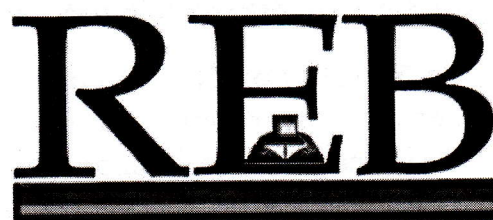


**Biology and Health
Sciences I**

001

19/11/2019
8:30 AM – 11:30 AM



Rwanda Education Board

ORDINARY LEVEL NATIONAL EXAMINATIONS, 2019

SUBJECT: BIOLOGY AND HEALTH SCIENCES

DURATION: 3 HOURS

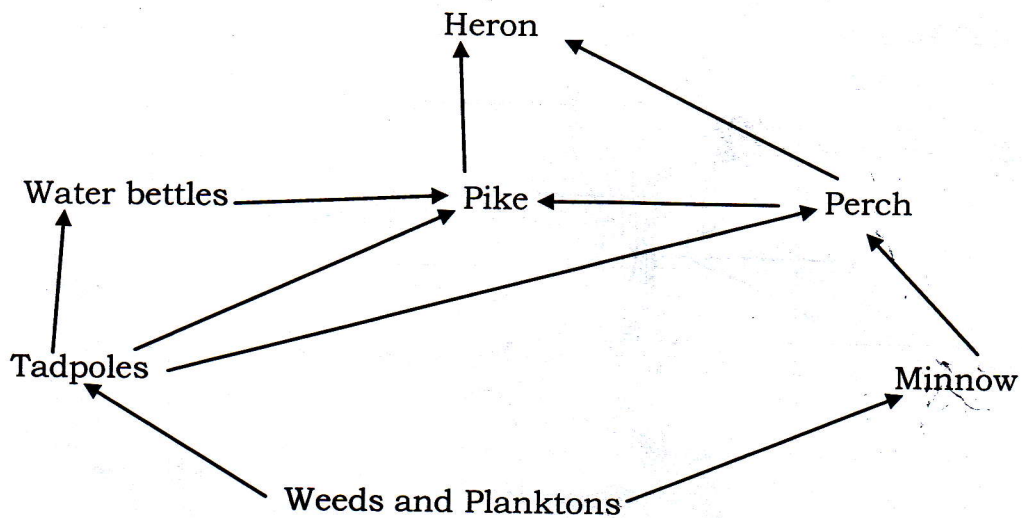
INSTRUCTIONS:

- 1) Write your names and index number on the answer booklet as written on your registration form and **DO NOT** write your names and index number on additional answer sheets of paper if provided.
- 2) Do not open this question paper until you are told to do so.
- 3) This paper consists of **THREE** sections: **A, B** and **C**.
Section A: Attempt **all** questions. **(55marks)**
Section B: Attempt any **three** questions. **(30marks)**
Section C: This section is **compulsory**. **(15marks)**
- 4) Use only a **blue** or **black** pen.

SECTION A : Attempt all questions (55 marks)

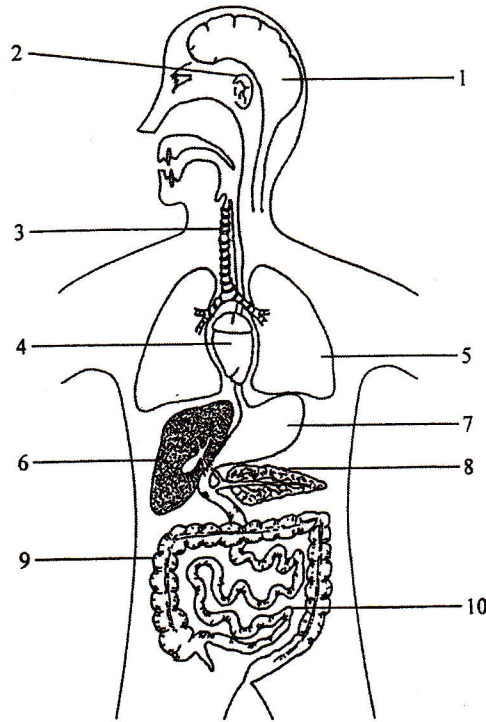
- 1) Write **T (True) or F(False)** against the following statements.
Anaerobic respiration in the body:
- a) Produces carbon dioxide
 - b) Uses glucose
 - c) Needs oxygen
 - d) Liberates more energy than aerobic respiration
 - e) Takes place in the Mitochondria.
- (5 marks)**
- 2) Suggest why it is difficult to decide whether viruses are living Organisms.
- (4 marks)**
- 3) Green plants make their own food by photosynthesis.
- a) What are raw materials of photosynthesis? **(2 marks)**
 - b) What gas is given off during photosynthesis? **(1 mark)**
 - c) What sugar is produced by photosynthesis? **(1 mark)**
 - d) Where does energy come from to make photosynthesis work? **(1 mark)**
- 4) From the following environmental factors, select those that are abiotic and those that are biotic
- a) Sunlight
 - b) Parasites
 - c) Symbionts
 - d) Wind
 - e) Competition
 - f) Mineral Salts
- (2 marks)**
- 5) Explain why elimination of water by the kidneys may be considered to be both excretion and osmoregulation. **(2 marks)**
- 6) Explain how microscopic animals can survive without having a circulatory system. **(3 marks)**
- 7) If sucrose is tested using Benedicts' test for reducing sugars, no change is observed. The bonds between the glucose and fructose must be broken before the test for reducing sugars. Describe how the bond can be broken chemically. **(2 marks)**

- 8) A group of students studied the feeding relationship in a pond. The Food Web below shows their results.



- a) What information is given by the arrows in this Food web? **(2 marks)**
- b) A disease killed most of the Minnows.
Explain the likely effect of the death of most minnows on the following organisms in the pond:
- i) Perch **(2 marks)**
 - ii) Tadpoles **(2 marks)**
 - iii) Planktons **(2 marks)**

- 9) The diagram below represents a human body. Some of the organs are numbered: Copy the table below and complete it. The first answer is done for you.



Function	Organ number
Helps to control bodily functions	1
Senses both sound and balance	<i>2, 3</i>
Acidic part of digestive system	
Stores carbohydrates as Glycogen	
Allows absorption of digested food into the blood stream	
Produces digestive enzymes and Insulin	
Absorbs water from undigested food	

(6 marks)

10) This question is about cell division. Copy the table below and complete it by putting a tick (✓) in the correct column. The first answer is done for you.

S/N	Feature	Type of Cell division	
		Meiosis	Mitosis
1	Changes take place in the Nucleus	✓	✓
2	Produces gametes		
3	Produces daughter cells with identical chromosomes		
4	Half chromosomes are passed to each daughter cell		
5	Homologous chromosomes are randomly assorted into daughter cells		
6	Mutations can occur to change genetic code		
7	Chromatids are separated by fibres within the cell		

(6 marks)

11) Individuals are different. A group of students studied the Variation in the Leaf area of one type of Rose Flowers. The table below shows their results.

Area in cm ²	3.0-5.0	5.0-7.0	7.0-9.0	9.0-11.0	11.0-13.0
Frequency	20	65	98	62	17

- a) i) What type of variation is shown by the leaf area? **(1 mark)**
 ii) Give two possible causes of this variation. **(2 marks)**
- b) i) What is Mutation? **(1 mark)**
 ii) Explain how mutations can be caused. **(2 marks)**

- 12) Certain Mullusca can either be striped or unstriped. The B allele for stripped is dominant over the b allele of unstriped mullusca. If Mullusca of genotype Bb is crossed with a homozygous dominant having a striped shell:
- a) What would be the ratio of genotypes in the offsprings?
Show your working. **(2 marks)**
 - b) What is the expected ratio of phenotypes? **(1 mark)**
- 13) Briefly explain how the flow of blood is maintained in a mammal. **(3 marks)**

SECTION B: Attempt only three questions (30 marks)

- 14) a) Define the term "health". **(4 marks)**
b) What are the factors that affect good health? **(6 marks)**
- 15) a) Explain the major differences between Mitosis and Meiosis **(8 marks)**
b) What is the role of Mitosis? **(2 marks)**
- 16) Using your knowledge of Biology, suggest how you can eliminate malaria in your District. **(10 marks)**
- 17) a) What is variation? **(2 marks)**
b) With examples, describe different types of variation. **(8 marks)**
- 18) Discuss the mechanisms by which blood glucose is controlled in a human. **(10 marks)**

SECTION C: This question is compulsory (15 marks)

- 19) Assuming that you are provided with a simple leaf of a plant labelled specimen Q;
- a) Draw a well labelled biological drawing of specimen Q. **(10 marks)**
 - b) How is specimen Q adapted to its functions? **(5 marks)**

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