NAME _____

AP BIOLOGY TEST- Chapters 6 & 7

1. One of the most pronounced differences between animal and plant cells is that
   (A) animal cells alone have one or more large vacuoles
   (B) animal cells alone have a nucleolus
   (C) animal cells alone have their nuclear chromatin attached to the spindle fibers during mitosis
   (D) plant cells alone have rough endoplasmic reticulum
   (E) plant cells alone have relatively thick, rigid cell walls

   1986 AP EXAM

2. Which of the following macromolecules is primarily responsible for the insolubility of cell membranes in water?
   (A) Starch
   (B) Cellulose
   (C) Protein
   (D) Phospholipid
   (E) Glycogen

   1986 AP EXAM

3. In cells, which of the following can function to give shape, enable movement, and anchor organelles?
   (A) Vacuoles filled with water and surrounded by a single membrane
   (B) Ribosomes, peroxisomes, and lysosomes
   (C) Microtubules, microfilaments, intermediate fibers, and microtrabeculae
   (D) The interconnected networks of the endoplasmic reticulum
   (E) Golgi apparatus and associated vesicles in the cytoplasm

   1986 AP EXAM

4. All of the following statements about a chloroplast and a mitochondrion are true EXCEPT:
   (A) Both use proton gradients for energy production.
   (B) Both capture light energy.
   (C) Both contain DNA.
   (D) Both are bounded by two unit membranes.
   (E) Both synthesize ATP.

   1986 AP EXAM

5. Prokaryotes differ from eukaryotes in that only the prokaryotes contain
   (A) mitochondria in which glucose is oxidized
   (B) DNA that is not bound to histone protein
   (C) chromosomes enclosed within a nuclear envelope
   (D) photosynthetic pigments in plastids
   (E) plasma membranes surrounding the cytoplasm

   1986 AP EXAM

6. All of the following are functions of the smooth endoplasmic reticulum of animals EXCEPT
   (A) detoxification of poisons in the liver
   (B) storage of Ca^{2+} in the sarcomere of muscles
   (C) synthesis of proteins
   (D) synthesis of lipids
   (E) synthesis of steroid hormones

1986 AP EXAM

7. The organelle that is a major producer of ATP and is found in both heterotrophs and autotrophs is the
   (A) chloroplast
   (B) nucleus
   (C) ribosome
   (D) Golgi apparatus
   (E) mitochondrion

1990 AP EXAM

8. Which of the following would result if the sodium-potassium pump of a neuron were inoperative?
   (A) The movement of chloride ions would produce an action potential.
   (B) An impulse would travel from the axon to the dendrites of the neuron.
   (C) The rate of transmission of the impulse would greatly increase.
   (D) The rate of ATP synthesis would increase.
   (E) An action potential would not occur.

1990 AP EXAM

9. All of the following cell components are found in prokaryotic cells EXCEPT
   (A) DNA
   (B) ribosomes
   (C) cell membrane
   (D) nuclear envelope
   (E) enzymes

1990 AP EXAM

10. Structures found in the cells of both angiosperms and mammals are
   (A) cell walls and cell membranes
   (B) centrioles and lysosomes
   (C) chloroplasts and ribosomes
   (D) cell membranes and chromosomes
   (E) contractile vacuoles and leucoplasts

1990 AP EXAM

11. If plant cells are immersed in distilled water, the resulting movement of water into the cells is called
   (A) conduction
   (B) active transport
   (C) transpiration
   (D) osmosis
   (E) facilitated diffusion

1990 AP EXAM

12. Which of the following is the primary role of the lysosome?
    (A) ATP synthesis
    (B) Intracellular digestion
    (C) Lipid transport
    (D) Carbohydrate storage
    (E) Protein synthesis 1990 AP EXAM

13. The cytoplasmic channels between plant cells which are most similar to gap junctions between animal cells are called
    (A) middle lamellas
    (B) tonoplasts
    (C) plasmodesmata
    (D) tight junctions
    (E) desmosomes 1990 AP EXAM

14. Which of the following is an example of a hydrogen bond?
    (A) The peptide bond between amino acids in a protein
    (B) The bond between an oxygen atom and a hydrogen atom in the carboxyl group of a fatty acid
    (C) The bond between Na^+ and Cl^- in salt
    (D) The attraction between a hydrogen of one water molecule and the oxygen of another water molecule
    (E) The bond between carbon and hydrogen in methane
    1990 AP EXAM

15. The nucleolus functions in the production of
    (A) Golgi apparatus
    (B) microtubules
    (C) mitochondria
    (D) ribosomes
    (E) endoplasmic reticulum 1994 AP EXAM

16. Which of the following is a characteristic of mitochondria and chloroplasts that supports the endosymbiotic theory?
    (A) Both have bacteria-like polysaccharide cell walls.
    (B) Both can reproduce on their own outside of the cell.
    (C) Both contain DNA molecules.
    (D) Both contain endoplasmic reticulum and Golgi bodies.
    (E) Both contain ribosomes that are identical to ribosomes of the eukaryotic cytoplasm.
    1994 AP EXAM

17. Which of the following are characteristic of both prokaryotic and eukaryotic cells?
    (A) Cytoplasm and a well-defined nucleus surrounded by a membrane
    (B) Membranous sites of ATP synthesis, Golgi complex, and ribosomes
    (C) Mitochondria, nucleus, and ribosomes
    (D) Cell wall, several chromosomes, and cytoplasm
    (E) Cell membrane, ribosomes, DNA, and RNA 1994 AP EXAM

18. Unlike the cells of flowering plants, the cells of animals are characterized by which of the following?
(A) Mitochondria
(B) A nucleus surrounded by a double membrane
(C) Centrioles
(D) A plasma membrane surrounded by a nonliving cell wall
(E) A single large central vacuole 1994 AP EXAM

19. Which of the following organelles modifies and packages for secretion the materials produced by the ribosomes?
(A) The chloroplast
(B) The Golgi apparatus
(C) The nucleus
(D) The nucleolus
(E) The mitochondrion 1999 AP EXAM

20. A student using a light microscope observes a cell and correctly decides that it is a plant cell because
(A) ribosomes are visible
(B) an endoplasmic reticulum can be seen
(C) a cell membrane is present
(D) it has a large central vacuole
(E) centrioles are present 1999 AP EXAM

21. Which of the following best supports the statement that mitochondria are descendants of endosymbiotic bacteria-like cells?
(A) Mitochondria and bacteria possess similar ribosomes and DNA.
(B) Mitochondria and bacteria possess similar nuclei.
(C) Glycolysis occurs in both mitochondria and bacteria.
(D) Both mitochondria and bacteria have microtubules.
(E) Neither mitochondria nor bacteria possess chloroplasts. 1999 AP EXAM

22. Membranes are components of all of the following EXCEPT
(A) microtubule
(B) nucleus
(C) Golgi apparatus
(D) mitochondrion
(E) lysosome 1999 AP EXAM

23. Prokaryotic and eukaryotic cells generally have which of the following features in common?
(A) A membranebound nucleus
(B) A cell wall made of cellulose
(C) Ribosomes
(D) Flagella or cilia that contain microtubules
(E) Linear chromosomes made of DNA and protein 1999 AP EXAM

23. Which of the following is best observed by using a compound light microscope?
(A) A eukaryotic cell
(B) A virus
(C) A DNA sequence
(D) The inner structure of a mitochondrion
(E) A nuclear pore 1999 AP EXAM

25. All of the following are typical components of the plasma membrane of a eukaryotic cell EXCEPT
(A) glycoproteins
(B) cytochromes
(C) cholesterol
(D) phospholipids
(E) integral proteins 1999 AP EXAM

26. Which of the following cellular processes is coupled with the hydrolysis of ATP?
(A) Facilitated diffusion
(B) Active transport
(C) Chemiosmosis
(D) Osmosis
(E) Na^+ influx into a nerve cell 1999 AP EXAM

27. Which of the following cells would most likely have the greatest concentration of densely packed rough endoplasmic reticulum?
(A) An amoeba engulfing small ciliates
(B) A bioluminescent bacterial cell
(C) A pancreatic cell engaged in the production of digestive enzymes
(D) A functional phloem cell at maturity
(E) An epithelial cell whose DNA is replicating before mitosis 1999 AP EXAM

28. Which of the following is an example of active transport across a membrane?
(A) The movement of water from a nephron into the collecting duct of the kidney
(B) The movement of glucose by facilitated diffusion into a liver cell
(C) The movement of water from the inside of a cell into a surrounding hypertonic medium
(D) The movement of Na^+ into a neuron as a nerve impulse is generated
(E) The movement of H^+ into a thylakoid disc during photosynthesis 1999 AP EXAM

29. A prokaryotic cell has which of the following?
(A) Centrioles
(B) Lysosomes
(C) Plasma membrane
(D) Mitochondria
(E) Endoplasmic reticulum 2002 AP EXAM

30. Which of the following provides the weakest evidence that mitochondria were once free-living prokaryotes?
    (A) Mitochondrial ribosomes resemble those of prokaryotes.
    (B) Mitochondria have DNA that is circular and does not have associated protein.
    (C) Enzyme pathways on mitochondrial membranes resemble those found on modern prokaryote membranes.
    (D) Mitochondria reproduce by a process similar to binary fission.
    (E) Mitochondria and prokaryotes both are found in a variety of sizes. 2002 AP EXAM

31. Simple diffusion and facilitated diffusion are related in that both
    (A) require protein carriers
    (B) depend on a concentration gradient
    (C) occur via contractions of cytoskeletal elements attached to membrane proteins
    (D) are endergonic processes and thus require the hydrolysis of ATP
    (E) occur in eukaryotic cells but not in prokaryotic cells 2002 AP EXAM

32. Which of the following is correct concerning a spherical cell?
    (A) As the diameter decreases, the surface area remains the same.
    (B) As the diameter decreases, the surface area increases.
    (C) As the diameter decreases, the surface-to volume ratio increases.
    (D) As the diameter increases, the volume decreases.
    (E) The surface-to-volume ratio is independent of the diameter. 2002 AP EXAM

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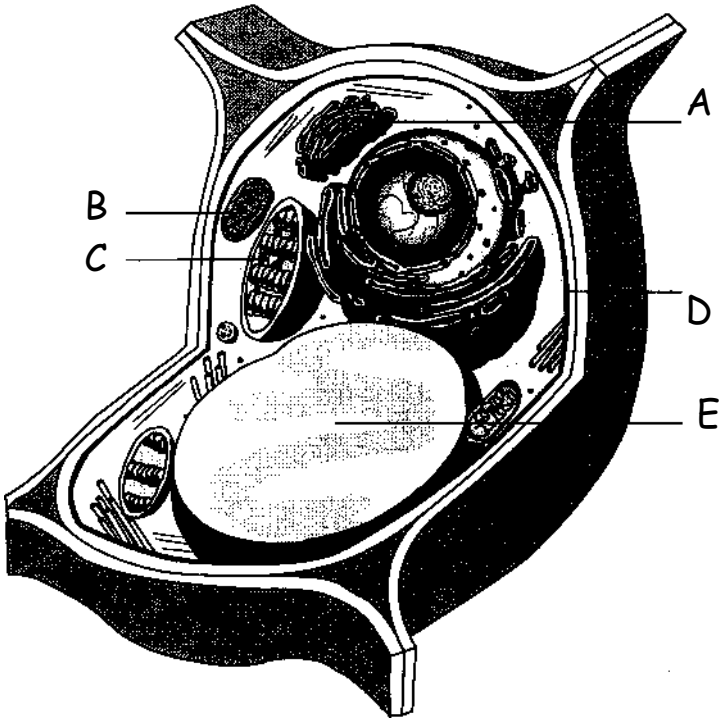
Questions 33-36 refer to the following diagram of a plant cell.



_____ 33. Site of conversion. of chemical energy of glucose to ATP

_____ 34. Site of modification and packaging of proteins and lipids prior to export from the cell

_____ 35. Site of transport of materials into and out of the cell

_____ 36. Evolved from a photoautotrophic prokaryote 2002 AP EXAM*

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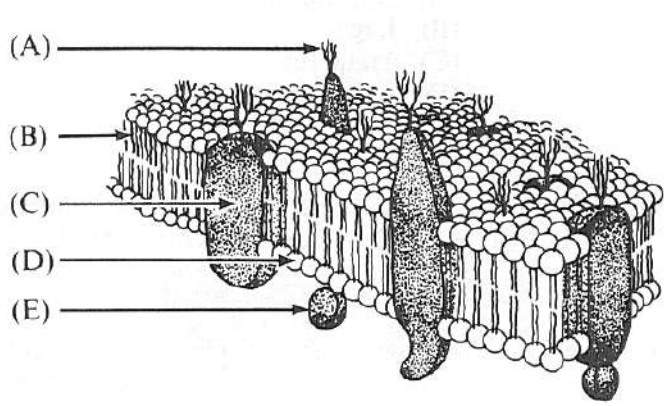
Questions 37-39 refer to the diagram of the plasma membrane below.

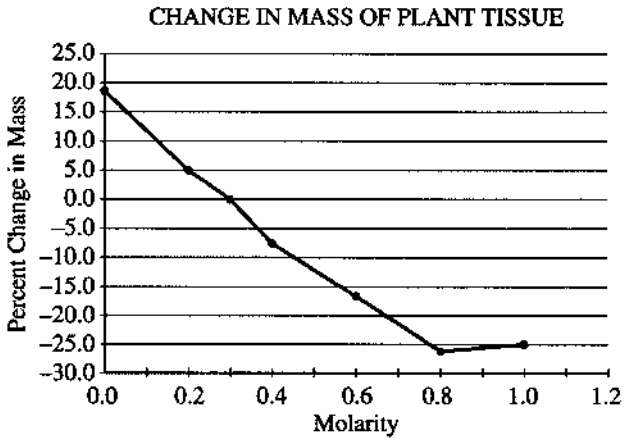


_____ 37. Hydrophilic portion of lipid molecule

_____ 38. Cell-recognition component

_____ 39. Carriers or permeases involved in cell transport 1990 AP EXAM

Questions 40-42 refer to the graph below, which illustrates the percent change in the mass of pieces of plant tissue placed in solutions of different sucrose molarities.



40 Which of the following occurs in the tissue that is placed in 0.6 M sucrose?

(A) The cells become turgid.
(B) The cells burst.
(C) The volume of the vacuoles decreases.
(D) The volume of the cytoplasm increases.
(E) The cells remain the same as before.

41. The approximate molarity of the solution in which the mass of the plant pieces would not change is

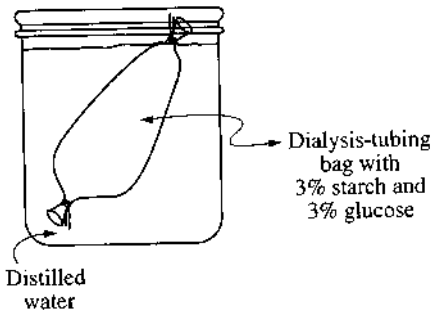
(A) 0.0 M
(B) 0.1 M
(C) 0.3 M
(D) 0.5 M
(E) 0.7 M

42. Water enters and leaves the plant cells primarily by

(A) endocytosis
(B) phagocytosis
(C) osmosis
(D) active transport
(E) facilitated diffusion

2002 AP EXAM

Questions 43-45 refer to an experiment in which a dialysis bag is filled with a mixture of 3% starch and 3% glucose and placed in a beaker of distilled water, as show below. After 3 hours, glucose can be detected in the water outside the dialysis tubing bag, but starch cannot.



43. From the initial conditions and results described, which of the following is a logical conclusion?
    (A) The initial concentration of glucose in the bag is higher than the initial concentration of starch in the bag.
    (B) The pores of the bag are larger than the glucose molecules but smaller than the starch molecules.
    (C) The bag is not selectively permeable.
    (D) A net movement of water into the beaker has occurred.
    (E) The molarity of the solution in the bag and the molarity of the solution in the surrounding beaker are the same.

44. Which of the following best describes the condiition expected after 24 hours?
    (A) The bag will contain more water than it did in the original condition.
    (B) The contents of the bag will have the same osmotic concentration as the surrounding solution.
    (C) Water potential in the bag will be greater than water potential in the surrounding solution.
    (D) Starch molecules will continue to pass through the bag.
    (E) A glucose test on the solution in the bag will be negative.

45. If, instead of the bag, a potato slice were placed in the beaker of distilled water, which of the following would be true of the potato slice?
    (A) It would gain mass
    (B) It would neither gain nor lose mass
    (C) It would absorb solutes from the surrounding liquid.
    (D) It would lose water until water potential inside the cells is equal to zero.
    (E) The cells of the potato would increase their metabolic activity.

1999 AP EXAM

TAKE HOME ESSAY ?'s

1. Cells transport substances across their membranes.
Choose THREE of the following four types of transport:

- Osmosis
- Active transport
- Facilitated diffusion
- Endocytosis/Exocytosis

For each of the three transport types you choose,

A) Describe the transport process and explain how the organization of cell membranes functions in the movement of specific molecules across the membrane AND

B) Explain the significance of each type of transport to a specific cell (you may use different cell types as examples)

1998 AP Exam

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2. A laboratory assistant prepares the solutions of a 0.8 M, 0.6 M, 0.4 M, and 0.2 M sucrose, but forgot to label the containers. After realizing the error, the assistant randomly labeled the flasks containing these four unknown solutions as Flask A, Flask B, Flask C, and Flask D.

Design an experiment, based on the principles of diffusion and osmosis, that the assistant could use to determine which of the flasks contains each of the four unknown solutions.

Include in your answer:

A) a description of how you would set up and perform the experiment
B) the results you would expect from your experiment
C) an explanation of those results based on the principles involved

BE SURE TO CLEARLY STATE THE PRINCIPLES ADDRESSED IN YOUR DISCUSSION

1992 AP EXAM