

SESEMAT MBARARA REGION
END OF YEAR ASSESSEMENT 2023
SENIOR THREE
BIOLOGY
SCORING GUIDE
SECTION A (50 scores)

1. During a biology lesson in S.2 class, students were asked to take their measurements for mass and height. Marion aged 15 years and a member of that class was 60kg and 142cm tall. When Marion mentioned her measurements everybody in class laughed. Marion started crying and went out of the class.

Support material

Standard body – mass index (BMI)

BMI	Interpretation
< 18.5	Underweight
18.5 to 24.9	Normal/ideal weight
25 to 29.5	Overweight
30 to 35	Obese
> 35	Gross obesity

Supposing you are Marion's biology teacher, prepare guidelines you would use to help her overcome the problems. (10 scores)

Body mass index =

Basing on the calculated BMI, that is 29.7; this is overweight; which means excess fats accumulation; which can lead to heart and vascular diseases; such as hypertension/high blood pressure; kidney diseases; due to high level of cholesterol in blood vessels;

Type 2 diabetes, gall bladder diseases; and stroke may be result;

Marion can be advised to observe the following;

Avoid processed junk foods;

Managing stress properly e.g by seeking counselling; to gain her self-esteem;

Eat varied, colourful foods; such as fruits; and vegetables;

Regulating the amounts of oily foods such as butter or cheese in her diet

Avoid excessive use of carbohydrates; such as white bread, instead use whole grains;

Eating mindfully; keep a food and weight diary; and measure servings (serve reasonable amount of food)

Doing regular conditioning exercises; to burn excess fats and cholesterol;

2. David a S.3 student at Nyamahembe S.S, arrived late for term III. He only found back seats in class vacant. Later, the Biology teacher noticed that David was copying notes from the neighbour. He told the teacher that he wanted to sit in front because he could not see words on the chalkboard properly as they were blurred. On shifting him to the front seat, David could see clearly and copy work from the chalkboard.

- a) What condition did David have in his eyes that made him fail to see words on the chalkboard from the behind seat? (1 score)

Short sightedness

- b) Explain the cause of the condition you have mentioned in 2 a) above (5 scores)

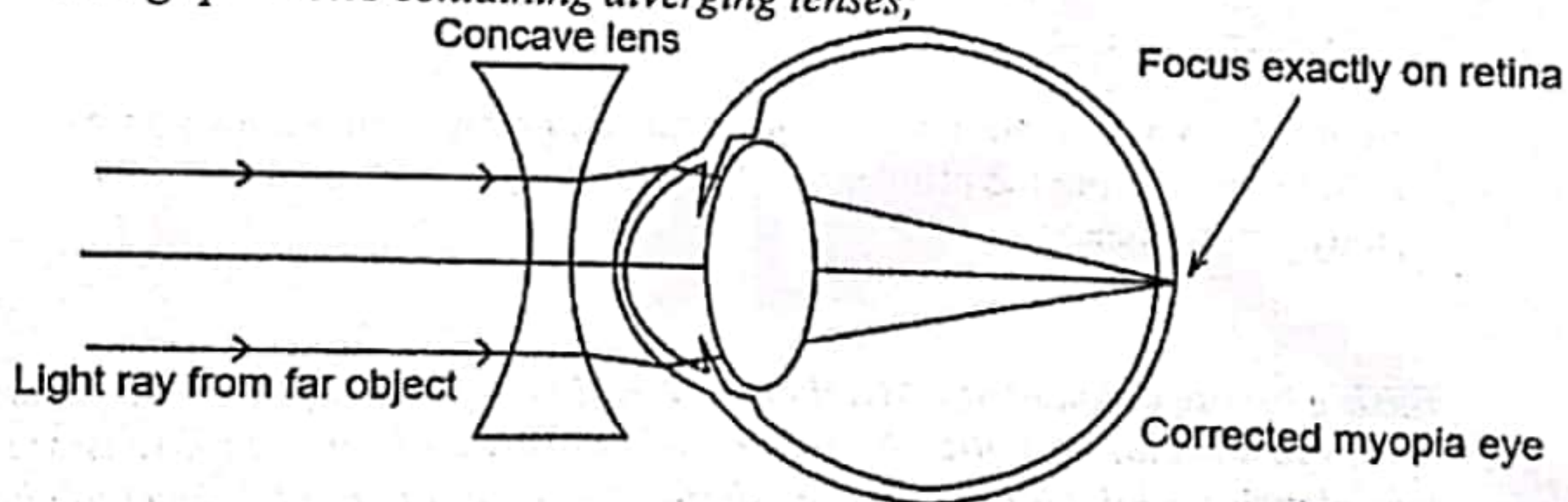
The eye ball being too long from front to back; that light rays from a distant object converge at a point in front of the retina.

The eye lens being very thick; with high converging power; that refracts the rays from a distant object; to converge at a point in front of the retina.

- c) How can David's condition be corrected? (4 scores)

Use a diagram to illustrate your answer.

Wearing spectacles containing diverging lenses;



3. In brewing, sugar (glucose) and yeast are the most commonly used raw materials. During the process, sugar is mixed with yeast in regulated proportions and the mixture is maintained at a pH between 4.0 and 5.5. The rate of reaction that occurs can be determined by measuring the amount Carbon dioxide produced in a given time.

The graph in figure 1 shows the effect of temperature on the amount of carbon dioxide produced in 1 minute.

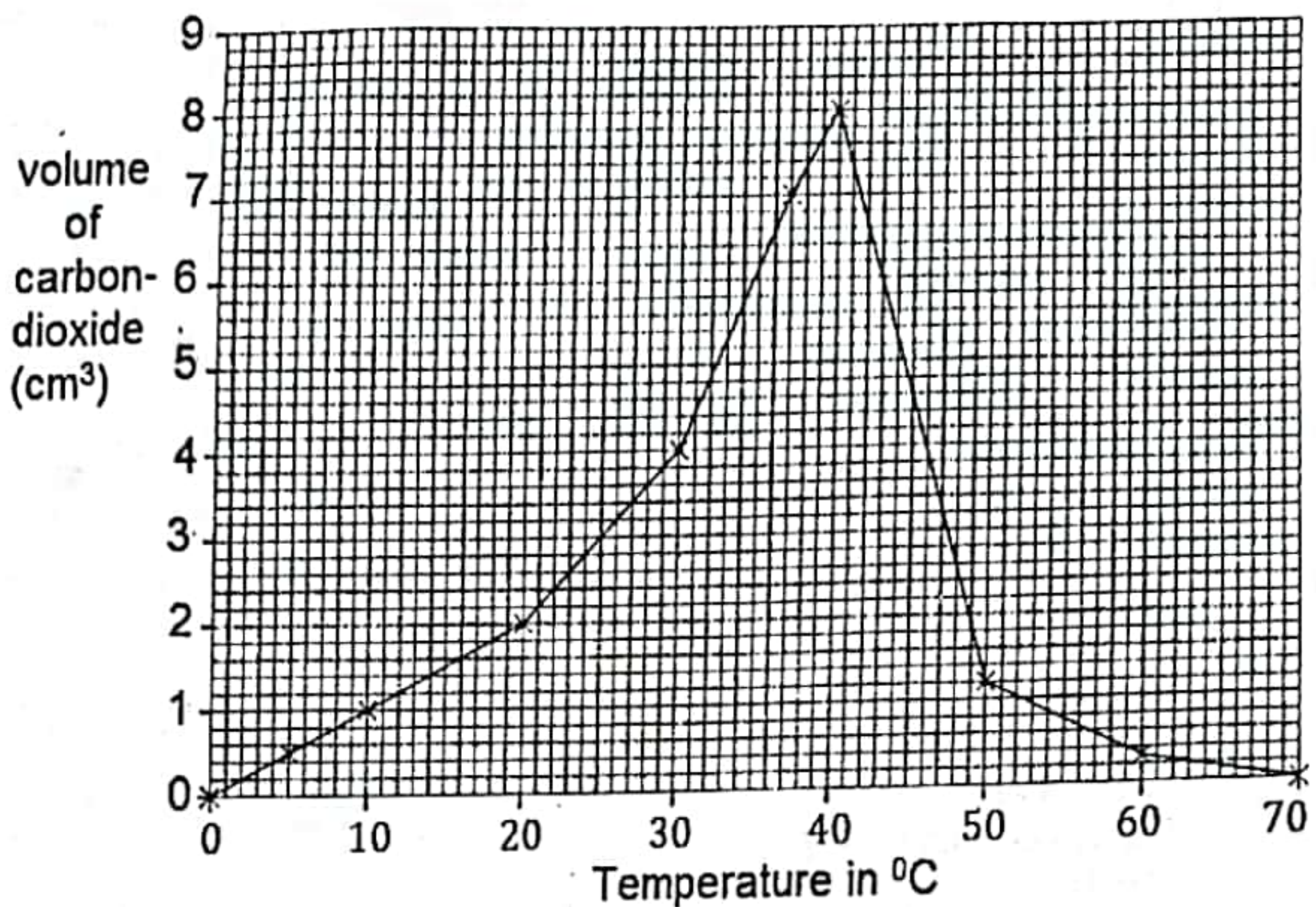


Figure 1

- a) Give an explanation for the volume of carbon dioxide produced at;
- 5 °C (3 scores)

At 5 °C, the volume of CO₂ produced was relatively low; because many enzyme molecules were still inactive; resulting in low rate of anaerobic respiration;
 - At 40 °C, (3 scores)

At 40 °C, the volume of CO₂ produced was high; due to activation of enzyme molecules; leading rapid anaerobic respiration;
 - At 70 °C. (2 scores)

At 70 °C, no CO₂ production occurred, due to denaturation of respiratory enzymes; reject; low CO₂
- b) Suggest two ways of increasing the amount of alcohol produced in process above; (2 scores)
- Increasing glucose concentration;*
Maintaining the temperature of the reactants at 40 °C;
Maintaining pH between 4.0 and 5.5
Addition of more yeast solution.

4. S.1 learners at Maranatha Secondary School, carried out an ecological study in which they examined and documented features of one of the organisms they came across. They labelled the organism as A and based on its external structural features to classify it in the hierarchy below.

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

Order: Hymenoptera

Family: Apidae

Genus: Apis

Species: Merifera

- a) Identify three structural features that the learners might have based on to classify organism A under the class and phylum shown in the hierarchy above.

Structural features for;

(i) Phylum

(3 scores)

External/exoskeleton;

Jointed limbs;

Segmented body;

(ii) Class

(3 scores)

three main body parts/divisions

three pairs of jointed legs

three thoracic segments

- (b) Write the scientific name of organism A following rules of Binomial Nomenclature.

(4 scores)

Apis merifera

Score if;

- *The name is composed of two words i.e genus and species regardless of the order*
- *The scientific name begins with the genus name followed by the species name*
- *The genus and species name begin with capital and small letters respectively and the rest of the letters are small (lower cases)*
- *The genus and species names are underlined separately*

5. Figure 2 below shows a diagram of a structure of part of human body organ that was observed by medical students.

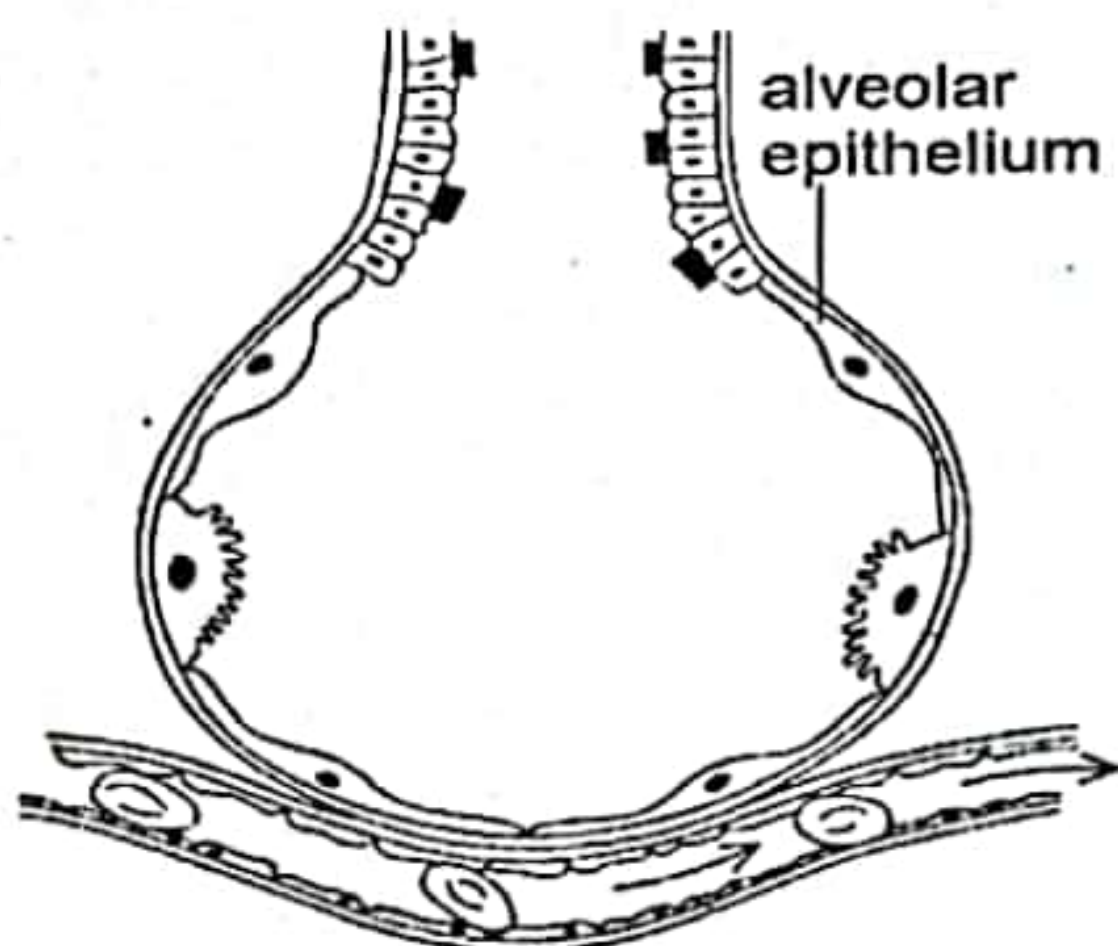


Figure 2

- a) Identify the human body system from which it was obtained. (1 score)

Respiratory system;

- b) What is the function of the structure in figure 2 above in the human body? (1 score)

For gaseous exchange;

- c) How is the structure above adapted to perform the function you have stated in b) above? (6 scores)

Supplied with blood capillaries; for transporting respiratory gases;

Has a thin epithelium; to shorten diffusion distance of the gases

Red blood cells are in close contact with the blood capillary; to reduce diffusion distance of the gases;

The alveolar epithelium is in contact with the blood capillary to reduce diffusion distance of the gases;

- d) Explain one human practice that may decrease the ability of the structure above to perform its function. (2 scores)

Smoking;

leading to inhalation of tar that reduces the moisture content of the respiratory surface

May cause lung cancer;

Inhaled smoke from tobacco damages the alveolar epithelium;

SECTION B (30 Scores)

6. John got an accident which damaged his testes at the age of 3 years in 2000. In January 2017, John observed his male agemates having beards and deep voices which they never had in early childhood. Contrary to what he observes on his male agemates, John has a soft voice and no beards. His agemates tease him. This greatly affected his self-esteem. He is also worried that he might have been bewitched by somebody.

John runs to you to help him understand his situation.

As a student who has studied coordination in animals, write a letter to John that will help him understand his challenge and possibly find a solution.

(15 scores)

*NY secondary school,
P.O.Box
Mbarara*

2nd November 2023

Dear John;

Hope this letter finds you with good health. You recently contacted us about some issues concerning your challenge. I wish to inform you that it is not only you with such a challenge. I want to explain to you what exactly happens that leads to such characteristics.

Human males have a pair of testes; these secrete a hormone called testosterone; which stimulates the development of secondary sexual characteristics in males; these characteristics include growth of beards; deepening of the voice; growth of pubic hair; increase in the size of the penis; and broadening of the chest; Once one's testes are damaged at an early stage, no production of testosterone occurs; resulting in failure of development of secondary sexual characteristics; such individuals may also fail to impregnate women; due to absence of sperm in their bodies; but the rest of their body organs function normally;

However, if attended to early enough, the anomaly can be diagnosed; and rectified by a medical specialist; either through surgery; or injection of male hormones;

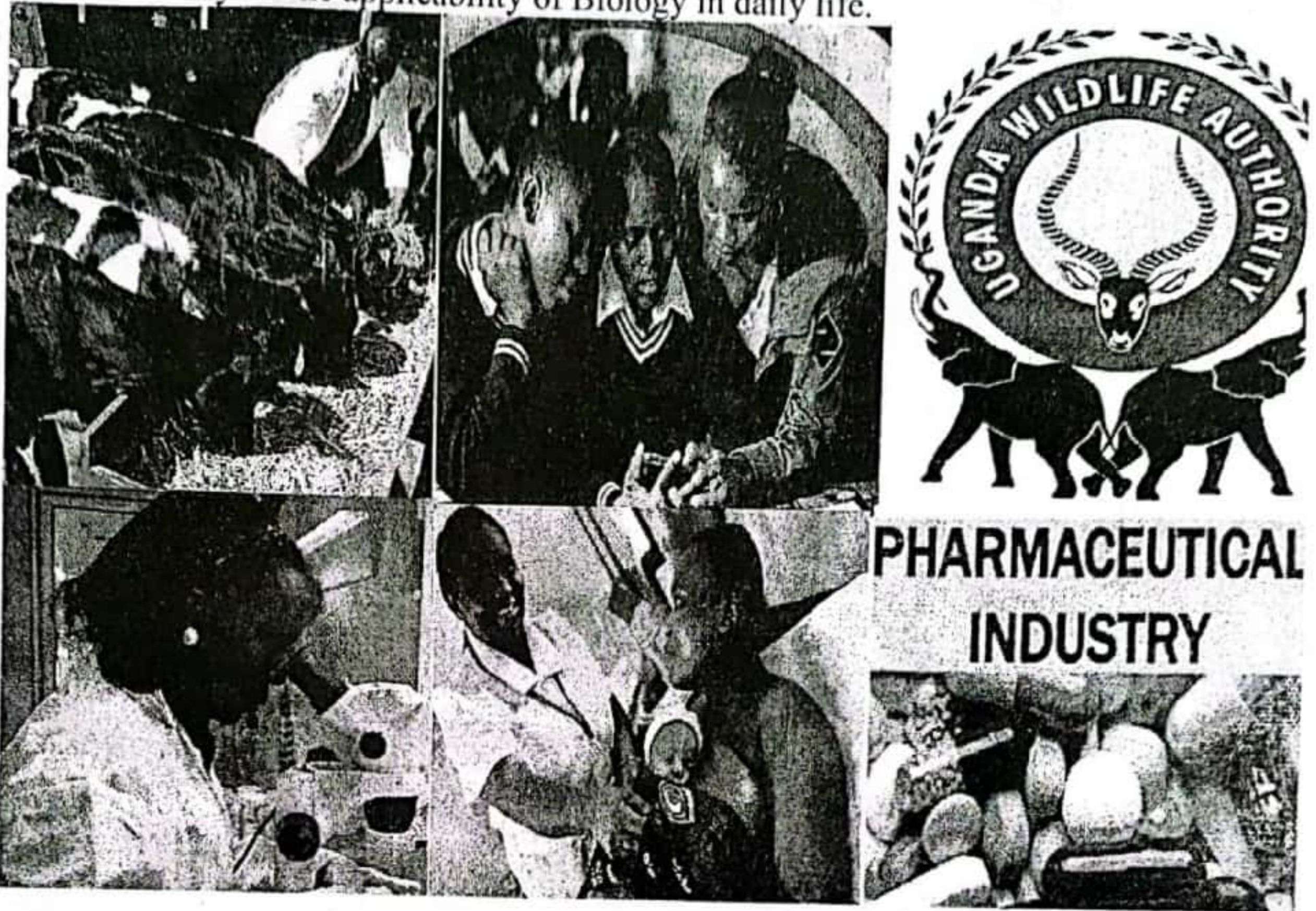
I wish to advise you to visit a urologist in that area for further assistance as soon as you can.

Wish you quick recovery

I remain

*Matia Mugisha
Counsellor*

7. NCDC, a body that formulates and reviews curriculum in Uganda conducted a survey on people's views about the New Lower Secondary Curriculum. The study focused mainly on the applicability of Biology in daily life.



Suppose you were one of the citizens who were approached by NCDC during the above study, write a report giving your views about the application of the subject mentioned above in daily life (15 scores)

Biology is a subject that concerns the study of life; and is applied in very many fields, which include;

Teaching; where learners acquire knowledge and skills that make them become professionals; such as biology teachers and doctors;

Tourism industry; where by knowledge and skills from biology are applied in conservation of wild life;

Animal husbandry; whereby skills of breeding, feeding and control of diseases of animals are applied

Crop production; whereby farmers apply biology in pest management; soil conservation and breeding of crops;

Human population control; through the use of contraceptives; such as condoms; abstinence etc

Control of human diseases; such as malaria; ebola etc

Scientific research; about various aspects of life; such as physiology in plants and animals;

Treatment of human diseases; through the administration of drugs; physiotherapy; surgeries etc.

Pharmaceutical industries; in the manufactures drugs; for both humans and other animals;

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