Hillcrest High School
Life Science

Gr. 10 **June 2017**
Time: 2½ hours **Max Marks: 150**

Instructions:

1. Write your Life Science teacher's name on your answer booklet.
2. Number the answers exactly as the questions are numbered.
3. Write neatly and legibly.
4. Do all drawings in pencil and label them in ink.
5. Only draw diagrams and flow charts when requested to do so.
6. The diagrams in the question paper may not necessarily be drawn to scale.
7. Non-programmable calculators, protractors and compasses may be used.

SECTION A:

QUESTION 1 - Choose the most correct answer for each of the following statements or questions. Write only the letter (A, B, C or D) next to the question number.

1.1. The element nitrogen forms part of .....

A. Glucose
B. Enzymes
C. Glycerol
D. Cellulose

1.2. Which of the following parts of the microscope have a combination of lenses to **MAGNIFY** images?

A. Mirror and objectives
B. Diaphragm and condenser
C. Eyepiece, stage and condenser
D. Objective and eyepiece

1.3. Specialised epidermal cells responsible for gaseous exchange.

A. Root hair cells
B. Cuticle
C. Guard cells
D. Parenchyma cells

1.4. The element that forms the basis of all organic compounds is:

A. Nitrogen
B. Oxygen
C. Hydrogen
D. Carbon

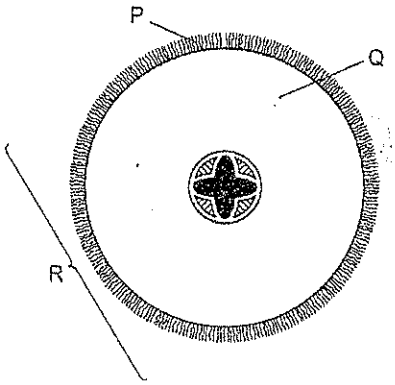
1.5. A disease caused by a deficiency of Vitamin D in the diet is:

A. Rickets
B. Night Blindness
C. Scurvy
D. Pellagra

1.6. The Fluid Mosaic Model describes the arrangement of molecules in the:

A. Cell wall
B. Centrioles
C. Cell membrane
D. Nucleus

1.7. The diagram below shows a cross section of a .....



A. Flower
B. Stem
C. Leaf
D. Root

1.8. Plant tissue in a leaf where photosynthesis mainly takes place is:
A. Intercellular spaces
B. Spongy mesophyll
C. Palisade mesophyll
D. Phloem

1.9. Another name for the knee cap is:
A. Patella
B. Sacrum
C. Ischium
D. Ilium

1.10. The tonoplast is associated with:
A. Vacuole
B. Nucleus
C. Mitochondria
D. Endoplasmic Reticulum

(10×2marks = 20 marks)

Terminology:

1.2. Give the correct term for the following descriptions/definitions.

1.2.1. The disorder / condition that results from a blockage in a blood vessel in the brain
1.2.2. In scientific method, the term we use for an educated guess.
1.2.3. Connective tissue involved in the transport of substances around the body.
1.2.4. Type of skeleton in which water supports the structure.
1.2.5. Organic compound that can lead to high cholesterol and heart disease.
1.2.6. The phase in the cardiac cycle when the atria contract.
1.2.7. The type of epithelium that is found in the alveoli and the walls of blood vessels.
1.2.8. Plant tissue responsible for storage of water and nutrients.
1.2.9. Fat that mainly originates from plants and are liquid at room temperature.
1.2.10. Vascular tissue that transports water and mineral salts from the roots to the leaves.

(10 marks)

1.3. Indicate whether each of the statements in **COLUMN A** applies to **A ONLY, B ONLY, BOTH A and B, or NONE** of the items in **COLUMN B.**
Write **A ONLY, B ONLY, BOTH A** and **B,** or **NONE** next to the question number (1.3.1 to 1.3.10) in the answer book.

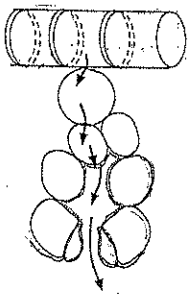
Functions of the different parts of plant and animal cells

COLUMN A	COLUMN B
1.3.1. Component of phloem tissue	A. Sieve tubes B. Companion cells
1.3.2. Responsible for protein synthesis	A. Ribosomes B. Golgi Apparatus
1.3.3. Plant cells without nuclei	A. Sieve tube B. Xylem vessels
1.3.4. The first vertebra of the human vertebral column	A. Axis B. Atlas
1.3.5. Joins ribs to the sternum	A. Bone B. Cartilage
1.3.6. Deficiency disease that develops due to a shortage of fresh fruit and vegetables in the diet.	A. Kwashiorkor B. Beri beri
1.3.7. The type of lipids that form part of the cell membrane.	A. Phospholipid B. Glycerol
1.3.8. Controls slow involuntary movement in the human body.	A. Striated muscle tissue B. Smooth muscle tissue
1.3.9. Actively dividing tissue	A. Epidermal B. Epithelial
1.3.10. Location of cuboidal epithelium	A. Salivary glands B. Sweat glands

(10 marks)

1.4. **Tall trees need to pull water up from their roots to their highest branches and leaves as water is required for a process that takes place in the leaves.**

1.4.1. Name that process. (1)
1.4.2. Transpiration is one way that draws water up a plant. List two other ways. (2)
1.4.3. With the use of the diagram below explain how transpiration works. (3)



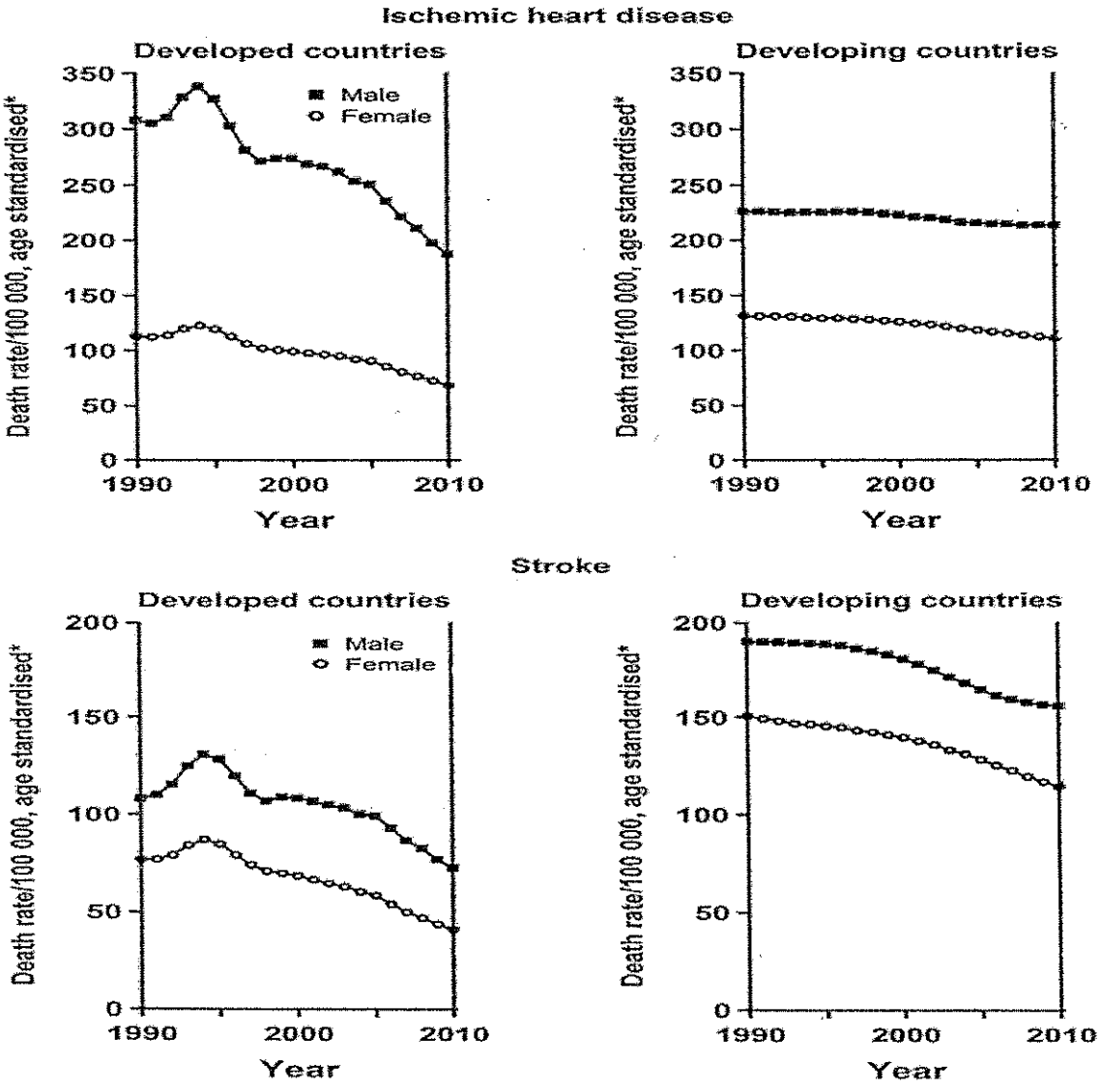
1.4.4. Name and explain 2 factors that affect the rate of transpiration. (4)
[10]

TOTAL SECTION A = 50 MARK

SECTION B

QUESTION 2

2.1. Study the following graphs and answer the following questions:



2.1.1. Provide **ONE** overall heading for the graphs. (2)
2.1.2. What two health conditions do these graphs deal with? (2)
2.1.3. Name the independent variable. (1)
2.1.4. Name the dependent variable. (1)
2.1.5. What is the trend that can be seen when the two bottom graphs are compared? (2)
2.1.6. Give 2 possible reasons for your answer in Ques. 2.1.5. (2)
[10]

2.2. The Flow Chart below shows the pathway of blood through the heart, up to the lungs and back to the heart again until finally the blood leaves the heart through the Aorta to be sent around the body.

2.2.1. Redraw the following **Flow Chart** into your **answer booklets** and fill in the missing words.

*Use the Diagram of the Heart (on the Right) to help you and **Provide a Heading for this flow chart.**

[8]

Superior Vena Cava

↓

a)

↓

Tricuspid Valve

↓

b)

↓

Semi lunar Valve

↓

c)

↓

Lungs

↓

d)

↓

Left Atruim

↓

e)

↓

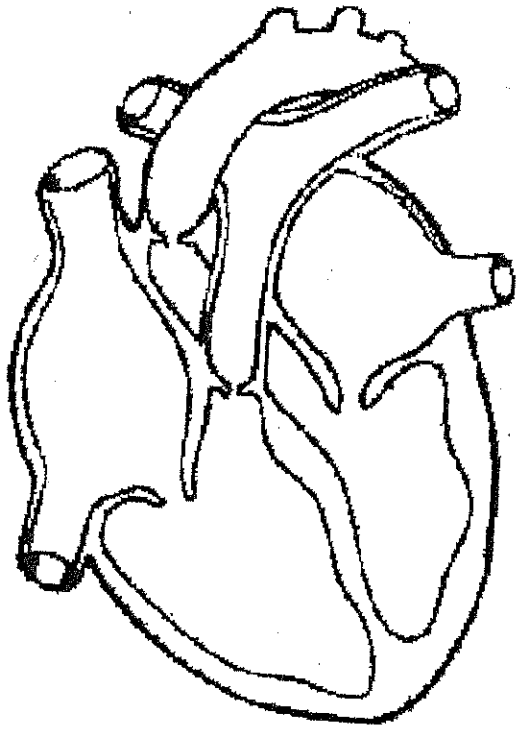
Left Ventricle

↓

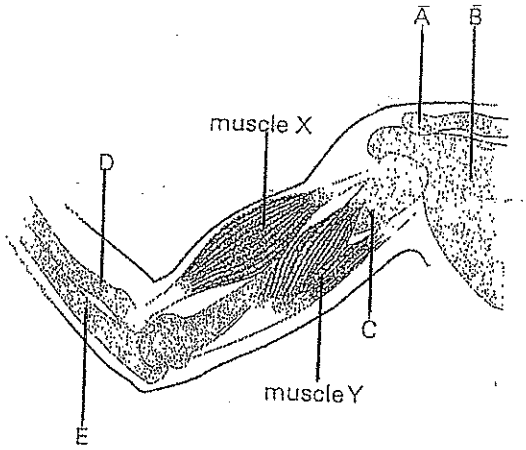
f)

↓

Aorta



2.3. Refer to the diagram below and answer the following questions:

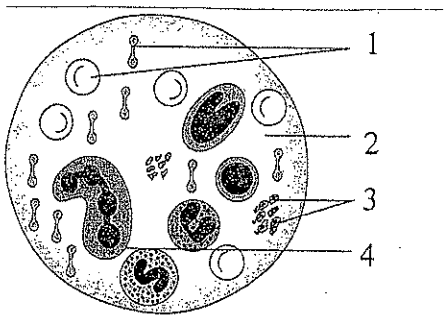


2.3.1. Describe what will happen to the arm when muscle X contracts. (2)
2.3.2. Muscle Y reverses the effect produced by muscle X. Explain how this is done. (2)
2.3.3. Label the bones A, B and C. (3)
2.3.4. What joins muscle X to the bone? (1)
2.3.5. Identify TWO types of joints in this diagram and explain the type of movement each type provides. (4)
[12]

2.4.

2.4.1. Draw a biological drawing of a plant's root hair and surrounding cells. ***Remember your biological drawing rules.** (5)

2.5. Study the diagram below and answer the following question.



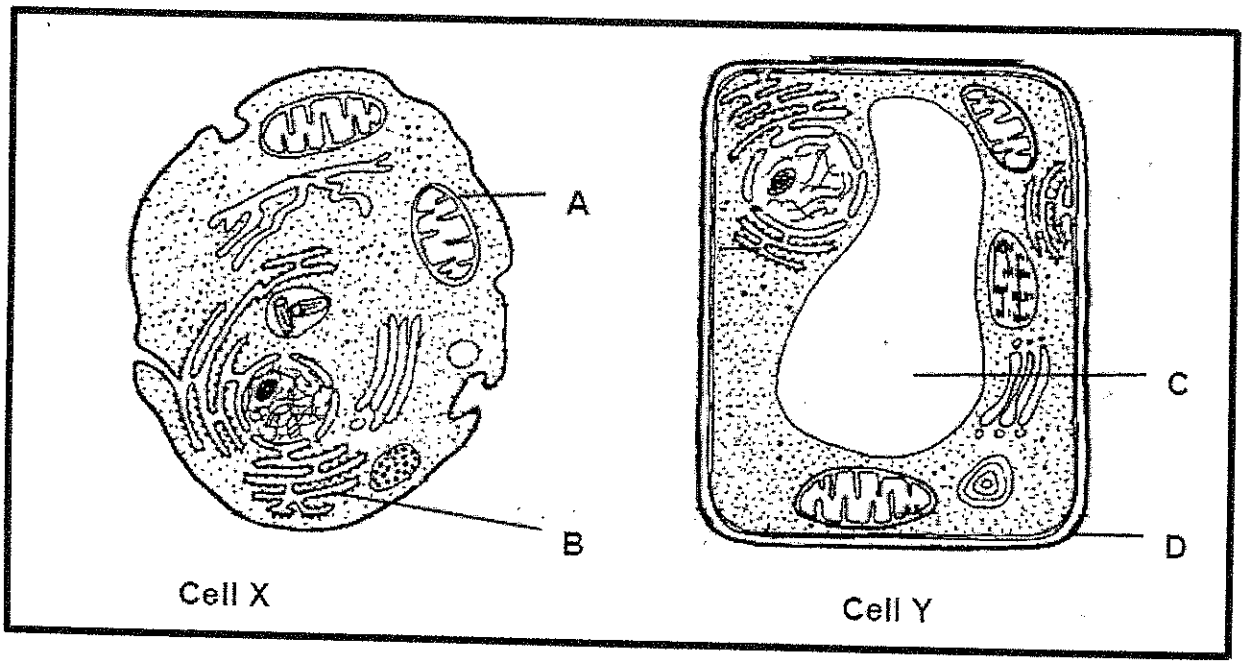
Blood Cell

2.5.1. Provide labels for 1, 2 and 3. (3)
2.5.2. What is the function of 3 and 4? (2)

[Question 2 total = 40 marks] **[10]**

QUESTION 3

3.1. Study the diagrams below representing two cells with their organelles.



3.1.1. Which cell, (**X** or **Y**) represents a plant cell? (1)

3.1.2. Give TWO visible reasons for your answer. (2)

3.1.3. Label parts **A** and **B**. (2)

3.1.4. Structure **C** plays an important role in cell **Y**. List THREE functions of this structure. (3)

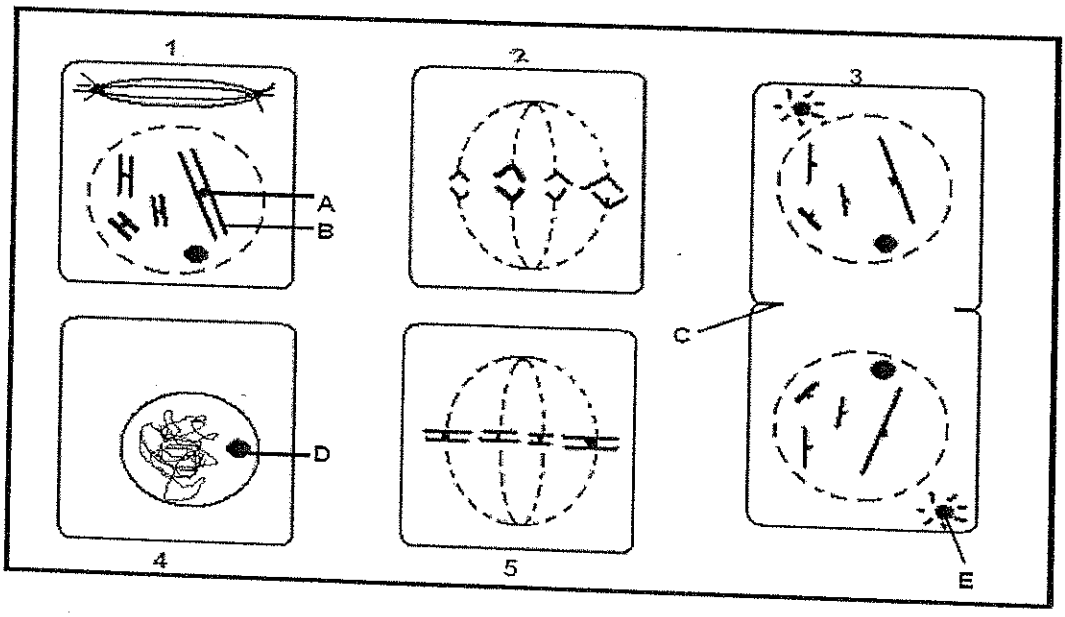
3.1.5. Name the organic substance that part **D** in cell **Y** mainly consists of. (1)

3.1.6. Give the function of the part labelled A. (1)

[10]

3.2.

Study the diagrams below which represent different phases of mitosis.



3.2.1. Label structures **A, B, D** and **E.** (4)
3.2.2. By making use of **NUMBERS ONLY**, arrange the phases into the correct sequence. (5)
3.2.3. Write down the number of chromosomes in a daughter cell at the end of the process shown above. (1)
3.2.4. State ONE difference between plant and animal cells with regard to the process taking place at C. (2)
3.2.5. State TWO reasons why mitosis is a biologically important process. (2)
[14]

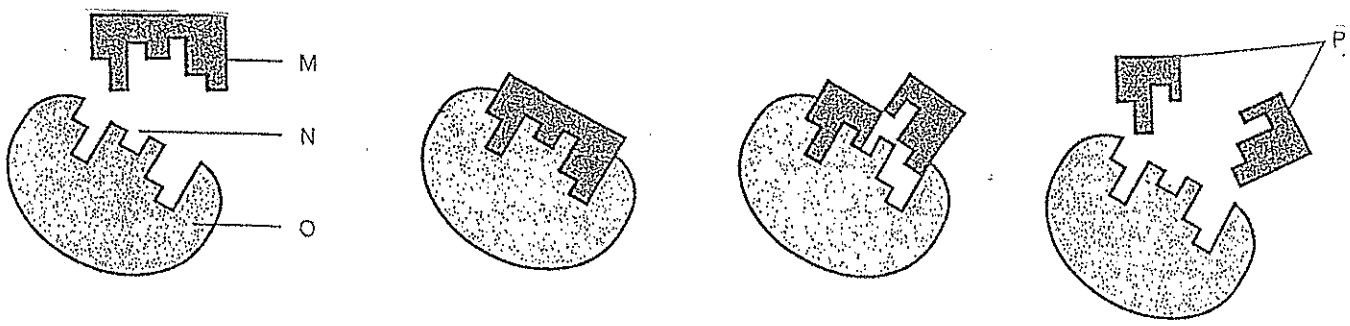
3.3. The table below shows the nutritional value of a certain brand of breakfast cereal. Study the information before answering the questions below.

NUTRITIONAL COMPOSITION OF CEREAL

Ingredients	Nutritional Information (Values per 100 g)	
Whole rolled oats, roasted wheat flakes, cane syrup, brown sugar, vegetable oil, sun-dried raisins	Energy	2 000 kJ
	Protein	12,5 g
	Carbohydrates	50 g
	Fats	12,5g
	Fibre	25 g
	Cholesterol	0 mg

3.3.1. Explain **ONE** advantage of this cereal having no cholesterol. (2)
3.3.2. The total energy value of a 100g cereal is 2 000 kJ. The boy requires 5 500 kJ of energy per day. How many grams (g) of cereal does he need to eat in order to obtain this energy (assuming that he does not eat any other foods)? Show your working. (2)
3.3.3. Draw a pie chart to illustrate the relative proportions of protein, carbohydrate, fats and fibre of this 100 g of cereal. (4)
[8]

3.4. Examine the diagram below carefully.



3.4.1. Provide labels for the parts labelled M and O. (2)
3.4.2. Give one function of enzymes. (1)
3.4.3. If enzymes are heated too much, they become denatured. Explain what this means. (2)
3.4.4. Other than heat, name one other cause that makes enzymes to become denatured. (1)
3.4.5. What causes an enzyme to become inactive? (1)
3.4.6. Give one example of enzymes being used in industry. (1)
[8]

[Question 3 total = 40 marks]

TOTAL SECTION B = 80 MARKS

SECTION C – ESSAY

QUESTION 4

Epithelial tissue forms the first line of defence against invasion by viruses and bacteria. In an essay discuss the four basic types of epithelial tissue, describing its location, structure, function and adaptations to perform its function.

You may not use diagrams or bullet points in your essay.

Contents = 17
Synthesis = 3
TOTAL SECTION C = 20 MARKS