NAME: .....PERSONAL NO. .....

SIGNATURE: .....

553/1
BIOLOGY
(Theory)
Paper 1
Jul-Aug 2023
2 ½ hours

MUKONO KAYUNGA JOINT MOCK EXAMINATIONS BOARD

Uganda Certificate of Education

BIOLOGY

(THEORY)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **all** *the questions in Section* **A** *and* **B** *plus* **two** *questions from section* **C**.

Answers to section **A** *must be written in the boxes provided.*

Answers to section **B** *must be written in spaces provided.*

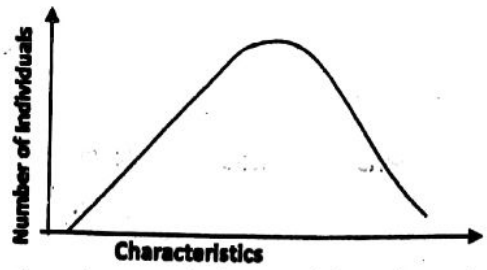
Answers to section **C** *must be written in answer sheets provided.*

FOR EXAMINERS' USE ONLY	
SECTION	**MARKS**
A	
B: 31	
32	
33	
C NO.	
NO.	
TOTAL	

SECTION A (30 MARKS)

1. To which one of the following phyla does the earthworm belong?
   A. Arthropoda B. Choroata C. Annelid D. Nematod
2. During dry conditions the spirogyra reproduces sexually by
   A. Budding B. Conjugation C. Fragmentation D. Sporulation
3. Which one of the following statements about pure water is correct?
   A. Has a high osmotic potential B. Has a high solute potential
   C. Has a low osmotic potential D. Has a negative osmotic potential
4. The type of cells attacked mainly by the HIV virus in the human body are:
   A. Erythrocytes B. Platelets C. Leucocytes D. Lymphocytes
5. The genes for inheritance of **ABO** blood groups are an example of
   A. Dominant alleles B. Codominant alleles C. Multiple alleles D. Lethal alleles
6. A dry fruit that splits along many lines of weakness is a:
   A. Samara B. Legume C. Capsule D. Caryops
7. The vitamin requires for good night vision is
   A. Vitamin A B. Vitamin B C. Vitamin C D. Vitamin D
8. Biological control of rats in a habitat would involve;
   A. Clearing bushes B. Use of rat poison
   C. Use of rat poison D. Breeding cats
9. Denitrifying bacteria change
   A. Ammonia into nitrates B. Nitrogen into nitrates
   C. Nitrates into free nitrogen D. Nitrites into nitrates
10. The highest amount of energy in a food chain is present in
    A. Decomposers B. Tertiary consumers
    C. Primary consumers D. Producer
11. Addition of humus to a sandy soil would
    A. Decrease soil mineral content B. Improve soil water retention
    C. Increase soil erosion D. Decrease capillarity of the soil
12. Secondary growth in a flowering plant is caused by;
    A. Cortex cells B. Xylem vessels C. Phloem cells D. Cambium cells
13. Which one of the following cell organelles would be largest in number inactive muscle tissue?
    A. Ribosomes B. Mitochondria C. Golgi bodies D. Chloroplas
14. The graph below shows the number of individuals varying with a given characteristic in a population.

Turn over



Which one of the following characteristics would produce the graph in figure 1 above?

A. Height B. Sextype C. Blood group D. Albinism

15. The part of a Bryophyllum plant leaf for vegetable propagation is the;

A. Lamina B. Notch C. Bud D. Apex

16. Crossing over occurs during;

A. Prophase of mitosis B. Prophase of meiosis

C. Metaphase of mitosis D. Metaphase of meiosis

17. Which one of the following vertebrae has demi facets?

A. Lumbar vertebra B. Thoracic vertebra C. Cervical vertebra D. Atlas

18. The excretory structures for an insect are;

A. Trachea B. Malpighian tubules C. Tracheoles D. Spiracles

19. Which of the following parts are for hearing and body posture?

A. Cochlea and cerebrum C. Eustachian tube and cerebrum

C. Eustachian tube and cerebellum D. Eustachian tube and cerebrum

20. The products of hydrolysis of lactose are;

A. Sucrose and galactose B. Glucose and galactose

C. Fructose and glucose D. Fructose and sucrose

21. What would be the phenotypes of children born of a colour blind man and a normal woman?

A. All normal B. All colour blind

C. Only boys colour blind D. Only girls normal

22. Which part of the brain is responsible for controlling breathing in mammals?

A. Cerebellum B. Medulla oblongata C. Thalamus D. Cerebrum

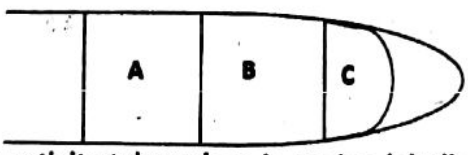
23. Which one of the following mammalian secretions contains an enzyme that digests maltose?

A. Salvia B. Succusentericus C. Gastric juice D. Pancreatic juice

24. Which one of these plasma constituents is re-absorbed in the distal convoluted tubule?

A. Glucose B. Protein C. Chloride D. Urea

25. Figure 2 shows a longitudinal section of a root apex.



Which main activity takes place in region labelled **B**?

Turn over

A. Cell expansion
B. Differentiation
C. Meiotic cell division
D. Mitotic cell division

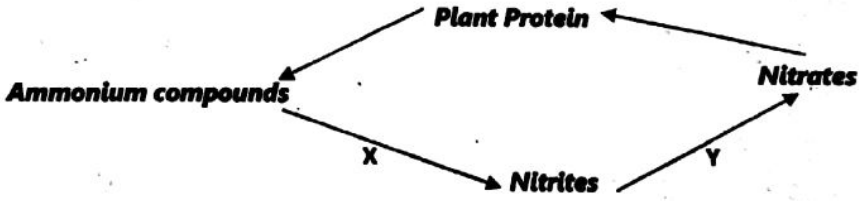
26. Possession of lungs in amphibians is an adaptation to live
A. On dry land
B. In water
C. In moist areas
D. Both in water and on land

27. The following are metabolic processes;
(i) *Synthesis of plasma metabolism*
(ii) *Regulation of fat metabolism*
(iii) *Storage of Vitamin A*
(iv) *Manufacture of digestive enzymes.*
Which of these are functions of the liver?
A. (i), (ii) and (iv)
B. (i), (ii) and (iii)
C. (i), (iii) and (iv)
D. (i), (ii) and (iv)

28. Cells with uniformly thickened and lignified walls are likely to be
A. Collenchyma B. Phloem
C. Parenchyma
D. Sclerenchyma

29. Yawing in tilapia is counteracted by
A. Caudal fin
B. Pectoral fins
C. Pectoral and Caudal fins
D. Dorsal and Ventral fins

30. Figure 3 below is a simplified representation of the nitrogen cycle.



Which of the following bacteria are responsible for the changes along X and Y
A. Azotobacter and Dostridium
B. Nitrobacter and Nitrosomonas
C. Nitrosococcus and putrefying bacteria
D. Rhizobium and Clostridium

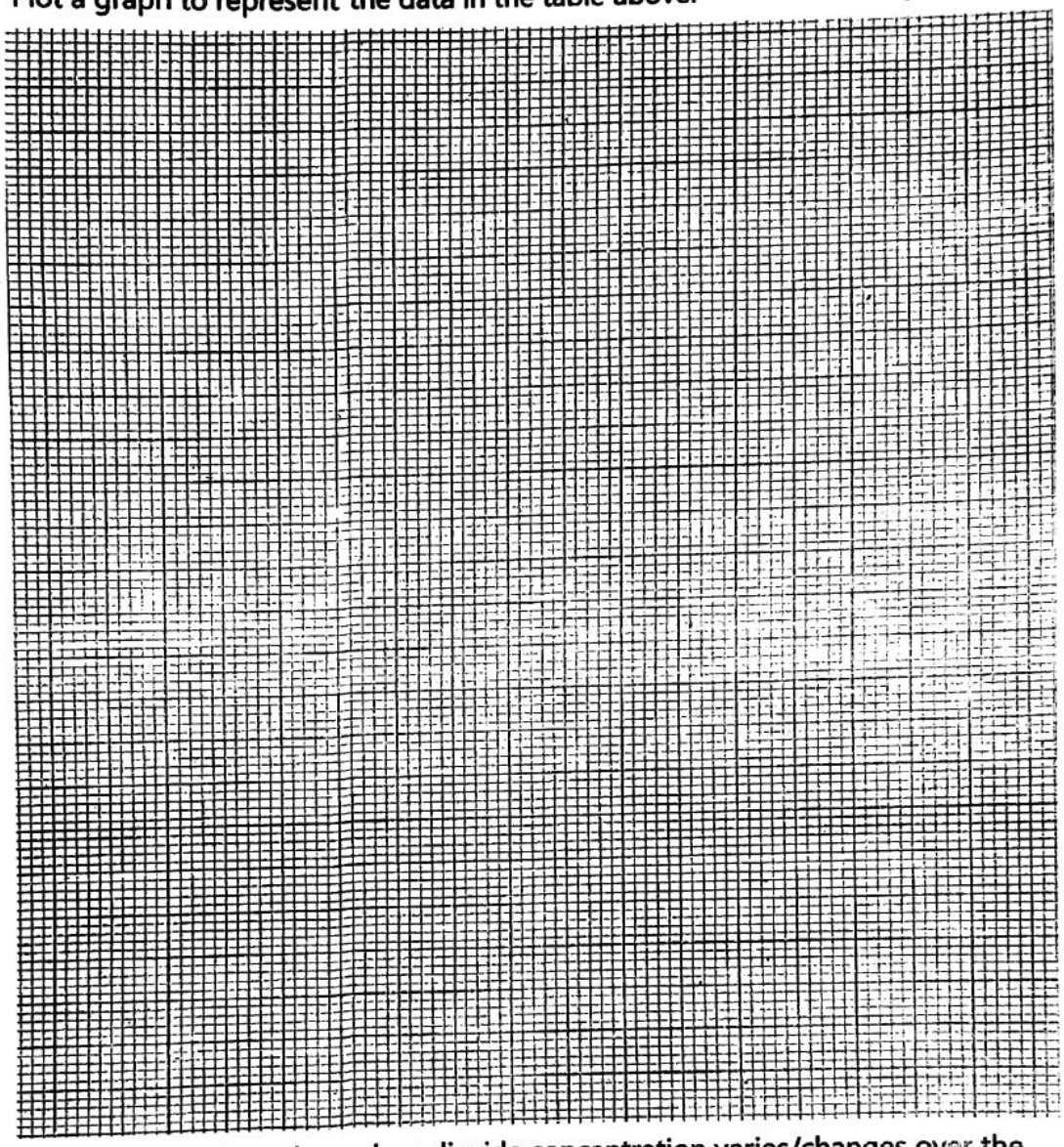
SECTION B

31. The table below shows the measurements for the carbon dioxide concentration in the air of a rain forest, over a 24-hour period. Normal carbon dioxide concentration is 0.03%.

Carbon dioxide concentration in %	0.049	0.051	0.052	0.054	0.053	0.045	0.038	0.033	0.031	0.032	0.040	0.046	0.04
Time of the day in 24 hours	1.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.0

Turn over

a) Plot a graph to represent the data in the table above. *(9 marks)*



b) (i) Describe how the carbon dioxide concentration varies/changes over the 24-hour period. *(2 marks)*

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(ii) Name the life processes responsible for the changes in carbon dioxide concentration. *(1 mark)*

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c) Explain the changes in carbon dioxide concentration from;

(i) 100hrs to 800hrs *(4½ marks)*

Turn over

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(ii) 1000hrs to 16.00hrs *(2 marks)*

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d) Suggest a reason why the carbon dioxide concentration in air of a forest is never at 0.03% over 24-hour period?

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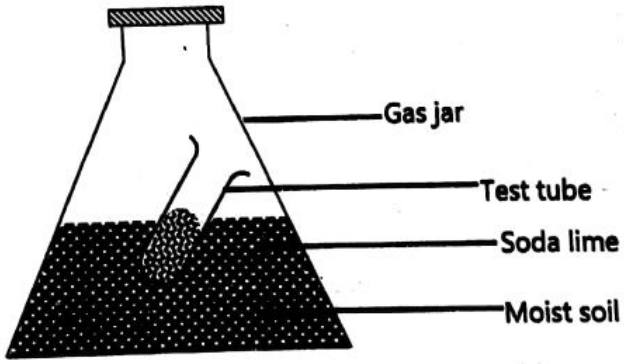
e) List environmental factors that affect the amount of carbon dioxide in the air of a forest. *(1 mark)*

32. A student was found in the laboratory carrying out an investigation with the following arrangement of apparatus.



a) (i) What was the student trying to investigate? *(01 mark)*

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(ii) State what was observed by the student at the end of the experiment. *(01 mark)*

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(iii) Explain your observation stated in a) (i) above. *(02 marks)*

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(iv) State and explain what would be observed if the student replaced moist soil with sterlised soil. *(03 marks)*

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b) Of what importance are the components from the student's investigation on soil? *(03 marks)*

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33.a) Complete the table below by stating one function and one effect of deficiency in flowering plants for each of the elements listed.

Element	Function	Effect of deficiency
Nitrogen		
Phosphorus		
Magnesium		

b) Name the symptoms caused by the deficiency of each of the following elements in the diet of man.

(i) Iodine

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(ii) Calcium

.....

(iii) Iron

.....

Turn over

SECTION C

34.a) State the meaning of the term meiosis and were does it occur in plants and animals. *(03 marks)*

b) What is the relevancy of meiosis in reproduction? *(02 marks)*

c) A breed of dogs has long hair dominant to short hair. A long-haired bitch was mated to a short haired dog. In the second mating of the long-haired bitch puppies produced were long haired and short haired.

(i) Use appropriate alleles to show the genetic composition of the bitch in the first generation and after selfing the first filarial generation. *(07 marks)*

(ii) Write phenotypic and genotypic ratio of the second generation *(02 marks)*

(iii) What is the percentage of homozygous recessive in the second generation? *(01 mark*

35.a) How does the mammalian body maintain a constant body temperature? *(07 marks)*

b) State the various ways by which the mammalian body loses;

(i) Heat *(04 marks)*

(ii) Water *(04 marks)*

36.a) How is soil air important to plants? (3 marks)

b) Describe an experiment to determine the percentage of air in a soil sample. *(12 marks)*

37.a) State, giving two examples in each case, what is meant by the following terms:

(i) Voluntary action.

(ii) Involuntary action

b) A person touches a hot object with a finger and the hand is quickly withdrawn. Give a full account of what happens from the moment the object is touched up to the time the hand is withdrawn.

END