1-20-2021

1-21-21

General Biology

Unit 2 Pre-Test

Section 1: Short Answer Essays

1.) (5 pts each, 75 pts total) Write a short answer essay for each of the following questions. The actual test will contain 15 of these questions.

a) List 3 major differences between prokaryotic and eukaryotic cells.

Eukaryotic cells have a nucleus, are larger and more complex, and contain membrane-bound organelles.

b) Explain the relationship between surface area and volume in biological systems. Provide at least one specific example.

Cells must be small to maintain a large surface area to volume ratio. Large surface area allows an increase to rate of chemical exchange between the cell and environment.

Ex: small intestine – villi, roots hairs in plants

c) Describe the difference between free and bound ribosomes.

Free ribosomes make (translate) proteins that will remain in the cell.

Bound ribosomes – ribosomes attached to the ER – make proteins that will be transported out of the cell (extracellular)

d) Describe how endoplasmic reticulum and golgi bodies coordinate the production and distribution of extracellular proteins. Be as specific as possible.

ER extracellular proteins are made → sent by vesicles → Golgi Body proteins are packaged and modified → sent by vesicle → plasma membrane protein is released.

e) Describe the difference between rough and smooth endoplasmic reticulum. Be sure to include the function of each in your answer.

Rough ER - site of extracellular protein translation sends vesicles to the golgi.

Smooth ER - synthesizes lipids, detoxifies drugs and poisons

Rough has ribosomes on the surface, smooth does not.

f) Describe the endosymbiotic theory. What organelle(s) are involved?

Mitochondria and Chloroplasts were early prokaryotic organisms that were ingested but not digested by ancestral eukaryotic cells.
These organelles produce energy for the cell, but require certain environmental conditions

g) Explain how one can differentiate between the extracellular and intracellular sides of the plasma membrane.

h) Which organelles are exclusive to either animal or plant cells? Please include at least five examples.

i) Describe in detail how the concept of selective permeability applies to the plasma membrane. Please include properties and characteristics of compounds involved.

j) Describe the fluid mosaic model. What is meant by each term in the phrase?

k) Describe how phospholipids are amphipathic. How does this help the formation of the plasma membrane?

l) Describe the correlation between lipid movement and temperature within the plasma membrane. How does cholesterol influence this dynamic?

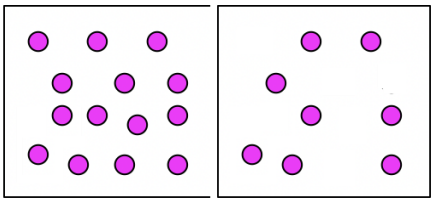
m) Describe the difference between integral and peripheral proteins. Where would each be found and how would they be used? Provide examples.

n) Describe how carbohydrates are used within the plasma membrane to provide a sense of “self” and encourage the orientation of proteins.

o) What is diffusion? How does it relate to concentration? What specific term is used to describe the diffusion of water?

p) Describe the movement of compounds in each of the following scenarios:

Permeable to water only.



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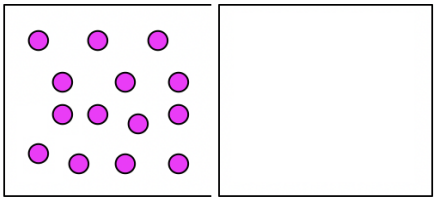


q) Describe what is meant by a hypertonic/hypotonic solution. What would happen to a blood cell placed in this environment? (The actual test will only include one of the two terms)

r) Describe facilitated diffusion. Provide an example.

s) Compare and contrast active and passive transport. Provide an example of each.

t) Describe the general function of the sodium-potassium (Na^+/K^+) ATPase pump. What is its purpose?

u) What is the difference between endocytosis and exocytosis? Provide at least one specific example of endocytosis.

v) Describe the difference between paracrine and endocrine signaling.

w) Describe the process of signal transduction. Be sure to include the three major stages.

Section 2: Matching

2.) (1 pt each, 15 pts total) Match the organelle with its description.

_____ cell wall

_____ chloroplasts

_____ chromatin

_____ cytoskeleton

_____ gap junctions

_____ golgi body

_____ lysosomes

_____ mitochondria

_____ nuclear pore

_____ nucleolus

_____ nucleus

_____ ribosomes

_____ rough ER

_____ smooth ER

_____ vacuole

a) channels through which ions, sugars, and small molecules can pass

b) protects plants, helps maintain shape

c) responsible for intracellular digestion and chromatin recycling of cellular materials

d) site of cellular respiration

e) complex of DNA and proteins

f) supports cell, regulates activities

g) region where ribosome are formed

h) site of photosynthesis

i) responsible for storage of materials

j) translates proteins

k) modifies and packages proteins for transport

l) control center of cell, contains DNA

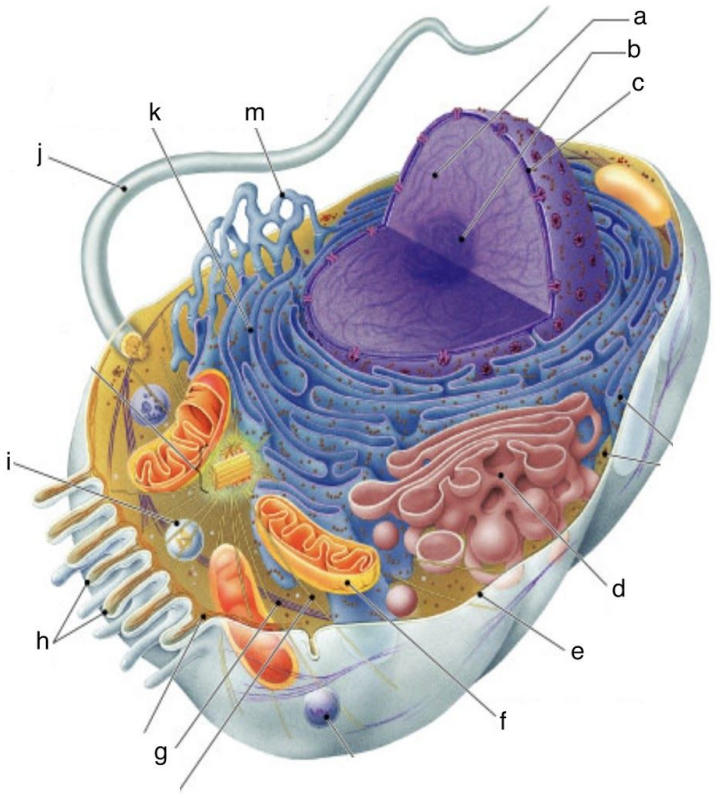
m) site of protein translation

n) synthesize lipids, detoxifies drugs and poisons

o) controls what enters and leaves the nucleus

Section 3: Diagram

3.) (1 pt each, 10 pts total) Write the letter that corresponds with each of the following structures. The actual test will feature either an animal or plant cell, not both.



Chromatin _____

Cytoskeleton _____

Flagellum _____

Golgi body _____

Mitochondria _____

Nuclear envelope _____

Nucleolus _____

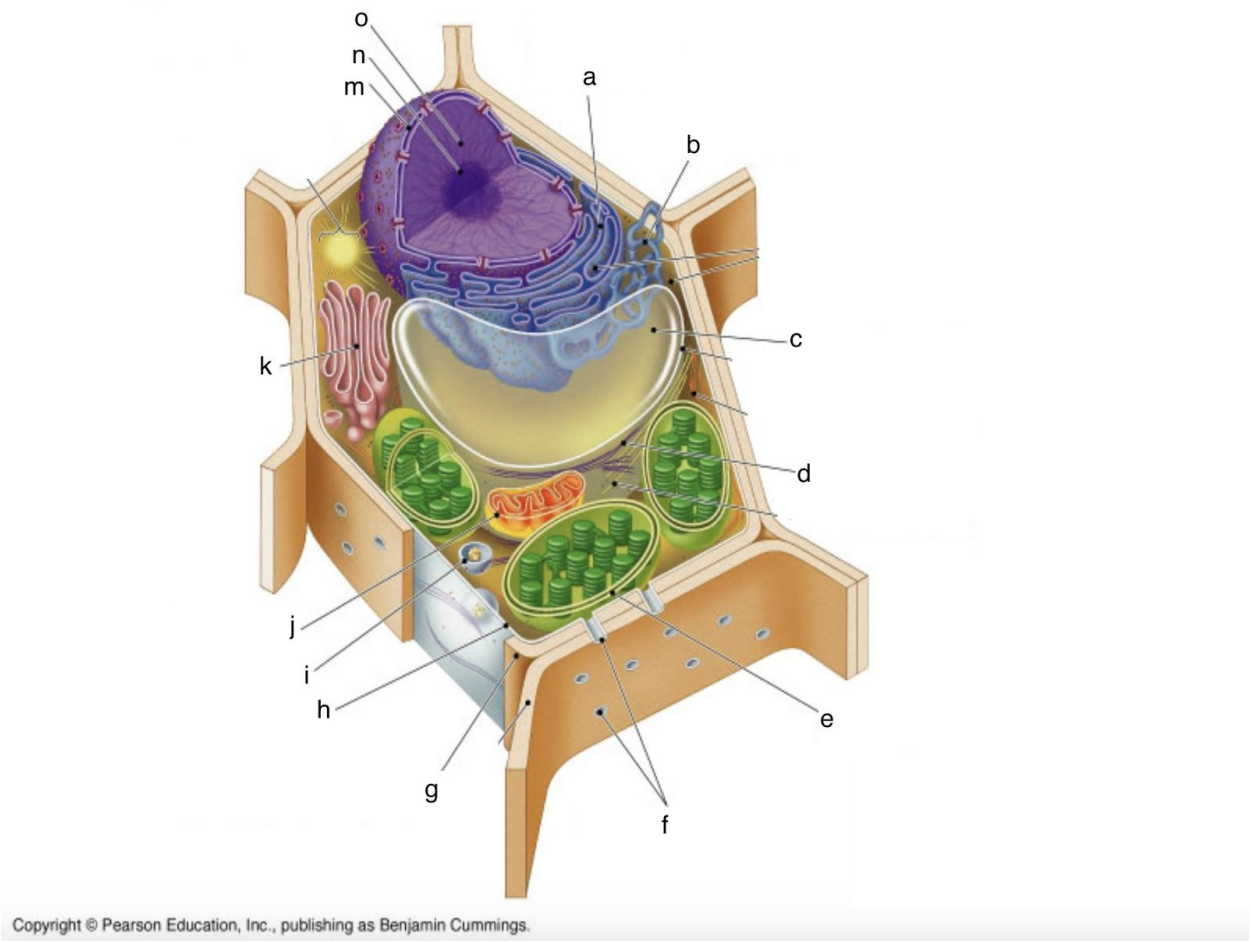
Plasma membrane _____

Rough ER _____

Smooth ER _____

Section 3: Diagram

4.) (1 pt each, 10 pts total) Write the letter that corresponds with each of the following structures. The actual test will feature either an animal or plant cell, not both.



Cell wall _____

Central vacuole _____

Chloroplast _____

Chromatin _____

Golgi body _____

Mitochondria _____

Nuclear envelope _____

Nucleolus _____

Rough ER _____

Smooth ER _____