

**BIOLOGY AND HEALTH SCIENCES**

**Date: 5 July 2023**

**Period: 8h30am-11h30am**



**END OF TERM III EXAMINATIONS  
2022/2023**

**GRADE :** S1

**COMBINATION :** O'LEVEL

**DURATION:** 3 HOURS

**MARKS:**

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**INSTRUCTIONS**

This paper is composed of three Sections **A**, **B** and **C**

**Section A:** Attempt all questions (55 marks)

**Section B:** Attempt any three questions (30 marks)

**Section C:** Attempt only one question (15 marks)

**Section A: Attempt all questions**

**(55 marks)**

1. Explain why it is important to study biology. **(4 marks)**
2. Give the correct name or word for each of the following: **(3 marks)**
  - a) the biologist who developed the binomial system
  - b) a system that groups living things into smaller and smaller groups
  - c) the naming and classification of organisms.
3. Explain why it is necessary to classify living organisms. **(3 marks)**
4. Match the leaf parts in column A and their functions in column B.

Column A	Column B
1. Petiole	A. Contains chlorophyll for trapping light energy, which is needed for photosynthesis
2. Midrib	B. Transports food from the lamina to the petiole
3. Veins	C. Carries food made by photosynthesis from the leaf to the stem
4. Lamina	D. Distribute water and mineral salts within the lamina

**(4 marks)**

5. Explain how leaves are suited to their functions **(3 marks)**
6. Explain why it is important to have plants in the garden of your home **(3 marks)**
7. The following are steps to view the specimen using your microscope and are not well arranged in a correct order. Using numbers arrange them in correct order.
  1. Turn the coarse focus knob until the lens is as far away from the stage as possible.
  2. Turn the nosepiece so that a more powerful objective lens is in place above the slide.

3. Slowly turn the coarse focus knob until the specimen is in focus. You can use the diaphragm above the mirror to change the amount of light passing through the specimen.
4. Once the specimen is in focus with one lens, it will be nearly in focus with the other lenses. Now you will need to turn only the fine focus knob.
5. Make sure that the lowest power objective lens is in place.
6. Use the fine focus knob to bring the specimen into focus.
7. Put the slide onto the stage and clip it in place. Move the slide until the specimen is directly under the lens. **(4 marks)**

8. What is the function of each of the following?

- a) the cell membrane
- b) the nucleus

**(2 marks)**

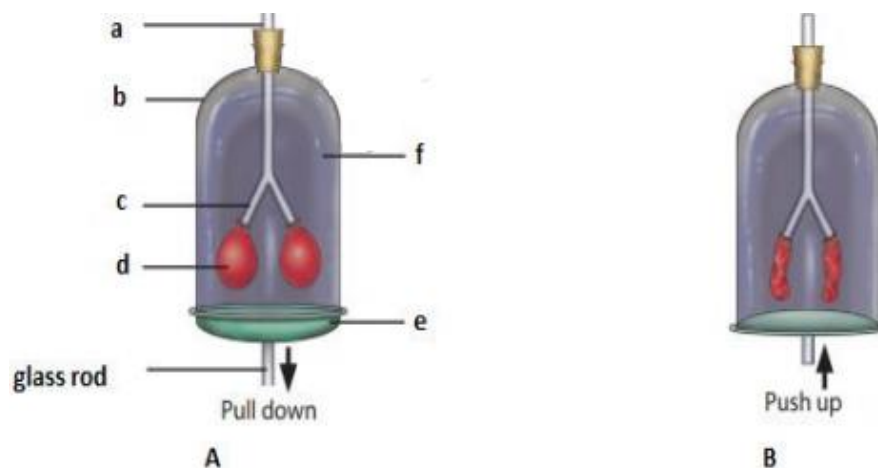
9. Red blood cells have haemoglobin. Explain how this is useful to humans.

**(2 marks)**

10. Explain why pregnant and breastfeeding women need more energy per day than the average adult woman.

**(4 marks)**

11. The figure below shows a model to demonstrate breathing. Observe it and answer the questions that follow.



- a) Which bell jar is representing exhalation? Give reason for your answer.
- b) State the parts of human respiratory system represented by letter A – F.

**(5 marks)**

12. We plant seeds randomly into soil but roots grow downwards while shoot grows upwards. Apply the knowledge of gravitropism to explain this. **(4 marks)**
13. Name two animals that have a hydrostatic skeleton. **(2 marks)**
14. Which vitamin is deficient when a person has:
- a) scurvy
  - b) rickets? **(2 marks)**
15. One day, a 90 years old woman fell and broke her arm. The doctor said that her arm broke because of osteoporosis, which is an age-related disease. Support the conclusion of the doctor. **(5 marks)**
16. How can you use the knowledge of menstrual cycle to prevent unwanted pregnancy? **(2 marks)**
17. List four functions of the placenta. **(3 marks)**

**Section B: Attempt any three questions**

**(30 marks)**

18. Make a table with three columns: Disease, Cause, Prevention. Complete the table using the information about nutritional disorders.

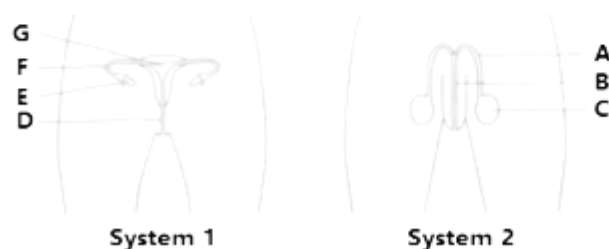
Disease	Cause	Prevention
Scurvy		
Rickets		
Anaemia		
Kwashiorkor		
Obesity		

**(10 marks)**

19. Appraise the role of skeleton in animals

**(10 marks)**

20. The diagrams below show the reproductive systems in humans.



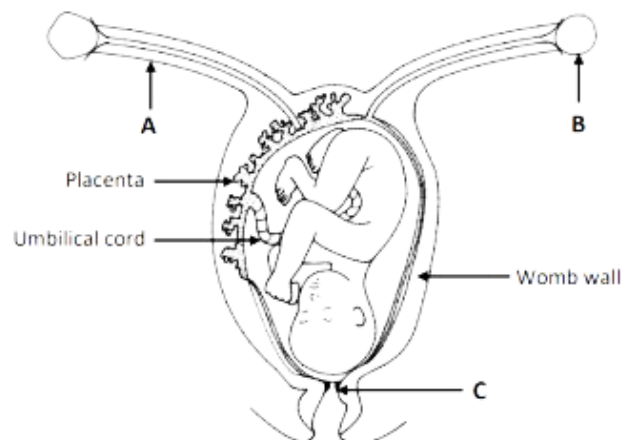
- a) With a reason, state the diagram representing the male reproductive system. **(2 marks)**
- b) Use the letters on diagrams to name:
- i. The place where female gametes are formed **(1 mark)**
  - ii. The place where the fetus develops **(1 mark)**
  - iii. The place where male gametes are formed **(1 mark)**
- c) Observe the diagram of the sperm cell.



- i) Identify the part labelled X. **(2 marks)**  
 ii) From your observation, explain how the sperm is suited to its function **(3 marks)**
- 21.** Make a table to differentiate sperm cell and ovum **(10 marks)**  
**22.** Make a comment on social issues and puberty in Rwandan society. **(10 marks)**

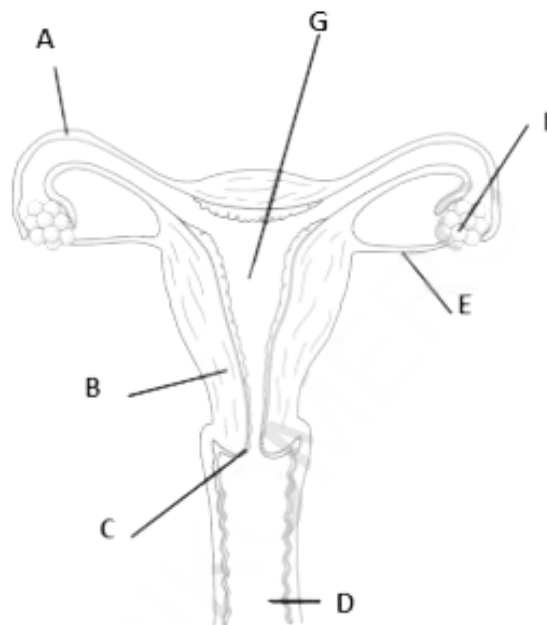
## Section C: Attempt Only One question

- 23.** The diagram shows a foetus in the womb before birth.



- a) Identify the structures labelled A, B, C on the diagram. (3 marks)
- b) Give two functions of the placenta. (3 marks)
- c) Give two benefits of breastfeeding. (3 marks)
- d) Describe what will happen to C during birth. (3 marks)
- e) How is placenta adapted to its functions? (3 marks)

24. The following figure indicates the internal organs of the female reproductive system



- a) Identify the parts labelled A, B, C, D, E, F and G. (7 marks)
- b) Give the processes that take place in:
  - i. Part labelled A (2 marks)
  - ii. Part labelled D (2 marks)
- c) Suggest two functions of part labelled D. (4 marks)

## **Marking Guide Biology S1**

1.

- It improves our understanding of diseases and their causes, prevention and treatment.
- It helps us to meet the needs of a growing population; for example, through increased food production.
- We can understand the variety of living organisms on Earth, and why we need to look after all of them.
- We can appreciate how all life on Earth is connected.

It helps us make decisions about our own health and form our opinions on controversial issues, such as organ donation. **(4 marks)**

- It can provide us with career opportunities.

2.

a) Linnaeus

b) Hierarchical classification

**(3 marks)**

c) Taxonomy

3. It is necessary to classify living organisms:

- To understand the evolutionary relationship between different organisms.
- To organise information about living organisms in order.
- To assign organisms universally accepted names.
- To help identify living organisms and place them into their correct groups.

**(3 marks)**

4.



Column A	Column B
1. Petiole	C. Carries food made by photosynthesis from the leaf to the stem
2. Midrib	B. Transports mineral salts and water from the petiole to the lamina and food from the lamina to the petiole
3. Veins	D. Distribute water and mineral salts within the lamina
4. Lamina	A. Contains chlorophyll for trapping light energy, which is needed for photosynthesis

**(4 marks)**

5. Leaves are suited to their function in the following ways:

- They have a large surface area to trap sunlight.
- They contain chlorophyll, which is needed for photosynthesis.
- They contain stomata, which enable the exchange of gases.
- Their veins transport water to the cells for photosynthesis and move the products of photosynthesis to other parts of the plant.

**(3 marks)**

6.

- Plants beautify the home
- Plants provide oxygen at home
- Some plants are food
- Plants provide shelter

**(3 marks)**

7.

5,1,7,3,4,2,6

**(4 marks)**



8.

a) Cell membrane controls entry and exit of substances into and out of the cell.

b) the nucleus controls the functioning of the cell. **(2 marks)**

9. Haemoglobin carries oxygen to humans, used in respiration to give energy to the body. **(2 marks)**

10.

A pregnant woman needs extra nutrients and energy for the healthy growth and development of her baby. A breastfeeding woman needs extra energy and nutrients to make breast milk. **(4 marks)**

11.

a) Exhalation is represented by **B**

Reason: volume of d (lung) decreases

b) a: trachea

b: thorax

c: bronchus

d: lung

e: diaphragm

f: thoracic cavity **(5 marks)**

12. Roots grow towards gravity (positively gravitropic) while shoot grows away from gravity (negatively gravitropic). Thus, when seeds are planted, roots grow downwards and shoot grows upwards. **(4 marks)**

13. Worms, leeches, slugs, snails, flatworms, jellyfish **(2 marks)**

14.

a) Vitamin C

b) Vitamin D

**(2 marks)**

15. This is true. Osteoporosis is a bone disease that occurs mostly in women after menopause. The bones become very porous, and they break easily and heal slowly

**(5 marks)**

16. Knowing menstrual cycle enables to know the fertility period during when conception is likely to occur. One can use contraceptive methods accordingly.

**(2 marks)**

17.

- Provide the foetus with nutrients;
- remove waste products from the foetus' blood; exchange oxygen and carbon dioxide between the foetus' blood and the mother's blood;
- act as a filter for harmful substances;
- secrete hormones

**(3 marks)**

## **Section B**

18.

<b>Disease</b>	<b>Cause</b>	<b>Prevention</b>
Scurvy	Lack of vitamin C	Improve intake of vitamin C (food rich in vitamin C such as oranges and lemons.
Rickets	Lack of vitamin D and calcium	Lack of vitamin D and calcium (food rich in vitamin D such and calcium such as milk)

Anaemia	Lack of iron	Improve intake of iron (food rich in iron such as s liver, eggs and green leafy vegetables)
Kwashiorkor	Shortage of proteins	Improve intake of proteins (food rich in proteins such as Meat, milk, chicken, fish, eggs, groundnuts, soya beans, seeds)
Obesity	Too much food and insufficient exercise	Reduce food intake and increase exercise

**19.**

**(10 marks)**

The skeleton is very important in animals.

- It supports and gives the body its shape.
- It protects soft and delicate parts of the body such as the brain, the heart, the lungs and the spinal cord from the mechanical injury.
- It works together with muscles to enable the body to move.
- It provides a surface for attachment of the body muscles.
- The endoskeleton in vertebrates from red blood cells.
- In arthropods the exoskeleton protects the body from excessive drying or desiccation.
- We have to take care of skeleton by eating healthy and exercising regularly.

**(10 marks)**

**20.**

**a)** System 2, it has testes

**( 2 marks)**

**b)** i. E

**(1 mark)**

ii. G

**( 1 mark)**

iii. C

**(1 mark)**

**c)**

i) X: nucleus

**(2 marks)**

ii) It has:

- many mitochondria to produce energy
- tail (flagellum) for moving
- acrosome to release enzymes

**( 3 marks)**

21.

<b>Sperm cell</b>	<b>Egg cell (ovum)</b>
Is male gamete	Is female gamete
smaller	larger
Contains acrosome	No acrosome
Nucleus contains either X or Y chromosome	Nucleus contains only X chromosome
Produced in testis	Produced in ovary
motile	Non motile

**(10 marks)**

22. At puberty, boys and girls can produce a baby if they have unprotected sexual intercourse. However, they are too young to manage the responsibilities of having a child. They will lose out on many educational and career opportunities, which could affect their future lives negatively. The unintended pregnancy will also cause family disruption. Rwandan society prepares boys and girls for their gender responsibilities. Adults warn girls and boys about avoiding unintended pregnancies.

**(10 marks)**

23.

- a) A: Fallopian tube (or oviduct); B: Ovary; C: Cervix **(3 marks)**
- b) Allows food (or nutrients or named nutrient) to pass to foetus / allows waste products (or named waste product) to pass to mother / allows oxygen to pass to foetus / produces hormones / prevents pathogens reaching the foetus/ keep foetal blood and mother's blood separate.**(3 marks)**

c) (Breast milk) contains antibodies / (breast milk) is free from harmful bacteria / (breast milk) is the correct temperature / (breast milk) contains the correct amounts of nutrients / creates a bond between mother and baby / helps uterus return to original size / could prevent breast cancer or reduces risk of breast cancer. **(3 marks)**

d) The cervix dilates, or widens. **(3 marks)**

e)

- It has villi (finger like projections that extend into the uterus wall), which further increase the surface area of the placenta.
- A rich supply of blood vessels **(3 marks)**

24. a)

A: oviduct

B: muscular wall of womb

C: cervix

D: vagina

E: ligament which holds ovary in position

F: ovary

G: uterus

b) i. Fertilisation

ii. Birth giving

c) Birth giving, copulation

**ALTERNATIVE TO PRACTICAL  
BIOLOGY**

**Date: 30 June 2023**

**Period: 8h30am-10h00am**



**END OF TERM III EXAMINATIONS  
2022/2023**

**GRADE :** S1

**COMBINATION :** O'LEVEL

**DURATION:** 1h30min

**MARKS:**

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**INSTRUCTIONS**

This paper is composed of **One Compulsory** question

**(20 marks)**

1. a) Draw the external structure of a flower of a typical flowering plant in the compound of your school. **(10 marks)**
- b) i) How is a flower adapted to its functions? **(5 marks)**
- ii) What would happen if there were no flowers **(5 marks)**

## **S1 ALTERNATIVE TO PRACTICAL BIOLOGY MG**

1. a) -Title-should be written in capital letters and underlined
- size – should be large enough at least 3/2 of A4 paper
  - Continuous outline
  - Neatness – should be clean
  - Labelling – label lines should be straight without arrows
  - Magnification – should be written on the left of the drawing below it.
- With multiplication sign **(10 marks)**
- b)i) - Bright colour to attract insects for pollination
- Have numerous pollen grains
  - Large stigma to receive pollen
  - Style for pollen tube growth to the Ovary **(5 marks)**
- ii) The end product of pollination is fertilization and production of fruits and seeds. It follows therefore that if there were no flowers, no fruits and seed would be produced. Fruits and seed are food to animals and human beings. If food, no life. **(5 marks)**