Solutions

APPLECROSS SENIOR HIGH SCHOOL

YEAR 11 HUMAN BIOLOGY
TEST 1

DO NOT MARK THIS PAPER IS ANY WAY

Time allowed: 50 minutes Total marks: /50

PART A: Multiple Choice (20 marks)

1. Mitochondria concentration would be highest in which of these cells?

a) Nerve cells
b) Secretory cells
c) Muscle cells
d) Red blood cells

2. What organelle would you expect to be abundant in enzyme secreting cells:

a) Lysosome
b) Chloroplast
c) Nucleolus
d) Golgi apparatus

3. When viewing cells under the microscope, which of the following is false?

a) The higher the magnification, the less cells you see
b) When the slide is moved to the right, it appears to move to the left
c) Under lower magnification you would see more of the cells in the field of view
d) When changing the magnification from 40X to 100X, the field of view is greater

4. A series of interconnecting canals transporting fluids has been observed in the cell. These canals are called:

a) Mitochondria
b) Endoplasmic reticulum
c) Centrioles
d) Lysosomes

5. If a mixture of proteins and glucose is placed in a cellulose bag immersed in water, the glucose will diffuse through the bag but the proteins will not. This is because the bag is:

a) A living membrane
b) Selectively permeable
c) Permeable only to molecule of inorganic origin
d) Impermeable to all except large organic molecules

6. Cells take in water through their cell membranes by the process called:

a) Respiration
b) Facilitated diffusion
c) Cytoplasmic streaming
d) Osmosis

7. The concentration gradient of carbon dioxide in a muscle cell is found to be greater after exercise than before. This would cause:

a) The passive movement of carbon dioxide out of the cell
b) The passive movement of carbon dioxide into the cell
c) The active movement of carbon dioxide out of the cell
d) The active movement of carbon dioxide into the cell

8. In the plasma membrane _____ makes the membrane more flexible:

a) Proteins
b) Phospholipids
c) Cholesterol
d) Glycolipids

9. Which statement is false:

a) Tissues are made up of cells
b) The skin is an organ
c) Organs are made up of tissues
d) Each organ is made up of its own kind of tissue

10. Which of the following statements about cells and surface area are correct?

a) Increasing the diameter of a cell increases the surface area more than the volume
b) Increasing the diameter of a cell increases the volume more than the surface area
c) Increasing the diameter of a cell increases the volume but decreases the surface area
d) Increasing the diameter of a cell increases its surface area but decreases its volume

11. Which of the following is the best definition of osmosis?

a) Movement of molecules from regions of high concentration to regions of low concentration
b) Movement of molecules from regions of low concentration to regions of high concentration
c) Net movement of water molecules across a differentially permeable membrane
d) Random movement of molecules or ions in solution

12. Skin is considered an organ because:

a) It consists of tissues structurally joined together to perform a specific function
b) It is large and covers the entire body
c) It is compact to give shape
d) It is continuous

13. The concentration of a particular ion within a cell is higher than the concentration outside the cell. However, the concentration in the cell is still increasing. This is due to:

a) Osmosis
b) Diffusion
c) Active transport
d) Facilitated diffusion

14. Four microscopes were set up in the laboratory as follows:

Microscope	Objective Lens	Ocular
A	10X	5X
B	20X	10X
C	40X	5X
D	40X	10X

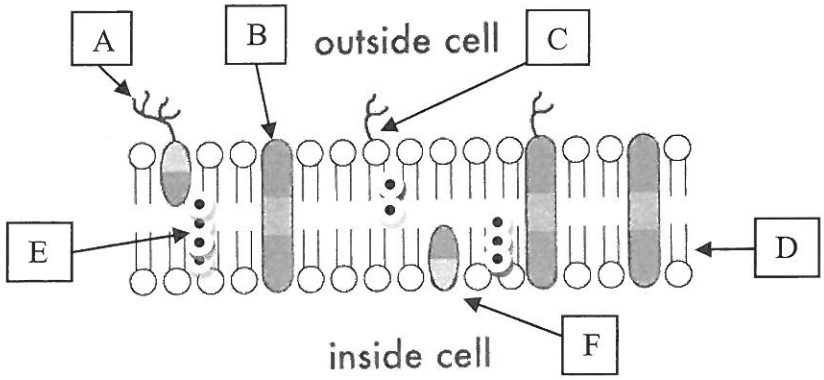
When looking at a slide of human tissue, which microscope would you expect to observe the fewest cells?

a) A
b) B
c) C
d) D

15. Oxygen always moves across the plasma membrane by the process of:

a) Active diffusion
b) Facilitated diffusion
c) Osmosis
d) Simple diffusion

Refer to the illustration to answer questions 16 and 17.



16. Which molecule may function in facilitated diffusion?

a) A
b) B
c) D
d) E

17. Which molecule is both hydrophobic and hydrophilic and aggregates as a bilayer to form the "fabric" of the membrane?

a) C
b) D
c) E
d) F

18. Extracellular fluid contains approximately 10 times more sodium ions compared to intracellular fluid. This is possible through the process of:

a) Facilitated diffusion
b) Osmosis
c) Exocytosis
d) Active Transport

19. If a blood cell is placed in pure water, it will die because:

a) Water diffusing in will cause it to burst
b) Water diffusing out will dehydrate it
c) Carbon dioxide will be unable to diffuse out
d) Cell organelles will diffuse through the membrane

20. The solvent that is usually associated with osmotic pressure is:

a) Alcohol
b) Fats
c) Oxygen
d) Water

Name: _____ Score: /30

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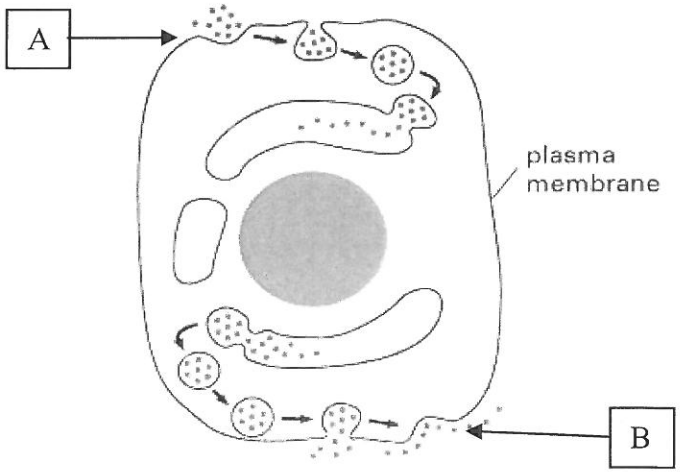
PART B: Short answer questions (30 marks)

The diagram below illustrates two processes carried out by a cell.



21. State the names of the two processes A and B illustrated and provide an example of what is transported this way. (4 marks)

A. Endocytosis (1)

Example: any relavant example (1)

B. Exocytosis (1)

Example: any relavant example (1)

22. Describe what is meant by the term fluid mosaic model. (2 marks)

Fluid - constantly moving (1)

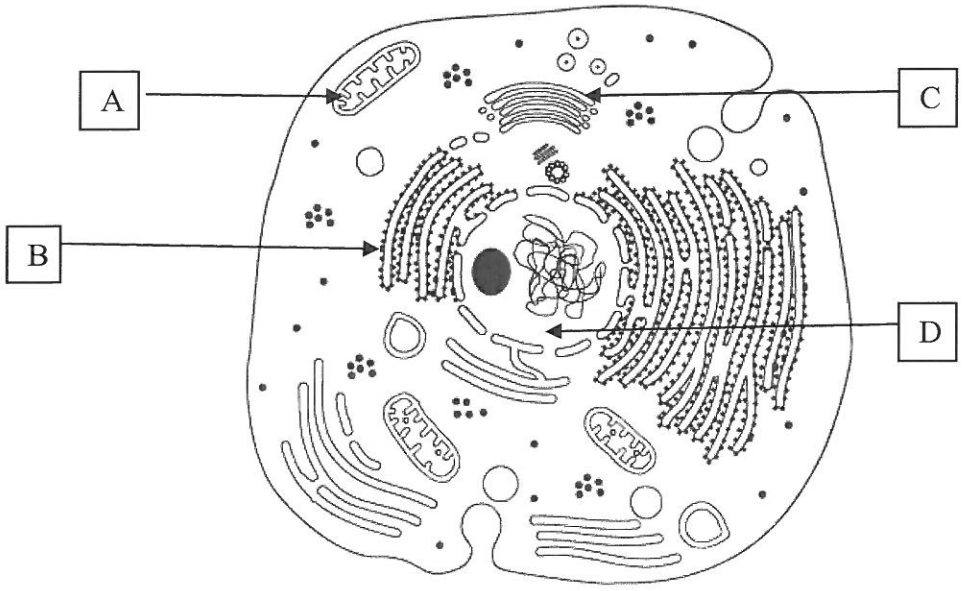
Mosaic - composed of many different types of molecules (1)

A model used to describe the structure and behaviour of the plasma membrane (1)

(Any 2)

23. Use the diagram below to complete the table.

(6 marks)



Structure Label	Cell Organelle Name (1/2 mark each)	Function (1 mark each)
A	Mitochondrion	Site of cellular respiration
B (small dots)	Ribosome	Site of protein synthesis
C	Golgi Apparatus	Proteins are package in vessicles ready for secretion
D	Nucleus	Control centre of the cell, contains all of the cell's DNA

rewarded to (are the differences'

24. A semi-permeable membrane allows materials to be transported through it in several ways.

a) What is the difference between passive and active transport?

(2 marks)

passive	active
• doesn't require energy	• does require energy
• movement of molecules down/with the concentration gradient	• movement of molecules against the concentration gradient

1 mark

b) Describe **one** type of each active and passive transport, and provide an example of what is transported in each process.

1 mark

(4 marks)

Description of a type with example

- passive: Osmosis (H_2O), diffusion (CO_2, O_2, alcohol, fatty acids, steroids etc.), facilitated diffusion (glucose, amino acids)
- active: ion pumps (Na, K, H, glucose), vesicular transport - or endo/exo cytosis w example

25. Complete the table by naming the four types of tissues, describing the function of each tissue type and providing a specific example of each tissue type.

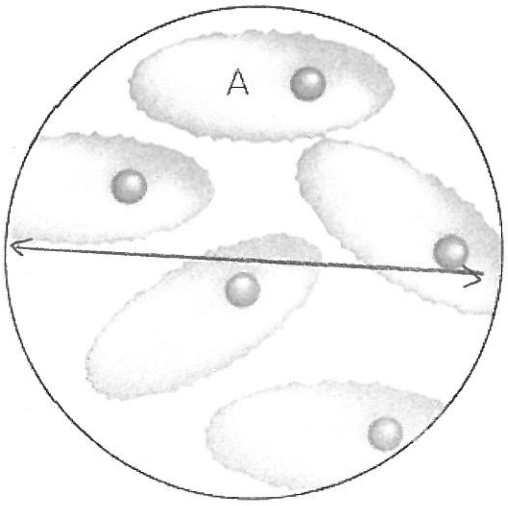
(8 marks)

Tissue Name	Function (1 mark each)	A specific example (1 mark each)
Muscular Tissue	Made of cells which are able to contract resulting in movement	skeletal muscle cardiac " " Involuntary " " Voluntary " "
Connective Tissue	Provide support, holds body parts together	bone, cartilage tendons
Epithelial Tissue	Cover or line the organs some of the body	Inside of the cheek, outer layer of the skin
Nervous Tissue	Send messages from one part of the body to another	Brain, spinal cord, nerves

26. If the field of view is 0.4mm, calculate the length and breadth of cell A in micrometres.
All working out must be shown to be awarded full marks.

(4 marks)

Incorrect units −1



FOV = 0.4 mm
= 400 μm

Cell A length = 3.5 cm

FOV = 6.6 cm (1)

how many times cell A fits across the FOV → $\frac{6.6}{3.5}$ = 1.89 times

5% buffer

Actual length: $\frac{400}{1.89}$ = 211.6 μm (1)

(accept answers within the range 201 − 222)

Cell A breadth = 1.5 cm

FOV = 6.6 cm

$\frac{6.6}{1.5}$ = 4.4 times (1)

Actual breadth: $\frac{400}{4.4}$ = 90.9 μm (1)

5% buffer

(accept answers with the range 85 − 97 μm)