feedback inhibition involves .....**

- A. X only      B. Y only      \*C. Z only
- D. X and Y      E. Y and Z



**24. Which of the following statements is NOT true about glycolysis?**

- \*A. It oxidizes glucose to carbon dioxide.
- B. It produces a small amount of ATP.
- C. It splits glucose to form two molecules of pyruvate.
- D. It generates NADH.
- E. It occurs in cytoplasm.

**25. When one acetyl CoA molecule is oxidized by citric acid cycle, the products are .....**

- A. three carbon dioxide, one ATP, four NADH, and one FADH<sub>2</sub>.
- B. oxygen, ATP, NADH, and FADH<sub>2</sub>.
- C. water and ATP.
- \*D. two carbon dioxide, one ATP, three NADH, and one FADH<sub>2</sub>.
- E. oxygen, ATP, NAD<sup>+</sup>, and FAD.

**26. In bacteria, the electron transport chain is located in the .....**

- A. nucleus.
- B. intermembrane space of the mitochondria.
- C. cytoplasm.
- D. mitochondrial matrix.
- \*E. plasma membrane.

**27. The ATP produced during fermentation is generated by which of the following?**

- A. The electron transport chain.
- \*B. Substrate level phosphorylation.
- C. The Krebs cycle.
- D. Chemiosmosis.
- E. The citric acid cycle.

**28. If oxygen is NOT present in muscle cells, glycolysis is completed .....**

- A. by its Krebs cycle.
- B. by the electron transport chain.
- \*C. as lactate fermentation.
- D. by chemiosmosis.
- E. none of the above.

**29. Which electron carrier is regenerated during fermentation and is required as an oxidizing agent in glycolysis?**

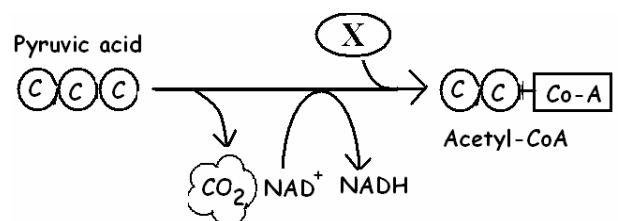
- \*A. NAD<sup>+</sup>
- B. NADPH
- C. ATP
- D. ADP
- E. NADP<sup>+</sup>

**30. The movement of which ion across the membrane from the intermembrane space to the matrix causes ATP synthase to spin and make ATP.**

- A. Na<sup>+</sup>.
- B. Oxygen.
- \*C. H<sup>+</sup>.
- D. Water.
- E. Electron.

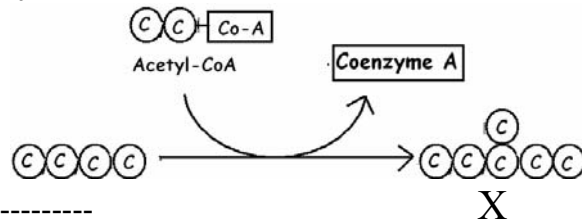
**31. In the shown figure, Name the molecule "X" that joins in this reaction to make Acetyl-CoA.**

- A. ATP.
- \*B. Coenzyme A.
- C. citric acid.
- D. NADP<sup>+</sup>.
- E. ADP.



32. In the figure shown of the first part of Krebs cycle, molecule "X" is.....

- A. ATP.
- B. pyruvate.
- C. oxalacetate.
- \*D. citrate.
- E. fructose.



33. In biological systems, an important enzyme involved in the reduction of  $\text{NAD}^+$  of redox reactions is .....

- A. aldolase.
- B. isomerase.
- \*C. dehydrogenase.
- D. ATP synthase.
- E. kinase.

34. When a fat molecule is used for aerobic respiration, it is first hydrolyzed into .....

- \*A. glycerol and fatty acids.
- B. sugars and glycerol.
- C. glycerol and amino acids.
- D. sugars and amino acids.
- E. fatty acids and sugars.

35. The conversion of pyruvate into lactate requires .....

- A. lactate.
- B. alcohol.
- C. oxygen.
- D. ATP.
- \*E. NADH

36. Complete oxidation of one acetyl CoA molecule gives a total of ..... ATP molecules.

- A. 2.
- B. 5.
- C. 8.
- \*D. 10.
- E. 20.

Refer to the figure to answer questions 37-39

37. A is .....

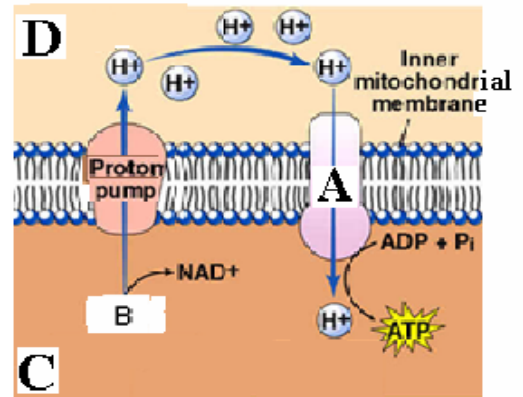
- \*A. ATP synthase.
- B. dehydrogenase.
- C. hexokinase.
- D. isomerase.
- E. mutase.

38. C is .....

- A. stroma.
- B. cytoplasm.
- \*C. matrix.
- D. intermembrane space
- E. grana

39. D is .....

- A. stroma.
- B. cytoplasm.
- C. matrix
- \*D. intermembrane space
- E. grana



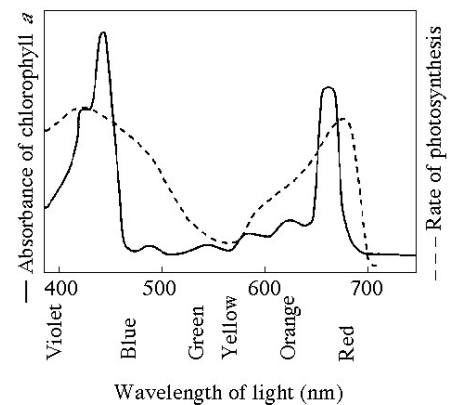
Refer to the figure to answer the following questions 40-41.

40. Plotting the rate of photosynthesis against wavelength is called...

- A. an absorption spectrum.
- \*B. an action spectrum.
- C. an electromagnetic spectrum.
- D. a spectrophotometer.
- E. the excited state of chlorophyll a.

41. The rate of photosynthesis does not correspond exactly to chlorophyll a absorbance because.....

- A. green and yellow wavelengths inhibit the absorption of red and blue wavelengths.
- B. bright sunlight destroys photosynthetic pigments.
- C. oxygen given off during photosynthesis interferes with the absorption of light.
- \*D. other pigments absorb light in addition to chlorophyll a.
- E. aerobic bacteria take up oxygen, which changes the measurement of the rate of photosynthesis.



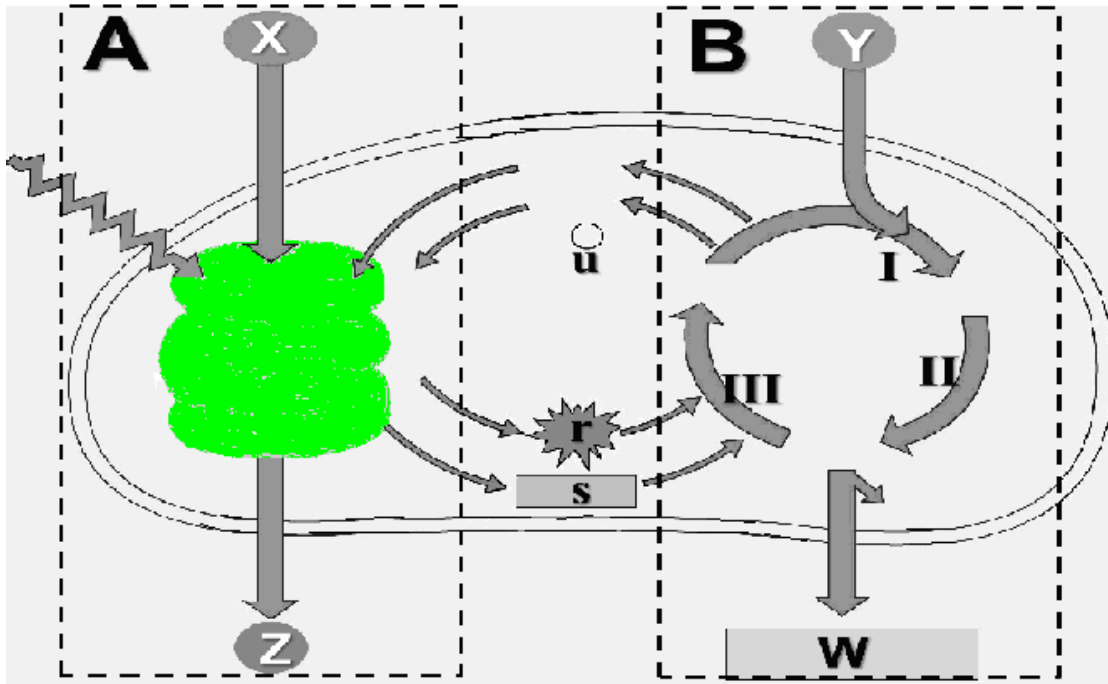
42. Cyclic electron flow .....

- A. uses both photosystem I and II.
- B. uses photosystem II only.
- \*C. generates ATP only.
- D. generates NADPH only.
- E. releases  $\text{O}_2$ .

43. To synthesize one glucose molecule, the Calvin cycle uses ..... molecules of CO<sub>2</sub> , ..... molecules of ATP, and ..... molecules of NADPH.

- \*A. 6, 18, and 12.    B. 3, 9, and 6.    C. 1, 3, and 2.    D. 6, 12, and 8.    E. 12, 6, and 18.

Refer to the figure to answer the following questions 44-47.



44. The organelle represented in the figure is found in all of the following EXCEPT:

- \*A. cyanobacteria.    B. unicellular algae    C. multicellular algae  
 D. olive trees    E. eukaryotic photoautotrophs

45. Which of the following are products of the process “A” of photosynthesis that are utilized in process “B”?

- A. CO<sub>2</sub> and glucose    B. H<sub>2</sub>O and O<sub>2</sub>    C. ADP, P<sub>i</sub>, and NADP<sup>+</sup>  
 D. Electrons and H<sup>+</sup>    \*E. ATP and NADPH

46. Where do the processes in Box “B” take place?

- \*A. Stroma of the chloroplast.    B. Thylakoid membrane.    C. Thylakoid space.  
 D. Cytoplasm surrounding the chloroplast.    E. Outer membrane of the chloroplast.

47. Which of the following sequences correctly represents the flow of electrons during photosynthesis?

- A. s → Z → Y.    \*B. X → s → W    C. s → chlorophyll → B  
 D. I → II → III    E. s → electron transport chain → Z

48. Which of the following is NOT part of the light reactions?

- A. P680 of photosystem II.    B. The primary acceptor of photosystem I.  
 \*C. Regeneration of ADP.    D. Linear electron flow.    E. NADP<sup>+</sup> reductase

49. Which of the following is NOT included in Calvin cycle?

- A. Rubisco.    B. G3P.    C. RuBP.    D. Consumption of ATP.    \*E. ATP synthase.

50. What is the primary function of the Calvin cycle?

- A. Use ATP to release carbon dioxide.    B. Use NADPH to release carbon dioxide.  
 C. Split water and release oxygen.    D. Transport RuBP out of the chloroplast.  
 \*E. Synthesize simple sugars from carbon dioxide.