

Hillcrest High School
Life Science

Grade 10
Time: 2.5 hours

June 2014
Max Marks: 150



I nstructions

1. Write your Life Science Teachers name on all booklets.
2. Start the answer to each question at the top of a NEW page.
3. Number the answers exactly as the questions are numbered.
4. Write neatly and legibly.
5. If you don't present your answers accordingly to the instructions of each question, you will lose marks.
6. Do all drawings in pencil and label them in ink.
7. Only draw diagrams and flow charts when requested to do so.
8. The diagrams in the question paper may not necessarily be drawn to scale.
9. Non-programmable calculators, protractors and compasses may be used.

QUESTION ONE

- 1.1. Various possible options are provided as answers to the following questions. Choose the correct answer and write only the letter (A –D) next to the question number (1.1.1 – 1.1.10) in your answer book e.g.: 1.1.11. B
- 1.1.1. The organelle in living cells which contain respiratory enzymes for cellular respiration, is the
- Mitochondria
 - Centriole
 - Ribosome
 - Lysosome
- 1.1.2. Which organelle are present on rough ER and absent on smooth ER?
- Golgi apparatus
 - Ribosomes
 - Lysosomes
 - Mitochondria
- 1.1.3. Food materials used in bulk for cell growth are ...
- Fat
 - Starch
 - Protein
 - Vitamins
- 1.1.4. The element required for the formation of haemoglobin is: -
- Sodium
 - Calcium
 - Iodine
 - Iron
- 1.1.5. In plants reserve food is mainly stored in the ...
- Epidermis
 - Parenchyma
 - Xylem
 - Phloem
- 1.1.6. The specialized tissues for the transport of inorganic substances in plants are.
- Phloem
 - Xylem
 - Collenchyma
 - Chlorenchyma
- 1.1.7. Which of the following is associated with compact bone.
- Chondrin
 - Pericardium
 - Chondrocytes
 - Harversian canal
- 1.1.8. Areolar connective tissue in mammals ...
- Attaches bones together.
 - Attaches skin to underlying tissue.
 - Attaches muscles to bone.
 - Lines the oesophagus

1. 19. The ulna is part of the ...
- Appendicular skeleton
 - Axial skeleton
 - Exoskeleton
 - Hydrostatic skeleton
1. 10. Which of the following bones do not fit in with the others.
- Carpals
 - Ulna
 - Fibula
 - Radius

10 x 2 = (20)

1.2. Give the correct biological term for each of the following descriptions/definitions.

- A group of cells that perform the same function
- Type of muscle that makes up the walls of the internal organs, such as small intestine.
- Liquid found in the vacuoles of plant cells, which consist mainly of water and dissolved substance.
- The light trapping pigment found in the green parts of plants.
- The substance which an enzyme acts upon.
- The total number of thoracic vertebrae in the human body.

6 x 1 = (6)

- 1.3. Indicate whether each of the statements in **COLUMN I** applies to **A ONLY**, **B ONLY**, **BOTH A and B** or **none** Of the items in **COLUMN II**. Write **A ONLY**, **B ONLY**, **BOTH A and B**, or **none** next to the question number (1.3.1 to 1.3.9) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1. The stage the cell cycle when the cell performs its normal functions	A: Interphase B: Cytokinesis
1.3.2. Responsible for protein synthesis.	A: Ribosomes B: Lysosomes
1.3.3. The first vertebra of the human vertebral column	A: Axis B: Atlas
1.3.4. Transports organic food in plants	A: Phloem B: Sieve tubes
1.3.5. Joins the rib to the sternum	A: Cartilage B: Bone
1.3.6. The waxy layer on the outer surface leaves	A: Epidermis B: Cuticle
1.3.7. The thin membrane surrounding a muscle fibre	A: Periosteum B: Sarcolemma
1.3.8. Plant cells without nuclei	A: Parenchyma B: Companion Cells
1.3.9. Controls slow involuntary movements in the human body	A: Striated muscle tissue B: Smooth muscle tissue

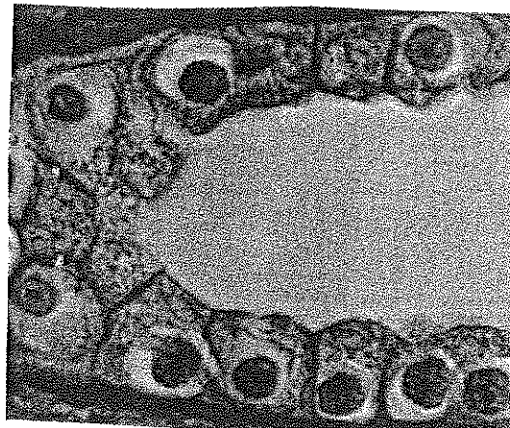
9 x 1 = (9)

14. The table below shows the nutritional content of 5 dairy products per 100g servings.
Refer to the table below and answer the questions.

Amount per 100 g					
Dairy product	Protein/g	Fat/g	Energy content/kj	Calcium/mg	Iron/mg
Cow's milk whole	3.4	3.7	276	120	.01
Cow's milk skimmed	3.5	0.2	146	124	.01
Butter	0.4	85.1	3318	15	.02
Margarine	0.2	85.3	3326	4	.03
Cheese	25.4	34.5	1778	810	.06

- 1.4.1. Name the product which gives the greatest amount of energy per 100g. (2)
- 1.4.2. Which food group is the main source of energy in the dairy product mentioned in question 1.4.1 above? (1)
- 1.4.3. State two functions of proteins. (2)
- 1.4.4. Give reason why babies and young children, should be given whole milk instead of skimmed milk, by using the information from the table. (3)
- 1.4.5. Name the macro-element found in the dairy products mentioned in the table. (1)
- 1.4.6. State 1 function of this mineral mentioned in question 1.4.5, in the body. (1)
- [10]

- 1.5. Study the micrograph of a type of epithelial tissue.



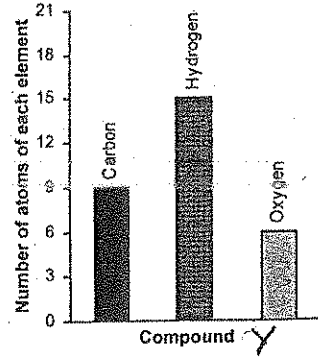
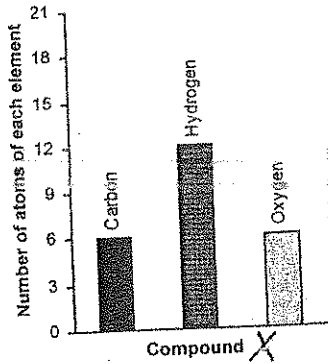
Draw and label the above micrograph. (use all the drawing skills you have been taught)

(5)

TOTAL SECTION A = 50 MARKS

SECTION B
QUESTION 2

2.1. The graphs below shows the composition of two organic compounds, X and Y found in living organisms.



2.1.1. Identify, with reason, compounds X and Y. (4)

2.1.2. Give 3 reasons why compound X is biological important. (3)

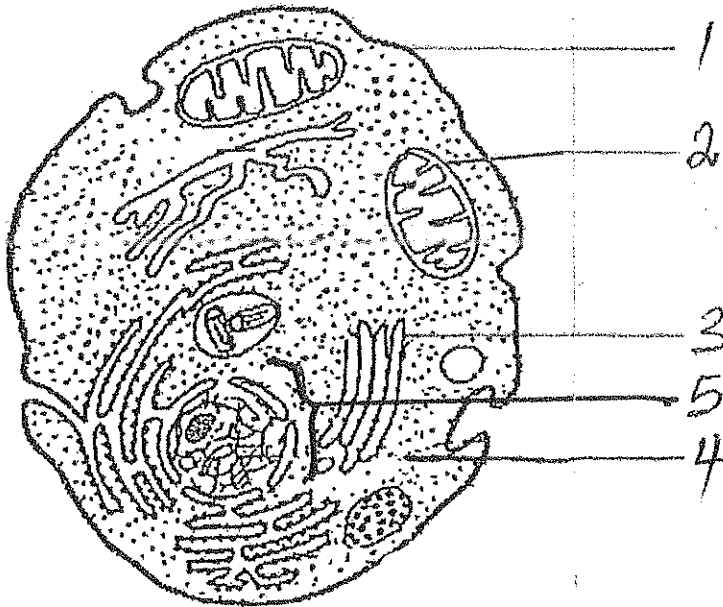
2.1.3(a) Which compound X or Y, is involved in the formation of large, insoluble compounds required for the cell wall formation. (1)

(b) Name the large compound. (1)

[9]

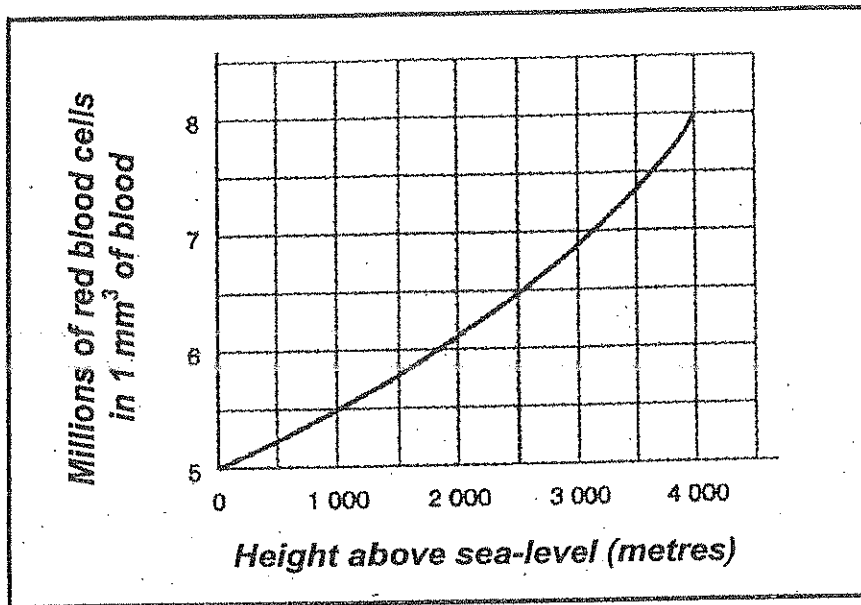
2.2. With the aid of suitable illustrations, explain the "LOCK and KEY" theory of enzyme action. [6]

2.3 Study the following sketch of an animal cell and answer the questions that follow:



- 2.3.1. Give 3 reasons why this sketch is NOT that of a plant cell. (3)
- 2.3.2. Identify the parts numbered 1, 2, 3 and 4. (4)
- 2.3.3. Give the main functions of parts numbered 1, 2, 3 and 4. (4)
- 2.3.4. (a) What would happen to this cell when placed in pure water? (1)
- (b) Give a reason for your answer. (1)
- 2.3.5. Give two functions of part numbered 5. (2)
- [15]

2.4. A scientist knew that as one moves higher altitudes (height above sea level), the air becomes RARIFIED (has less oxygen). He therefore wanted to investigate the relationship between altitude and the number of red blood cells in a person's blood.



2.4.1. Write a hypothesis for this investigation. (3)

2.4.2. Identify the following:

- a) Dependant variable (1)
- b) Independent (1)

2.4.3. The scientist then used the results from this investigation, to draw the following graph. Study and answer the questions based on it.

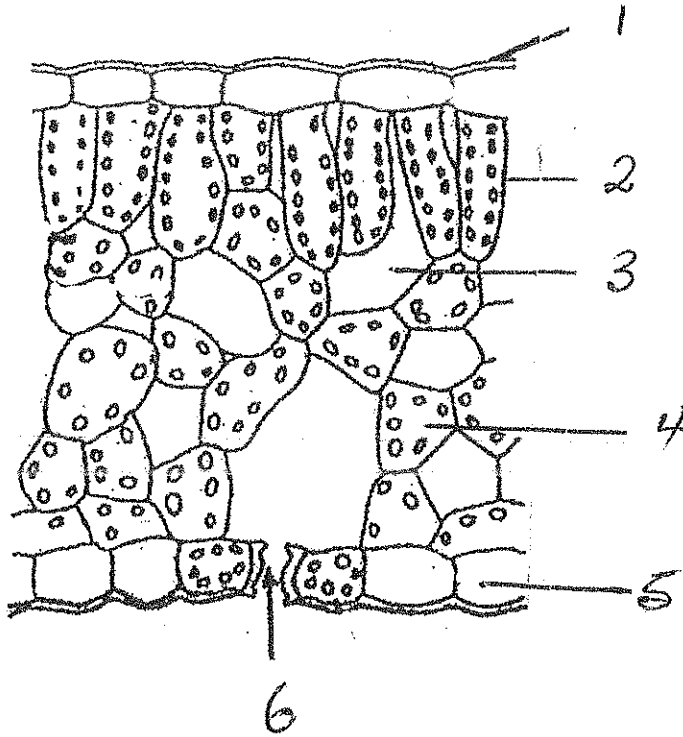
2.4.3.1. From the above graph, it is evident that as the altitude above sea level increases, the number of red blood cells per mm³ of blood, also increases. Suggest a reason for this relationship between these two variables. (3)

2.4.3.2. Explain why it is advisable to take the blood samples of more than one person at each altitude. (2)

[10]

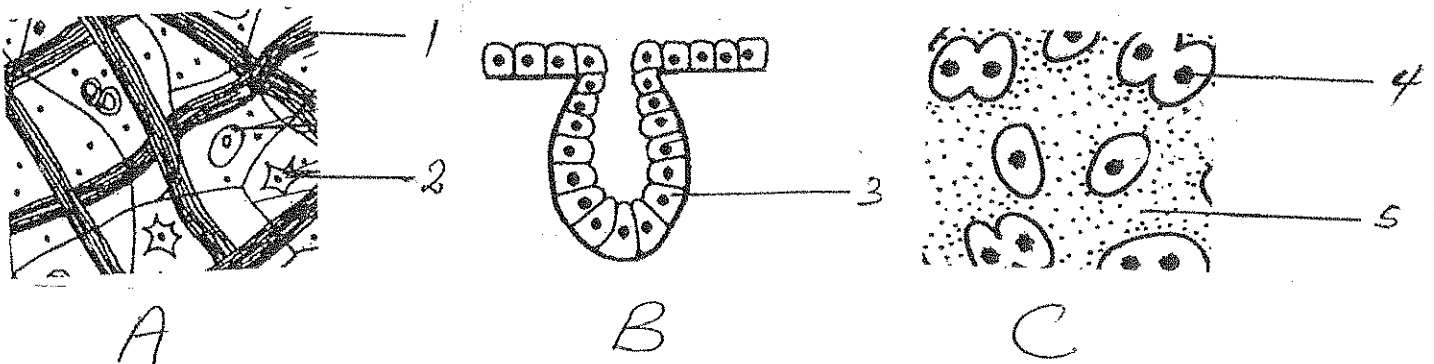
QUESTION 3

3.1. Study the diagram of a cross section through a dorsiventral leaf and answer the questions that follow.



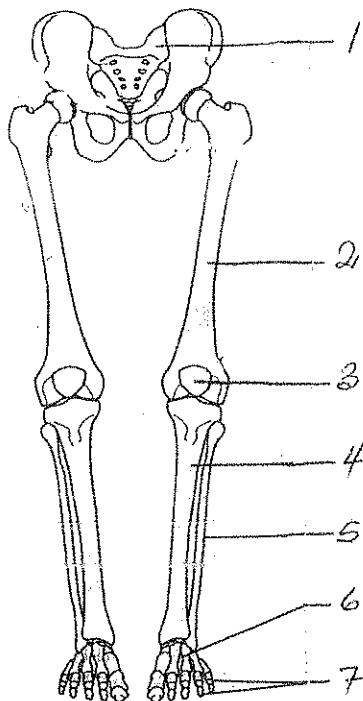
- 3.1.1. Identify the labels numbered 1, 2, 3, 4 and 5. (5)
 - 3.1.2. What is the function of part numbered 1 and 5. (2)
 - 3.1.3. The part that is numbered 6 is involved in gaseous exchange. Name THREE gases that are exchanged through the opening at 6. (3)
- [10]

3.2. Study the following diagrams of mammalian tissues and answer the questions that follow:



- 3.2.1. Identify the tissues numbered A, B and C (3)
 - 3.2.2. (a) Name one place where tissue A is found in the human body. (1)
 - (b) Name one function of this tissue. (1)
 - 3.2.3. Give one function of tissue C (1)
 - 3.2.4. Identify the parts numbered 1, 2, 3, 4 and 5. (5)
- [11]

3.3 . Study the following sketch on the skeletal system and answer the questions that follow.



- 3.3. 1. Identify parts numbered 1 to 7. (7)
- 3.3. 2. Which part of the human skeleton is depicted in the diagram. (2)
- 3.3. 3. Name TWO types of joints found in this part of the body and state clearly between which bones they are found. (4)

3.4 Below are 6 events that occur during mitosis. A letter identifies each event. Arrange the events in order that they occur during cell division. Write only the letters of the event in correct order. E.g. A, B, C, C, D, E, F

- A. Centromeres divide
- B. The nuclear membrane breaks up
- C. Cytokinesis occurs
- D. Chromosomes arrange themselves at the equator
- E. Chromatids separate
- F. Chromosomes become visible as individuals threads. (6)

[40]

TOTAL SECTION B = 80 MARKS

SECTION C
QUESTION FOUR

Describe the absorption of water by a root hair of a plant as well as the lateral movement of the absorbed water from the root hair to the xylem of the root. Also explain the different ways in which xylem is structurally suited to transport water upwards in plants.

CONTENTS 17

SYNTHESIS 3

TOTAL SECTION C= 20 MARKS

NOTE: NO MARKS WILL BE AWARDED FOR ANSWERS IN THE FORM OF FLOW CHARTS OR DIAGRAMS.

