

P530/2

BIOLOGY

JULY/AUGUST, 2023

2 ½ HOUR2.

UGANDA PRIVATE AND INTERGRATED SCHOOLS ASSOCIATION

UGANDA ADVANCED CERTIFICATE OF EDUCATION

FINAL ASSESSMENT EXAMINATIONS YEAR 2023

BIOLOGY

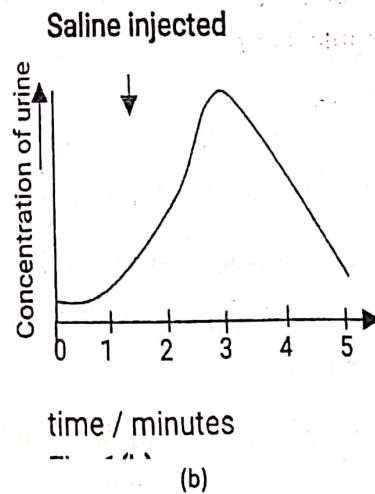
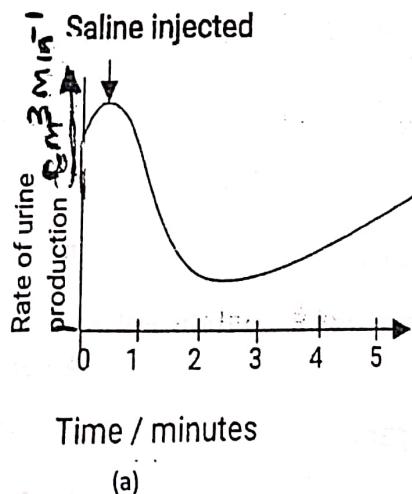
PAPER 2

TIME: 2 ½ HOURS

- Q1. An experiment was carried out on a dog which was made to drink water to full capacity.

Measurements were taken to determine the changes in the rate of urine production and concentration of urine .After 10 minutes a saline solution ,hypertonic to blood plasma was injected into its carotid artery .Measurements were continued for other 20 minutes .

Figures (a) and (b) show the results of the investigations.



- a) Describe the effect of the saline solution on each of the following;
- (i) Rate of urine production (2marks)
- (ii) Concentration of urine. (3marks)
- b) Explain the effects of the saline solution on the;
- (i) Rate of urine production. (8marks)
- (ii) Concentration of urine. (6marks)
- c) Explain the changes in each of following before injection of the saline solution;
- (i) rate of urine production. (8marks)
- (ii) Concentration of urine. (6marks)
- d) Suggest and explain what would happen to the rate of urine production if the;
- (i) Saline had been injected in the neck of a dog, (4marks)
- (ii) Pressure of blood fall. (3marks)

## SECTION B

Answer any **three** questions in this section.

2. a) Distinguish between action and absorption spectra in plants. (2marks)
- b) Describe mechanisms of synthesis of ATP molecules in the thylakoids of chloroplasts of a green plant. (10marks)
- c) Explain how photorespiration is avoided by C<sub>4</sub> plants. (8marks)
3. Discuss the effects the following might have if;
- a) Untreated sewage entered a slow flowing river (8marks)
- b) Hot water from the cooling towers of a power station entered a slow flowing river. (8marks)
- c) Forest is cleared to establish an industrial park. (4marks)
4. (a) Describe the role of hormones in behavior. (5marks)
- h) How do instinctive behaviors differ from learned behaviors? (5marks)

- c) (i) With an example describe what is meant by a releaser. (3marks)
- (ii) State the function of releasers. (7marks).
5. a) Describe how the structure of bone is related to its function. (13marks)
- b) With the aid of a labeled diagram describe the fine structure of a striated muscle. (7marks)
- 6.(a)Explain how paleontology provides evidence for evolution. (7marks)
- b)Explain the modern concept of evolution by natural selection. (13marks)

END



Candidate's Name: .....

Signature: ..... Index No: .....

553/1

**BIOLOGY**

(Theory)

**PAPER 1**

**JULY/AUG 2023**

2 ½ hours

**ASSHU ANKOLE JOINT MOCK EXAMINATIONS 2023**

**Uganda Certificate of Education**

**BIOLOGY**

**(THEORY)**

**Paper 1**

**2hours 30 minutes**

**INSTRUCTIONS**

This paper consists of sections A, B and C.

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

Write answers to section A in the **boxes** provided, answers to section B in the **spaces** provided and answers to section C on the **answer sheets** provided.

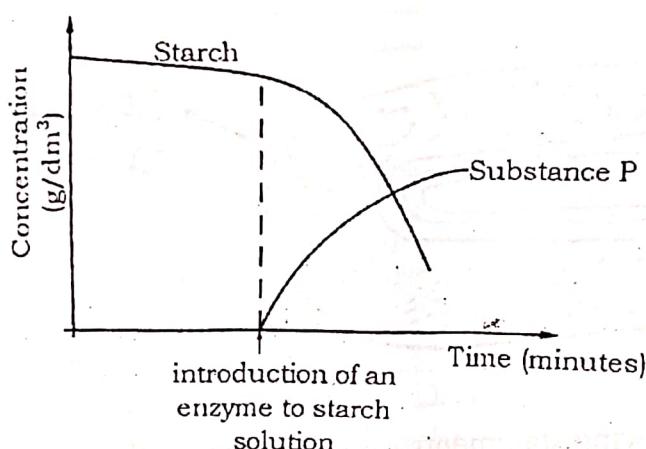
**For Examiners' Use Only.**

Section		Marks	Examiner's signature
A	No: 1 – 30		
B	No. 31		
	No. 32		
C	No. 33		
	No.		
<b>Total</b>			

### **SECTION A (30 marks)**

- The red blood cells are specialized for oxygen transportation by having  
A. Cell wall C. Haemoglobin  
B. large vacuole D. a nucleus
  - Which one of the following structures distinguishes a scorpion from a crab?  
A. Two body parts C. Number of legs  
B. Segmented body D. Presence of skeleton
  - Which of the following affects the speed at which impulses are relayed along a given neurone?  
A. The length of the neurone  
B. The number of dendrons in the neurone  
C. The presence of myelin sheath in the neurone  
D. The presence of cell body in the neurone
  - Which one of the following reproductive methods is carried out by yeast under unfavourable conditions?  
A. Binary fission C. Budding  
B. Sporulation D. Vegetative propagation
  - Which one of the following hormones is not secreted by the anterior lobe of pituitary gland?  
A. Vasopressin C. Luteinising hormone  
B. Prolactin D. Thyroxine
  - A horizontally growing stem that has roots at the nodes and develops buds growing into a new plant is a  
A. Runner C. Stolon  
B. Sucker D. Rhizome
  - Which of the following conditions is least important in seed germination?  
A. pH of the soil C. Temperature  
B. Light D. Viability of seeds
  - The part of the ear that equalizes air pressure in the middle ear is  
A. Ear drum C. Oval window  
B. Round window D. Eustachian tube

9. The graph below shows the production of substance P when an enzyme works on starch solution.



Which one of the following represents substance P?

- A. Maltose
- B. Amylase
- C. Amino acids
- D. Glycerol

10. The role of magnesium to a plant is to make

- A. Auxin hormone
- B. Chlorophyll
- C. Cellulose
- D. Proteins

11. Which of the following is an example of a character controlled by multiple alleles?

- A. Haemophilia
- B. Sickle cell anaemia
- C. Blood group
- D. Albinism

12. The importance of seed dormancy to plants is that

- A. Helps in faster growth of plants
- B. Increases the girth of stems and roots
- C. Helps in regeneration of plant parts
- D. Improves chances of a seed to mature

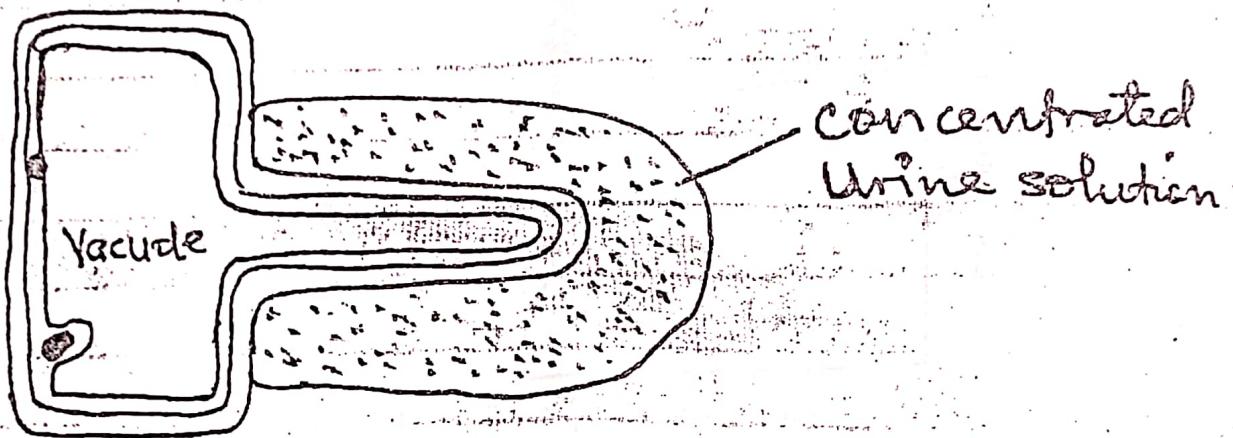
13. Dry weight is the best method of estimating the growth in seedlings because it

- A. Saves time
- B. Can be applicable to both plants and animals
- C. The materials used are cheap
- D. Gives actual weight of the plant.

14. Prolonged anaerobic respiration is not good because

- A. Ethanol produced becomes poisonous
- B. An oxygen debt is incurred
- C. So much energy is lost
- D. Much carbon dioxide is produced

15. The diagram below shows a root hair placed in a solution of concentrated urine



Which one of the following statements explains what will happen to the root hair cell?

- A. Water molecules move into the root hair due to their low concentration inside.
- B. Water molecules move into the root hair due to their low concentration outside
- C. Water molecules move out of the root hair due to their low concentration inside
- D. Water molecules move out of the root hair due to their low concentration outside.

16. Which one of the following types of muscles are myogenic?

- A. Cardiac muscles
- B. Skeletal muscles
- C. Smooth muscles
- D. Flight muscles

17. In the colonization of a bare rock, the next most likely group of plants after the lichens are the

- A. Grasses
- B. Shrubs
- C. Mosses
- D. Trees

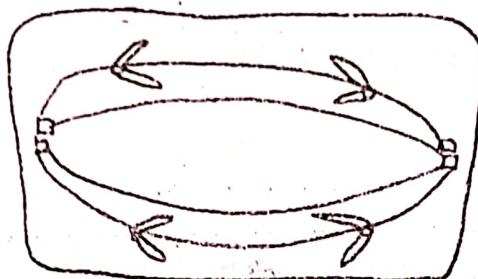
18. Which one of the following structures produces simple sugars?

- A. Cell wall
- B. Chloroplast
- C. Vacuole
- D. cytoplasm.

19. An ecosystem can be explained as

- A. A self supporting unit consisting of living and non-living factors.
- B. A location where an organism lives.
- C. A group of organisms of the same species living in a given area
- D. A group of organisms of different species living in a given area.

20. The diagram below shows a stage in cell division



Which stage of cell division is represented in the diagram above

- A. Anaphase I                      C. Anaphase II  
B. Metaphase I                      D. Metaphase II

21. Which one of the following vertebrae consists of entirely the centrum only?

- A. Sacral                            C. Caudal  
B. Lumber                           D. Thoracic

22. Which one of the following characteristics shows discontinuous variation?

- A. Height of plants                C. Number of fruits in trees  
B. Weight of seeds                D. Tongue rolling

23. In which one of the following atmospheric conditions does water move most quickly through the Xylem?

- A. Cool and damp                C. Damp and warm  
B. Dry and warm                D. Cool and dry

24. Which one of the following parts of a cell is used to distinguish fungi from plants?

- A. Nucleus                        C. Cellulose cell wall  
B. Cytoplasm                      D. Vacuole

25. Which of the following are characteristics of insect pollinated flowers?

- A. Feathery stigma, light pollen grains  
B. Sticky stigma, heavy pollen grains  
C. Light pollen grains, dull coloured  
D. Long filaments, much pollen

26. Which of the following events occur to the ciliary muscles and the lens when focusing on an approaching object?

Ciliary muscle	Lens
A. Contracts	Becomes fatter
B. Contracts	Becomes thinner
C. Relaxes	Becomes fatter
D. Relaxes	Becomes thinner

27. Which of the following features of an amphibian are suited for aquatic life?

- A. Possession of short fore limbs
- B. Muscular hind limbs
- C. Moist skin without scales
- D. Webbed toes

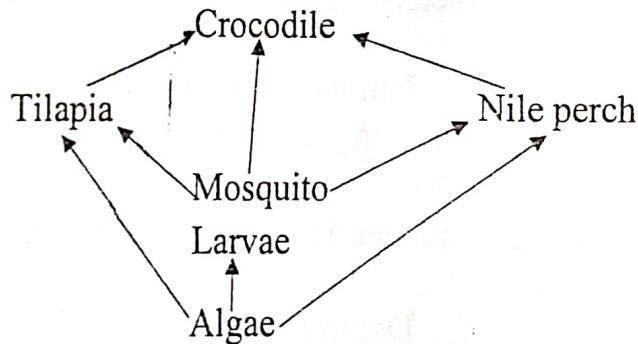
28. Which of the following blood vessels transports blood most rich in nutrients?

- A. Pulmonary artery
- B. Hepatic portal vein
- C. Mesenteric artery
- D. Renal vein.

29. The disadvantage of an exoskeleton is that it

- A. Limits growth
- B. Too heavy for flight
- C. allows water loss
- D. hinders gaseous exchange

30. The diagram below shows a food web



Which of the following organisms are primary consumers?

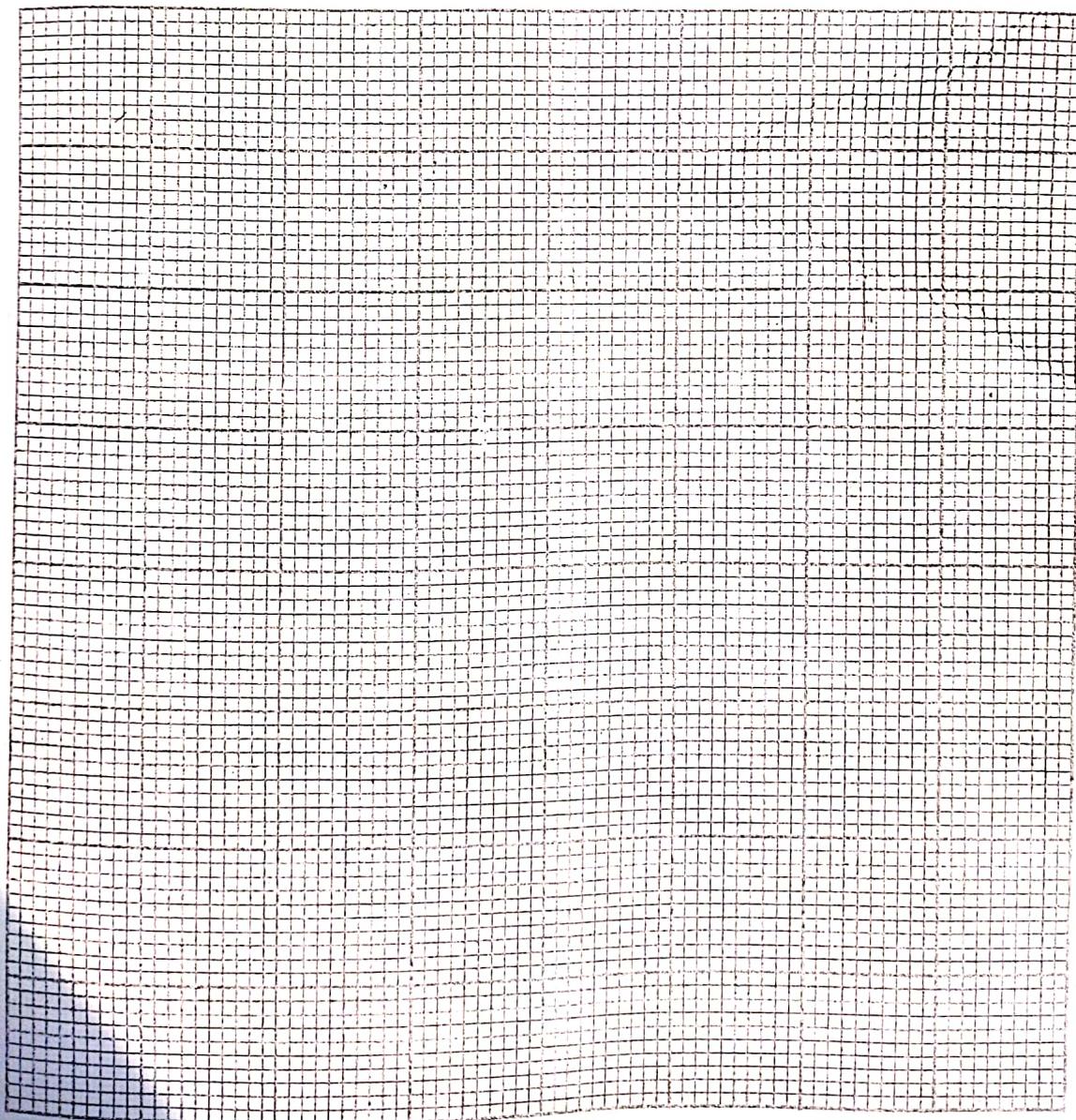
- A. Tilapia and crocodile
- B. Mosquito larvae and crocodile
- C. Algae and mosquito larvae
- D. Mosquito larvae and Nile perch

## SECTION B (40 MARKS)

31. In an investigation, two persons, A and B ingested the same amount of a glucose solution. Their blood sugar levels were monitored and recorded immediately and there after at intervals of 40 minutes of the next four hours. The results are as shown in the table below.

Blood glucose level in mg/100cm <sup>3</sup>		
Time in minutes	Person A	Person B
0	90	1220
40	220	360
80	160	370
120	100	380
160	90	240
200	90	200
240	90	160

a) Present the above data on the graph paper provided below (7½ marks)



b) Describe the changes in person A's blood sugar level throughout the period of investigation. (3marks)

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c) Compare the changes in blood sugar levels of the two persons

(3marks)

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d) (i) Explain the drop in blood sugar level of person A, during the period from 40 to 160 minutes (2marks)

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(ii) State with a reason, the normal blood sugar level for a human being (1mark)

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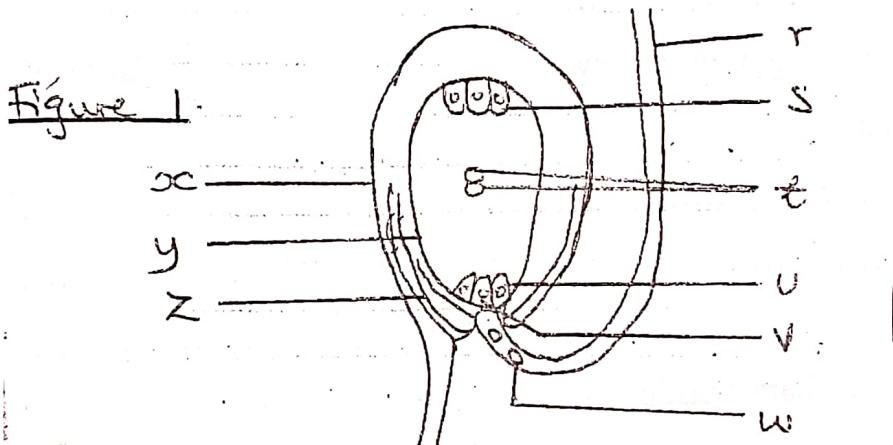
- e) Suggest a reason for the high blood sugar level of a person B and explain how it can be controlled (2marks)

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- f) What is the biological importance of maintaining a relatively constant blood sugar level in a human body? (1mark)

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32. Figure 1 shows a section of a part of a flower and a germinated pollen tube.



- a) Name parts; (4 ½ marks)

r: .....

w: .....

S: .....

x: .....

t: .....

y: .....

u: .....

z: .....

v: .....

- b) Name the structures formed from parts x, y and z after fertilization.

(1 ½ marks)

From x: .....

From y: .....

From z: .....

- c) (i) What term is given to the form of fertilization that results from the arrangements shown in figure 1 above (1mark)

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- (ii) Briefly explain how the fertilization in c(i) above occurs

(3marks)

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- 33.(a) State the meaning of the following terms (2marks)

- i) Chromosome

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- ii) Sex linked characteristic

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- (b) Haemophilia is a sex-linked character caused by a recessive gene that is located on X – chromosome. A haemophiliac woman married a normal man.

- i) Work out the probability of producing a carrier daughter (5marks)

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- ii) If the daughter married a normal man, what is the percentage of producing a normal boy? (3marks)

## SECTION C

- 34.(a) Describe how air is taken from the surrounding into the body of;  
i) Terrestrial insect (5marks)  
ii) Bony fish (5marks)  
(b) How is the bony fish adapted for gaseous exchange? (5marks)
- 35.(a) Describe sexual reproduction in Rhizopus (8marks)  
(b) Of what advantage is asexual reproduction in Rhizopus? (2marks)  
(c) State the economic importances of flowers (5marks)
- 36.(a)(i) Explain the meaning of the term anaerobic respiration (1mark)  
(ii) Write down a word equation for anaerobic respiration in plants (1mark)  
(b) Give four reasons why an animal needs energy in its body (4marks)  
(c) Describe an experiment to show that germinating seeds produce heat. (9marks)
- 37.(a) Describe the different modifications of leaves (Diagrams not required) (10marks)  
(b) In which ways are leaves suited to carry out photosynthesis? (5marks)

**END**