KCSE 2023 FINAL PREDICTION

BIOLOGY

(KCSE PREDICTIONS 1-10)

Confidential Analysis of Possible Expected sample KCSE Questions most likely to be tested in the Forthcoming KNEC examinations scheduled for November 2023.

The following are Expected Questions in KCSE 2023 EXAM.

CONFIDENTIAL!

For Marking Schemes

Mr Isaboke 0746 222 000 / 0742 999 000

SUCCESS TO ALL CANDIDATES

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 1

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- *Write your name and admission number in the spaces provided above*
- *Write the name of your school and the date of examination in the spaces provided above*
- *Answer **ALL** the questions in the spaces provided*
- Answers must be written in the spaces provided in the question paper.
- Additional papers must not be inserted.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. **a)** Name the **one** chemicals of a life that makes up **protoplasm** **(1mark)**

b) State **Two** disadvantages of using fats as respiratory **substrates** **(2marks)**

2. **(a)**Name the type of gene mutation that results in loss of skin **pigment** **(1mark)**

b) Explain how sunlight contributes to stronger bones and teeth in human beings **(2marks)**

3. Name the main target organ of the following hormones**:** **(2marks)**

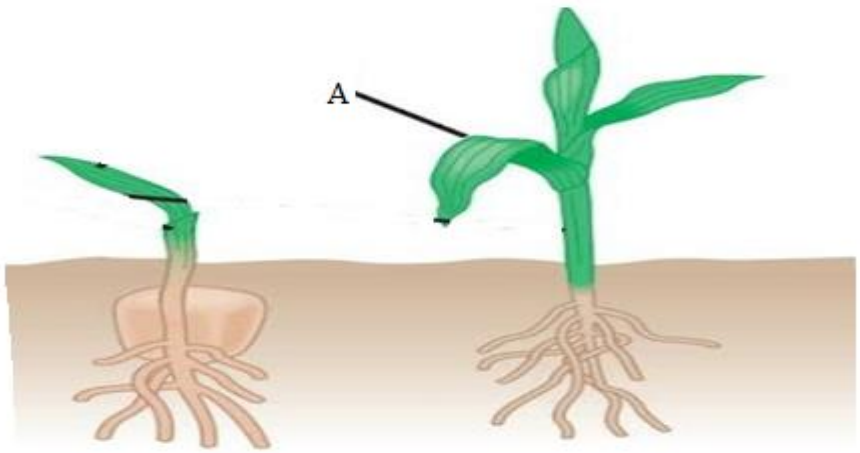
a) Antidiuretic**….. ……**

b) Glucagon**……**

4. a) What is Binary Fission? **(1mark)**

b) Give **Two** disadvantages of sexual reproduction **(2marks)**

5. The diagram shown below represents a seedling. Use it to answer questions that follow



a)(i) Name Class in which the seedling **belong** **(1mark)**

(ii) Give reasons for your answer in a (i) above **(2marks)**

b) Explain why the biomass of part labelled **A** will be lower compared to the one found in the seed stage of the same **plant** **(2marks)**

6. A solution of sugarcane was boiled with hydrochloric acid. Sodium hydrogen carbonate was added and the mixture heated with Benedict's solution. An orange precipitate was formed.

a) Why was the solution boiled with hydrochloric acid? (**1mark)**

b) To which class of carbohydrates does sugarcane belong? **(1mark)**

c) Name the type of reaction that takes place when:

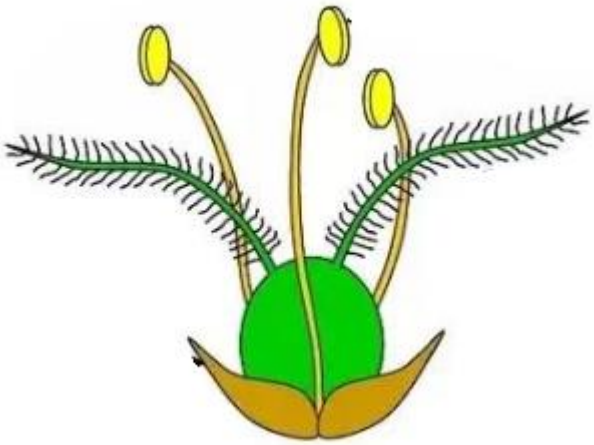
Simple sugars combine to form complex sugar**.** **(1mark)**

d) State the form in which carbohydrates are stored in **animals** **(1mark)**

7. a) State **Two** ways in which blood clotting is important to a human being **(2marks)**

b) What are the roles of thrombokinase enzyme during blood clotting? **(2marks)**

8. The diagram shown below represents a flower



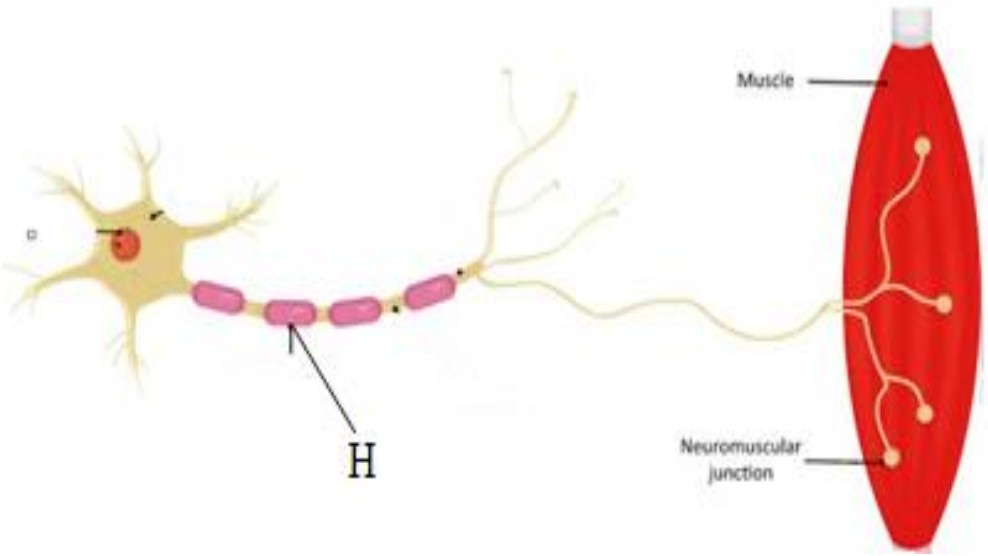
a) Name the agent of pollination for the flower shown **above** **(1mark)**

b) Give **Two** reasons for your answer in a) **above** **(2marks)**

9. State the differences between cones and rods in terms of the **following** **(2marks)**

Feature	Cone	Rod
Visual acuity	High	
Photochemical	Low	

10. Use the diagram of a nerve cell shown below to answer questions that follow



a) With a reason, give the identity of the nerve cell **(2marks)**

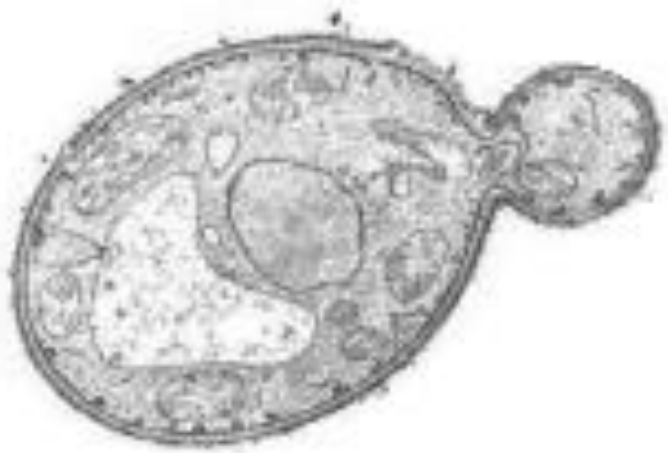
Identity …….

Reason ……...

b) Explain the significance of absence of part labelled **H** in nerve cells found in the brain. **(1 mks)**

11. Give **Three** features that make modern man to be more adaptable to the environment **(3mrks)**

12. The diagram below represents a living organism



a) State **Two** economic importance of the above organism in the food **industry** **(2marks)**

b) Why does the rate of respiration reduce under the following conditions**?** **(2marks)**

i) Low temperature ii) Metabolic poison

13. State **Two** reasons why Biotechnology is important in modern **science** **(2marks)**

14. Fill in the table shown below to give differences between biceps and gut muscles **(3marks)**

	Biceps	Gut muscles
I		
II		
III		

15. Explain how variation is important in the process of evolution? **(2marks)**

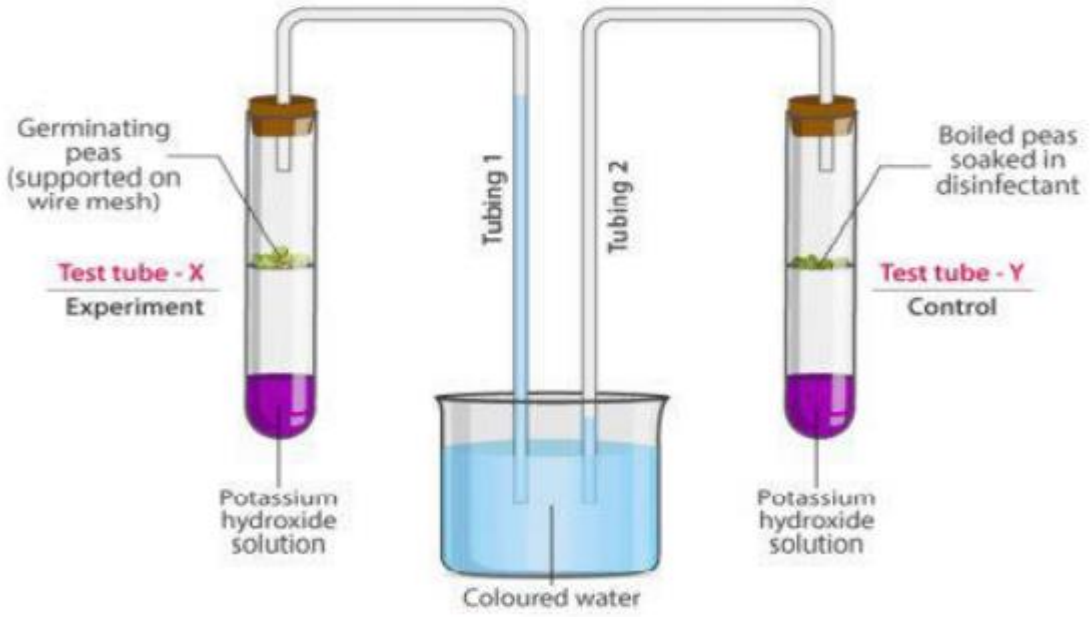
16. Explain the term negative **feedback** **(1mark)**

17. State **Two** contributions of Carolus Linnaeus (1708 – 1778) to **taxonomy** **(2marks)**

18. a) In an experiment, Venna counted 9 cells along the diameter of field of view of a light microscope measuring 3.0mm. Determine the diameter of one cell in micrometers **(3marks)**

b) Why is electron microscope safer to the eye than light microscope during use**?** **(1mark)**

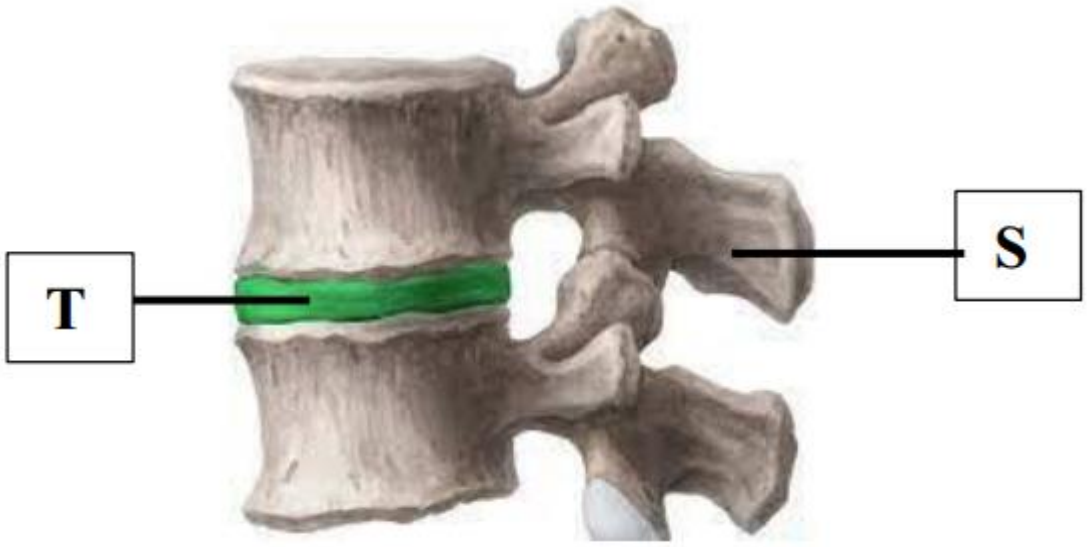
19. The following diagram represents results of an experiment carried out on two sets of germinating seeds.



a) Account for the result shown in test tube **X** **(2marks)**

b) What is the importance of dipping the boiled seeds in a disinfectant in test tube **Y**? **(1mark)**

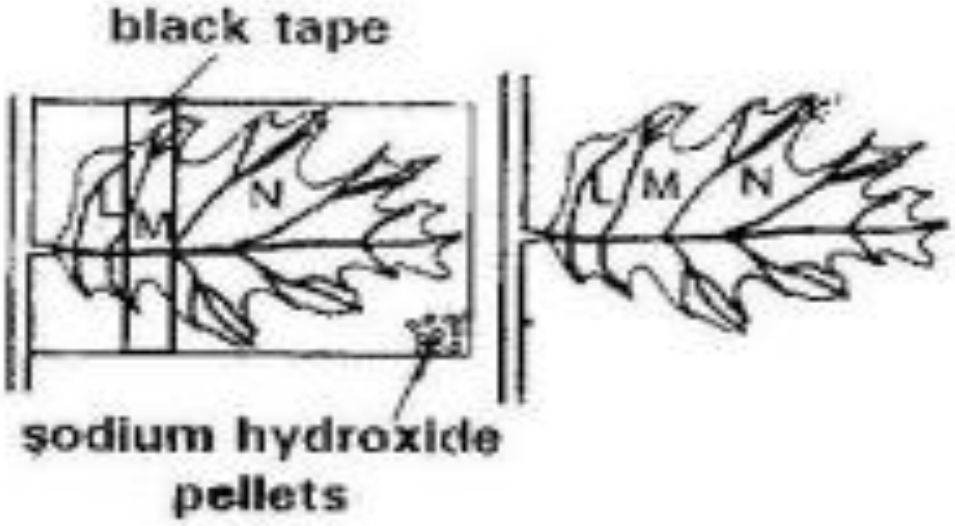
20. The diagram shown below represents a section of the vertebral column



a) Name the part labelled **S** **(1mark)**

b) State **TWO** ways in which part **T** is important to movement in human **beings** **(2 marks)**

21. The diagram below shows an experiment carried out to investigate photosynthesis in a potted plant which has been kept in the dark for 48 hours.



The setup was left in the sunshine for 6 hours. The leaf was tested for starch using iodine solution at the end of the experiment.

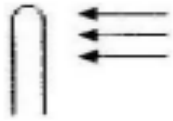
a) What would be the colours of the regions of the leaf marked L, M and N? **(3marks)**

b) What is the function of the sodium hydroxide pellets**?** **(1mark)**

22. (a) In fruit flies (Drosophila) the gene for red eyes (R) is dominant over the one for white – eye (r). In a true breeding white – eyed male, all the offspring will be red eyed. However, if a true – breeding white-eyed female is mated with a true- breeding red- eyed male, all the female offspring will be red – eyed. Explain this apparent contradiction. **(1mark)**

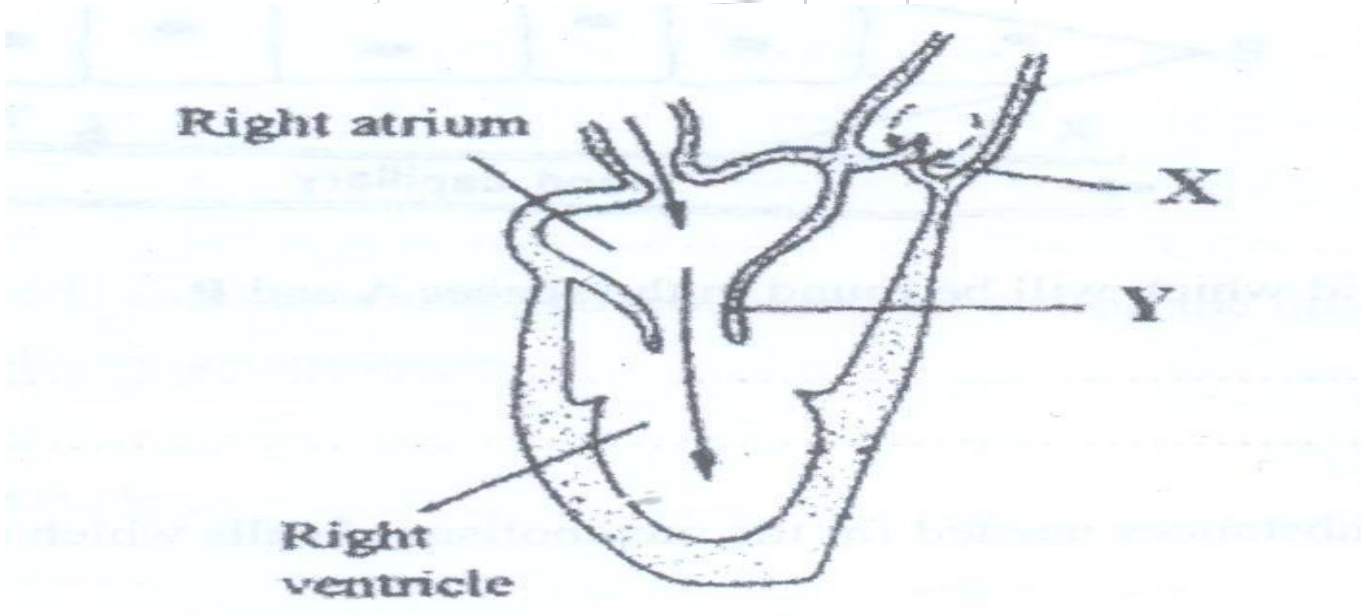
(b) Work out the expected FI genotypes if a red- eyed female offspring from the cross- described in (a) above is mated with red- eyed males. **(4marks)**

23. An experiment was set up to investigate the effect of unilateral/unidirectional light in growth of maize seedlings. The diagram in the table below represents experimental set up at the beginning. The tip of D is covered by an aluminium foil.

Experimental set up	Beginning of experiment	Expected results
C		
D		
B		

Using diagrams, complete the table to show the expected results in experimental set up**.(3 marks)**

24. Use the figure below to answer the questions that follow.



(a)Identify the cardiac cycle represented by the diagram. **(1mark)**

(b)Identify the valves **X** and **Y** **(2marks)**

X.....

Y.....

25. How does sunken stomata help in lowering transpiration? **(3marks)**

26. a) Name the hormone that stimulate the maturation of the graafian follicles to release a mature ovum in female reproductive cycle. **(1mark)**

b) Explain why menstruation does not take place after fertilization in human beings.

(2marks)

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KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 1

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

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INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

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- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
- *In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8*

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. A potted plant was placed in each of the following conditions for a period of one hour in the order given and transpiration in each hour was measured. The air temperature was 18^0C throughout the experiment.

CONDITIONS	RELATIVE HUMIDITY	TRANSPIRATION g/hr
A) Still air in sunlight and shade	70	1.2
B) Moving air only	70	1.6
C) Still air in bright sunlight	70	3.75
D) Still air in dark chamber	100	0.20

a) Account for the rate of transpiration in

i) Condition C **(3mks)**

ii) Condition D **(3mks)**

b) Name the apparatus used to measure the rate of transpiration. **(1mark)**

c) Give one modification in the stomata of xerophytes that reduce the rate of transpiration. **(1 mrks)**

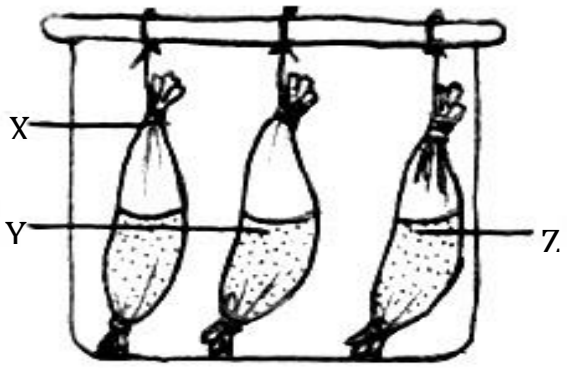
2. **Sickle cell anaemia** is a disease in which people produce abnormal haemoglobin in their red blood cells. Letter **H** represents the gene for normal haemoglobin while letter **S** represent the gene for abnormal haemoglobin. Heterozygous individuals are said to have **sickle cell trait**.

a) If both parents have sickle cell trait, work out the proportion of their offspring that have sickle cell anemia. **(5marks)**

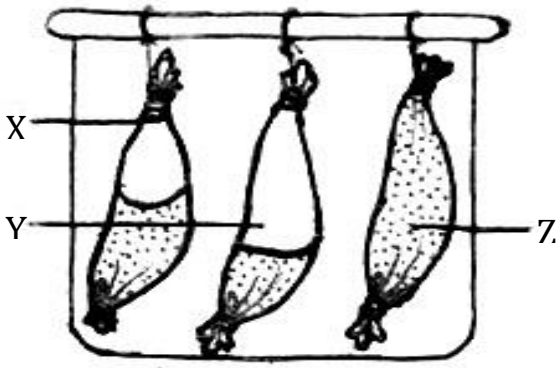
b) Explain why sickle cell trait is more prevalent in tropical countries than temperate countries. **(2marks)**

(c) Name any other disease caused by gene mutation. **(1mk)**

3. Equal volumes of three different sugar solutions were placed in visking tubings X, Y and Z. The tubings were placed in a beaker containing 5%sugar solution. The set up was left for two hours. The results were as shown in the diagram below.



Start of the experiment



End of the experiment

a) Name the process being investigated **(1mark)**

b) What is the significance of set up X in the experiment? **(1mark)**

c) Account for the observations in set up Y and Z. **(4mks)**

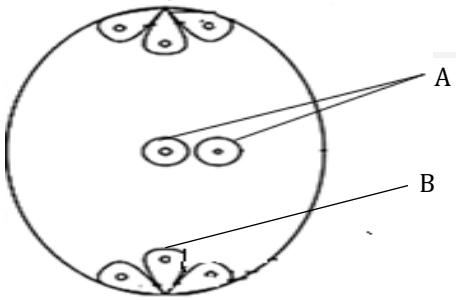
Y .....

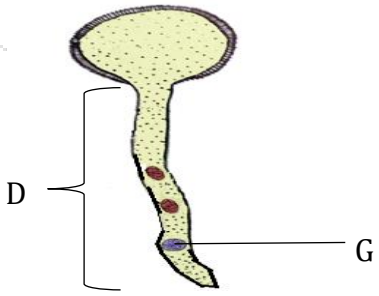
Z .....

d) Name a structure in cells that can be compared to the visking tubing. **(1mark)**

e) Explain how high temperature above 40^0C will affect the process being investigated in the cells of organism. **(1marks)**

4. The diagrams below show changes in the life cycle of a flowering plant.





a) Name the parts labelled A, B and G. **(3marks)**

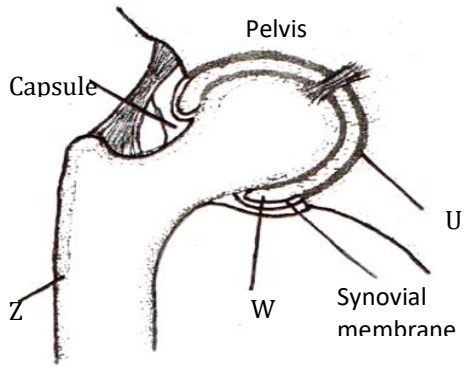
b) State the function of the part labelled D. **(1mark)**

c) (i) What will part A develop into after fertilization? **(1mark)**

(ii) Define the term parthenocarpy. **(1mark)**

d) Name two features in flowering plants that prevent self-fertilization **(2marks)**

5. The diagram below represents one of the joints in the mammalian body.



a) Name the type of joint shown in the diagram. **(1mark)**

b) Name each of the parts labeled **Z and U.** **(2marks)**

c) State two functions of the fluid found in W. **(2marks)**

d) Identify the type of muscle found attached to bone Z. **(1mark)**

e) State two differences between the muscle identified in (d) above and those found in the gut. **(2marks)**

SECTION B (40MARKS)

Answer question 6 (compulsory) and either question 7 or 8

6. In an experiment to investigate a certain process in a given plant species, the rate of carbon (IV) oxide consumption and the rate of carbon (IV) oxide released were measured over a period of time of the day. The results of the investigation are shown in the table below.

Time of day	6am	8am	10am	12pm	2pm	4pm	6pm	8pm	10pm	12am
CO_2 consumption (mm^3/min)	0	43	69	91	91	50	18	0	0	0
CO_2 release (mm^3/min)	38	22	10	3	3	6	31	48	48	48

(a) On the same axis, plot graphs of volume carbon (IV) oxide against time **(7mk**

b) Name the biochemical process represented by:

i) Carbon (IV) oxide consumption **(1 mark)**

ii) Carbon (IV) oxide released **(1 mark)**

c) Account for the shape of the curve for:

i) Carbon (IV) oxide consumption **(3 marks)**

ii) Carbon (IV) oxide released **(3marks)**

d) (i) What is meant by the term compensation point? **(1marks)**

(ii) From the graph state the time of the day when the plant attains compensation point **(2 mark)**

e) Explain how temperature affects the rate of CO_2 consumption in a plant. **(2 marks)**

7. a) Explain how the villi in the small intestines are adapted to their functions. **(10 marks)**

b) Describe the photosynthetic theory as a mechanism of opening and closing of the stomata. **(10marks)**

8. a) Explain how ultrafiltration occurs within the kidneys. **(5marks)**

b) Describe water pollution under the following headings:

i) Causes **(5marks)**

ii) Effects **(5marks)**

iii) Control measures. **(5marks)**

KCSE 23

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 2

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

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QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

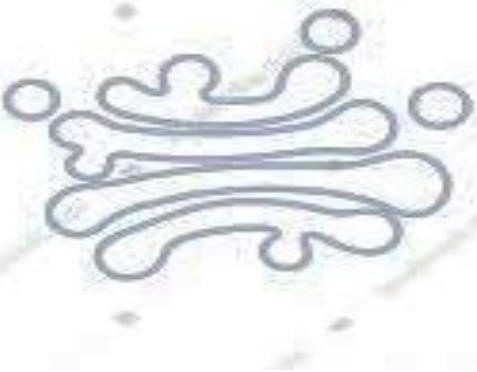
*Answer **ALL** the questions*

1. Two students were observing bacteria using identical microscopes and identical slides. Student A saw 10 bacteria and student B saw 50 bacteria.

a) Suggest a reason why they observed different number of bacteria. **(1 mark)**

b) Which of the following combination would give a wider field of view, eye piece X10 and objective lens X20 or eye piece X10 and objective lens X40? **(1 mark)**

2. The diagram below represents a cell organelle.



i) Identify the organelle **(1 mark)**

ii) State the function of the organelle **(1 mark)**

3. A plastic bottle full of water was stoppered using a piece of stem obtained from a young herbaceous plant whose epidermis had been peeled off. After 24 hours, it was noted that the stopper closed the container tightly.

a) Why was the epidermis peeled? **(1 mark)**

b) Account for the observation made **(2 marks)**

4. Give the roles of the following in the alimentary canal:

a) Hydrochloric acid in the stomach **(1 mark)**

b) Mucus **(1 mark)**

c) Name the cells that secrete enzyme pepsin and renin in the stomach **(1 mark)**

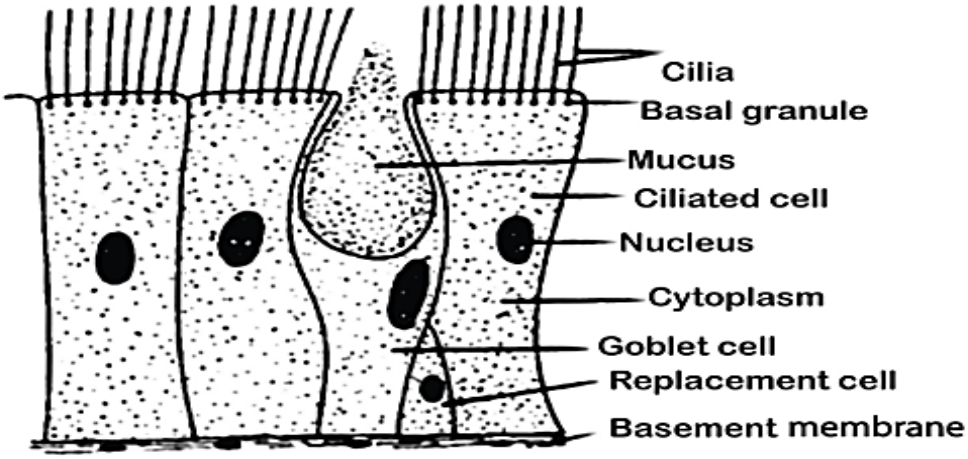
d) Enzyme enterokinase activates trypsinogen to trypsin. Give the origin of the enzyme **(1 mark)**

5. Give the roles of the following hormones: **(2 marks)**

i) Secretin

ii) Cholecystokinin

6. The figure below shows some cells that form part of the mammalian respiratory tract.



a) Identify the part of the respiratory tract **(1 mark)**

b) Give the role of the: **(2 marks)**

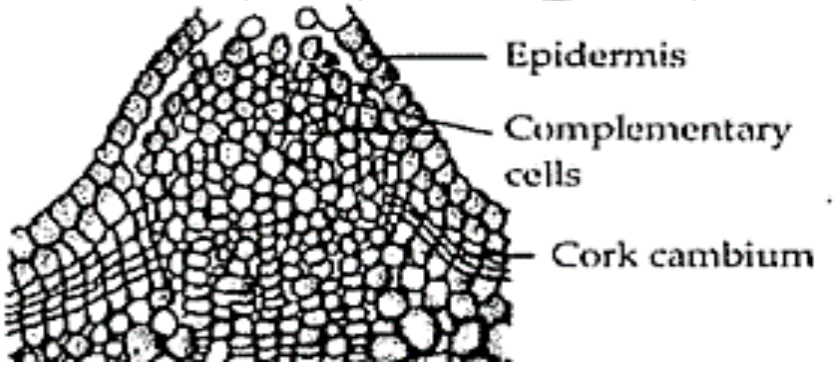
i) Goblet cell

ii) Cilia

7. Alveoli do not collapse when we breath out. Explain **(1 mark)**

8. Name the site in the human body where parallel flow is operational. **(1 mark)**

9. The diagram below shows the structure of gaseous exchange in a woody plant



i) Identify the gas that diffuse **(2 marks)**

In _____

Out _____

ii) Give two adaptations of the structure **(2 marks)**

10. Explain how sunken stomata affect the rate of transpiration. **(2 marks)**

11. Give two adaptations of the liver to its functions **(2 marks)**

b) Explain why insulin is not administered orally. **(1 mark)**

12. Give the role of the following hormones in reproduction: **(3 marks)**

a) Prolactin

c) Oxytocin

d) Relaxin

13. What is blood transfusion? **(1 mark)**

b) state one factor to consider during blood transfusion **(1 mark)**

14. Give reasons for the following:

i) Donated blood should be discarded after 21 days **(1 mark)**

ii) Upon donation, the blood donor is usually given a drink **(1 mark)**

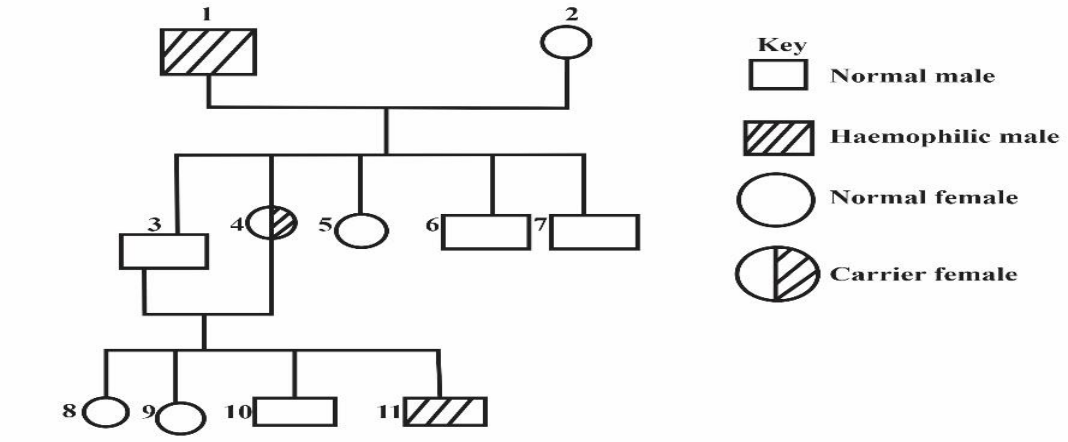
15. A transfusion of Rh+ blood was given to a patient Rh- blood. After a week, a similar transfusion was given to the same patient. What is likely to be the effect of the second transfusion? **(2 marks)**

16. Name the form in which:

i) Carbon (IV) oxide is transported in blood. **(1 mark)**

ii) Give the role of the enzyme found in the red blood cells **(1 mark)**

17. Haemophilia is a sex-linked condition. The following pedigree shows a portion of a family in which members are haemophiliac. Use H to represent the gene for haemophilia and h to represent the gene for non-haemophilia.



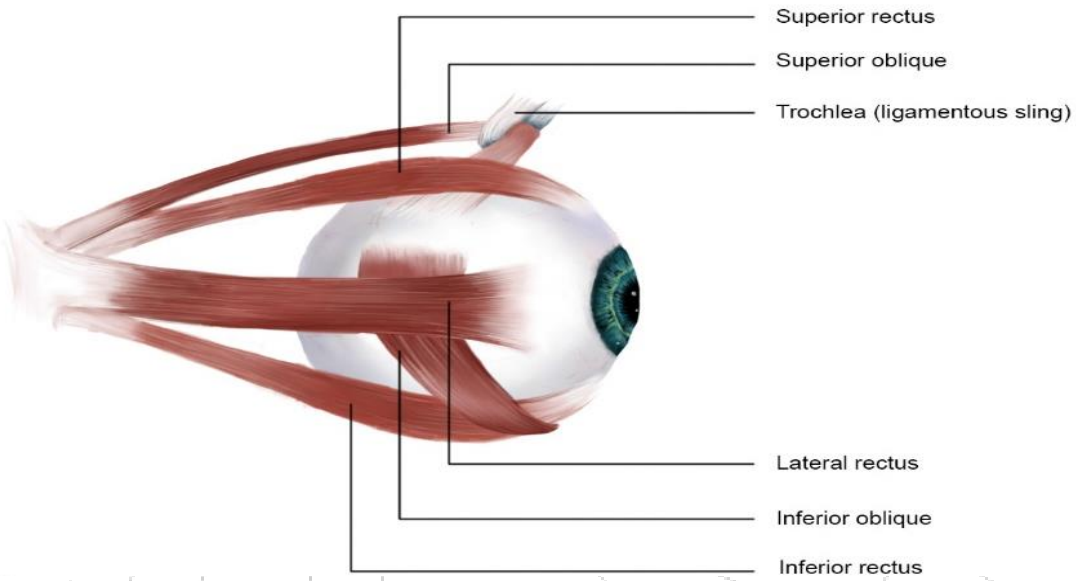
a) Identify the genotypes of the parents:

1 _____ **2** _____ **(2 marks)**

b) What is the genotype of the offspring 4 **(1 mark)**

c) Explain the prevalence of haemophilia in males compared to females **(2 marks)**

18. The diagram below represents the mammalian eye.



a) Give the role of the muscles: **(3 marks)**

i) Superior and inferior rectus muscles

ii) Lateral rectus muscles

iii) Oblique muscles

b) What is accommodation of the eye? **(1 mark)**

c) Describe accommodation of close objects **(3 marks)**

19. Give one difference between aerobic and anaerobic respiration **(1 mark)**

b) Give two importance of respiratory quotient **(2 marks)**

20. Explain why there is increased heartbeat during vigorous exercise in man. **(1 mark)**

21. What is eutrophication? **(1 mark)**

b) Give two effects of eutrophication. **(2 marks)**

22. Name the organisms involved in the following processes. **(2 marks)**

i) Nitrification_____

ii) Denitrification _____

23. Give two functions of cerebral spinal fluid **(2 marks)**

24. Which parts of the brain are concerned principally with:

i) controlling body temperature _____ **(1 mark)**

ii) interpreting what is seen _____ (1 mark)

25. Name the structure responsible for maintaining posture and balance in the mammalian ear **(1 mark)**

26. What is the disadvantage of the eustachian tube? **(1 mark)**

27. The diagram below shows the leaves of *Medicago marina* during the day B, and at night A.



a) Name the response _____ **(1 mark)**

b) State the survival value of the response **(2 marks)**

28. Name the cartilage found in between the bones of the vertebral column **(1 mark)**

b) Give two functions of the cartilage named above **(2 marks)**

29. State the type of muscle fiber found in the following regions: **(3 marks)**

a) Stomach _____

b) Aorta _____

c) Left ventricle _____

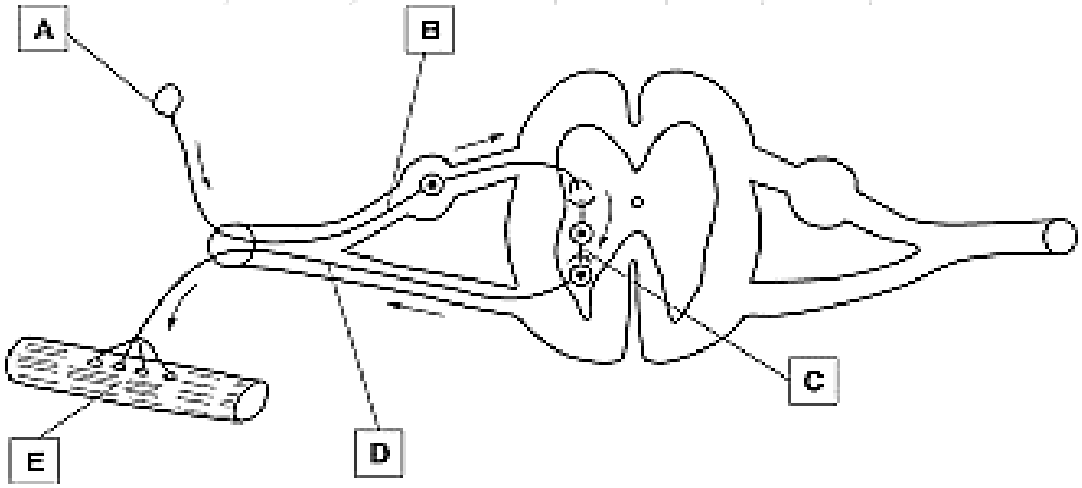
30. Which part of the flower develops into the following structures after fertilization: **(2 marks)**

a) Seed coat _____

b) Fruit _____

31. What is a reflex arc? **(1 mark)**

b) the figure below outlines the basic components of a reflex arc in humans



a) Name the type of neurone labeled C **(1 mark)**

b) Name the part of the arc labeled A and E **(2 marks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 2

231/2

BIOLOGY

PAPER 2 (THEORY)
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Kenya Certificate of Secondary Education.

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- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
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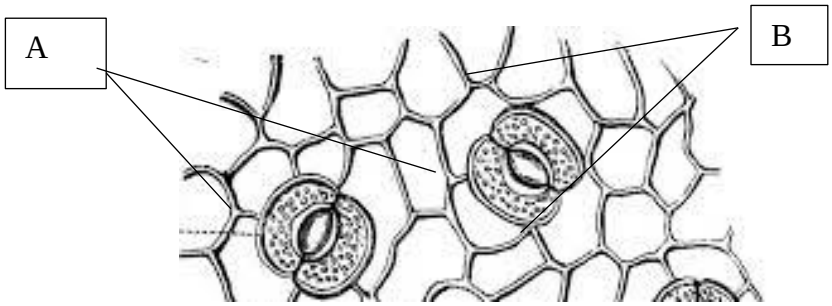
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. Study the diagram below and answer the questions that follow



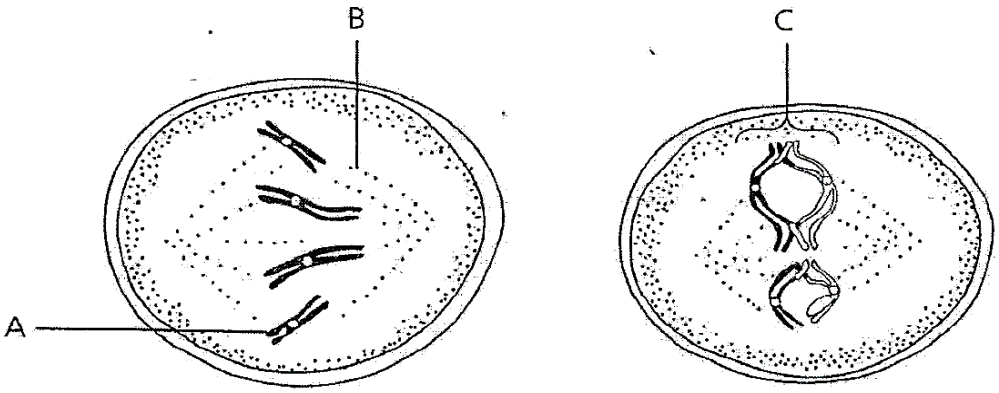
(a) Explain what would happen to the cells labelled a sunny day. **(3marks)**

(b) State structural differences between cells labelled **A** and **B**. **(3mrks)**

(c) Name the plant hormone that promotes the closure of the stomata. **(1mark)**

(d) Name the site where light independent stage occurs. **(1mark)**

2. The diagram below show two cells, **X** and **Y** from the organism. Study the diagrams and answer the questions that follow.



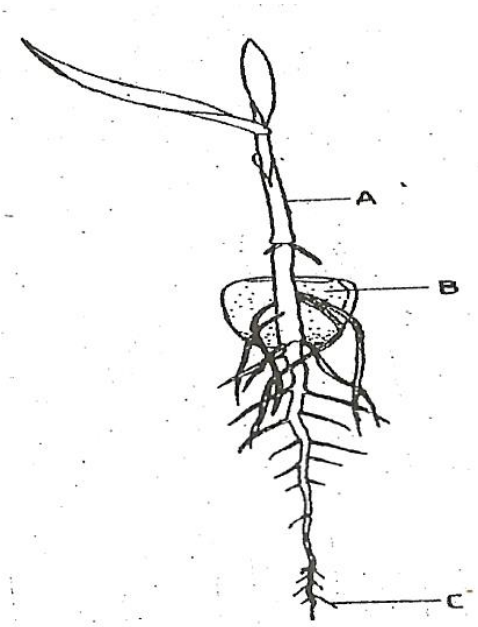
(a) Name the parts labelled **A**, **B** and **C**. **(3 marks)**

(b)(i) Which cell is dividing by meiosis**?** **(1 mark)**

(ii) Give **two** reasons for your answer in b ii above. **(2 marks)**

(c) How are frogs adapted to carry out fertilisation**?** **(2 marks)**

3. The diagram below represents a certain seedling.



(a) Name the parts labelled **A** and **C.** **(2 marks)**

(b) State the functions of the parts labelled **A**, **B** and **C**.

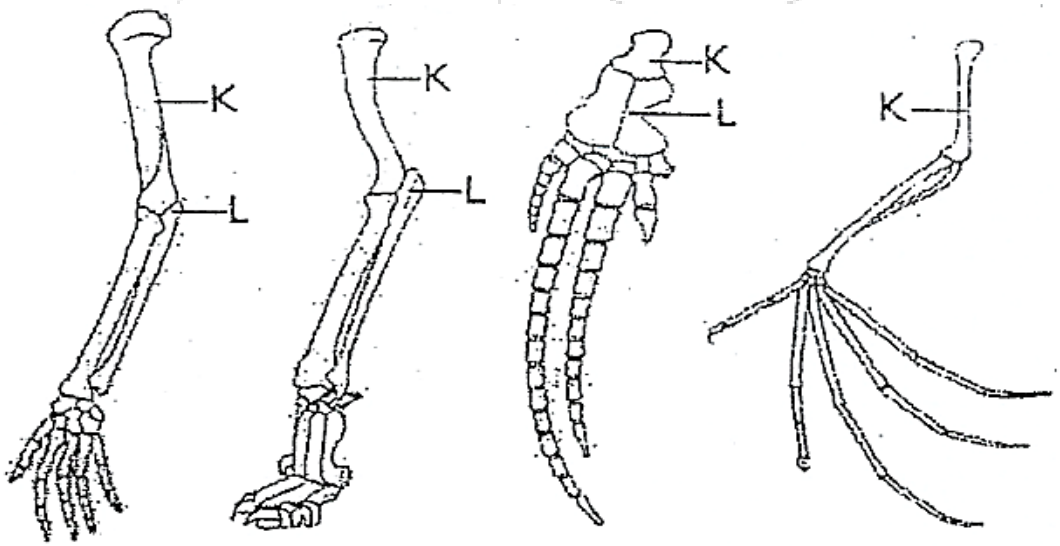
A. **(1 mark)**

B. **(2 marks)**

C. **(1mark)**

(c) Why is seed dormancy necessary? (2 marks)

4. Study the diagrams below and answer the questions that follow.



(a) Explain the type of evolutionary evidence illustrated above. (**4 marks)**

(b) Name the parts labelled **K** and **L**. **(2 marks)**

(c) Name the joint formed:

(i) At the proximal end of bone **K**. **(1 mark)**

(ii) At the distal end of bone **K.** **(1 mark)**

5. Afia and Kalisha were carrying out a field activity during Biology lesson. They accidentally injured themselves and they were given First Aid to stop bleeding. Afia stopped bleeding after 10 minutes while Kalisha continued bleeding regardless of further medical attention.

(a) Name the condition that Kalisha was likely suffering from. **(1 mark)**

(b) Explain the process that occurred to stop Afia's bleeding. **(3marks)**

(b) Kalisha's mother was phenotypically normal for the condition that she was suffering from. Work out a genetic cross between Kalisha's parents **(4marks)**

SECTION B (40 Marks)

Answer question **6 (Compulsory)** and either question **7** or **8** in the spaces provided after question **8**.

6. An investigation was carried out in a terrestrial ecosystem. The population size and species biomass were determined and recorded as follows.

Species	Population size	Species biomass(tons)
A	1×10^3	1×10^3
B	1×10^3	1×10^{-1}
C	1×10^5	1×10
D	1×10	1×10^4

(a) What is a food chain**?** **(1 marks)**

(b) If all the organisms in the table had a feeding relationship, construct a food chain involving all the organisms. **(1 mark)**

(c) From the food chain, identify the part of the biotic component to which each of the species belongs**.** **(4 marks)**

A.....

B .....

C .....

D .....

(d) State the effect on the other species if species **C** was removed from the **ecosystem** **(2 marks)**

A .....

B .....

(e) From the data construct in the species below a labelled diagram of:

(i) Pyramid of numbers**;** **(1 mark)**

(ii) Pyramid of biomass; **(1 mark)**

(f) How would you describe the pyramid of numbers? (**3 marks)**

(**g)** What possible feeding relationship exists for this ecosystem between the species of:

(i) The first and second trophic level; **(1 mark)**

(ii) The second and third trophic level. **(1 mark)**

(h) Explain why water logging of soil may lead to death of plants. **(3 marks)**

(b) State **two** protozoan diseases in man**.** **(2 marks)**

7. Describe the process of hearing in man. **(20 marks)**

8. (a) Explain how high blood sugar is regulated in the body **(4marks)**

(b) Describe secondary thickening in flowering plants. **(16marks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 3

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

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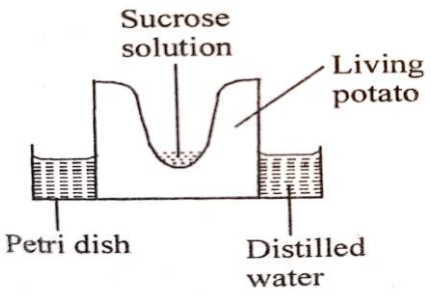
FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. (a) Students at Ikumbi high school observed that when sodium chloride was poured onto grass, the grass dried up. Explain this observation. **(2mks)**

(b) Study the experimental setup below and answer the questions that follow:



(i) Name the process that is being investigated **(1mk)**

(ii) State and explain what would be observed if the setup was left for 12 hours **(3mks)**

2. (a) Name the blood vessel that connects arteries to vein. **(1mark)**

(b) Explain two ways in which the vessel named in (a) above are adapted to carry out their functions **(2 marks)**

3. How does hot water of about 35^0C act as a pollutant when it is discharged from industries into rivers? **(2mks)**

4. Name the causative agents of the following diseases in humans. **(2mks)**

(a) Amoebic dysentery.

(b) Candidiasis.

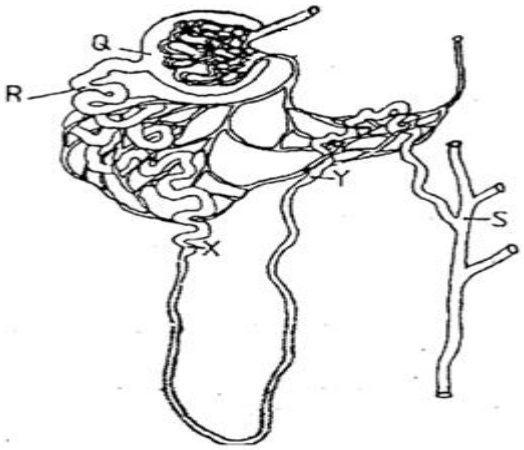
5. a) Define the term immunity. **(1mk)**

b) Distinguish between natural immunity and acquired immunity. **(1mk)**

c) Identify one immunizable disease in Kenya. **(1mk)**

6. Give two advantages of polyploidy in plants. **(2mks).**

7. The diagram below illustrates part of a nephron from a mammalian kidney.



a) Name the fluid found in the part labeled Q. **(1mk)**

b) Identify the process responsible for the formation of the fluid named in (a) above. **(1mk)**

c) Which two hormones exert their effect in the nephron? **(2mks)**

8. Explain how blood sugar level is maintained constant in human blood **(3mks)**

9. State three unique characteristics of members of the class Crustacea. **(3mks)**

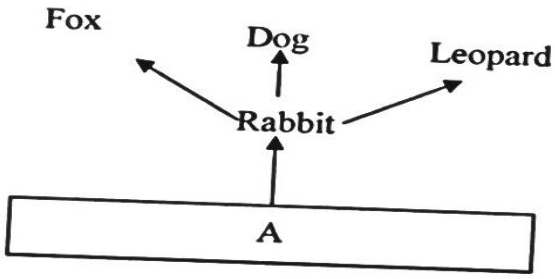
10. How is mammalian skin adapted for excretion **(3mks)**

11. The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

a) Name the evolutionary process that may have given rise to these structures. **(1mk)**

b) What is the name given to such structures? **(1mk)**

12. The diagram below show part of a food relationship in an ecosystem



a) Name the food relationship shown in the diagram **(1mk)**

b) Name the trophic level occupied by organism A **(1mk)**

c) What is the main source of energy in the ecosystem shown in the diagram above **(1mk)**

13. a) Name a protein and vitamin involved in blood clotting.

(i) Protein. **(1mk)**

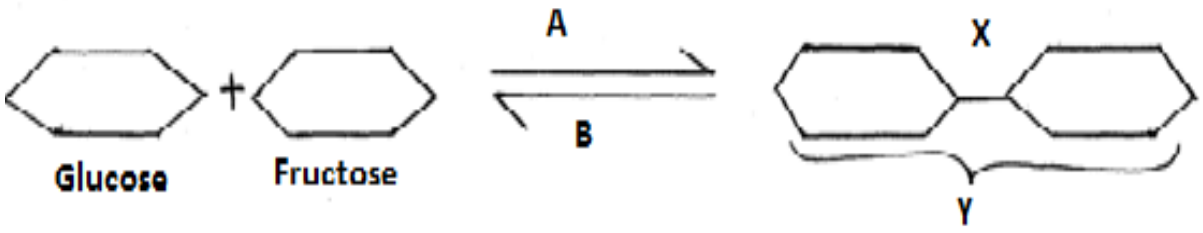
(ii) Vitamin **(1mk)**

b) Explain why blood from a donor whose blood group is A cannot be transfused into the recipient whose blood group is B. **(2mks)**

14. a). State two effects of Gibberellins on shoots of plants. **(2mks)**

b) Account for loss in dry weight of cotyledons in a germinating bean seed. **(1mk).**

15. Study the reaction below and answer the questions that follow.



a) What biological processes are represented by **A and B?** **(2mks)**

A .....

B .....

b) Identify the product Y. **(1mk)**

c) State the bond represented by X. **(1mk)**

16. Explain what happens during the light stage of photosynthesis. **(3mks)**

17. State two characteristics of aerenchyma tissue. **(2mks).**

18. a). Name the substance that accumulates in muscles when respiration occurs with insufficient oxygen. **(1mk)**

b) Give the end products of anaerobic respiration in plants. **(2mks).**

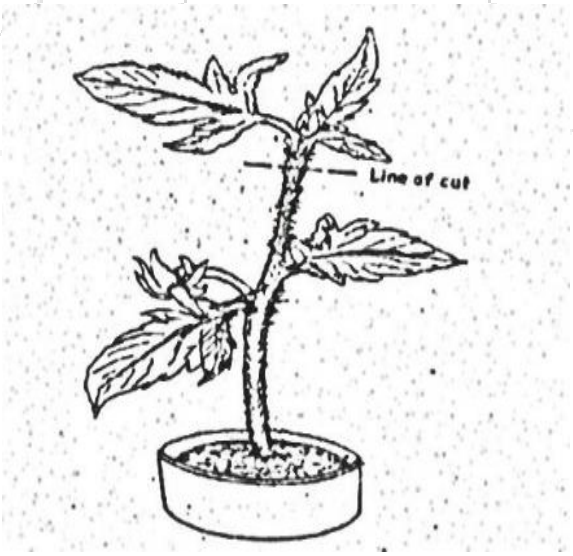
19. What is the importance of carrying out the following procedures when preparing temporary slides in the laboratory? **(3mks).**

a) Adding water to the specimen.

b) Staining the specimen.

c) State two functions of the body tube of a light **microscope** **(2marks)**

20. In an experiment the shoot tip of a young tomato plant was decapitated as shown in the diagram below



a) State the expected results after 2 weeks **(1mk)**

b) Give a reason for your answer in (a) above **(2mks)**

21. Name two internal factors that are necessary for seed germination. **(2mks)**

22. Certain animals have the following dental formula

A; i 3/3, c 1/1, pm 4/4, m 2/3 B. i 0/3 , c 0/1 , pm 2/2 , m 3/3

(i) What is the most likely mode of feeding for animals A and B.? **(2mks)**

(ii) Give a reason for your answer in (i) above. **(1mk)**

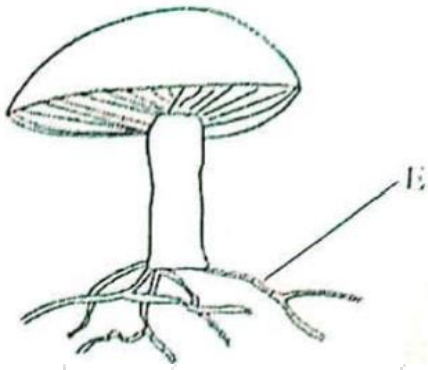
23. Name the components of a DNA molecule. **(3mks)**

24. Name the characteristics of living organisms shown by each of the following;

a) Budding in yeast **(1mark)**

b) Enlargement of the eye pupil in dim light **(1mark)**

25. The diagram below shows an organism in a certain kingdom



a) Name kingdom to which the organism belongs **(1mk)**

b) State the mode of nutrition for the organism **(1mk)**

c) Name the part labeled E and state two of its functions **(3mk)**

Name……

Functions:

THE END

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 3

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

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- *Answer **ALL** questions in section A in the spaces provided*
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FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. a) State two adaptations of the amphibian's skin to gaseous exchange. **(2mks)**

b) Explain how the human nasal cavity is adapted to gaseous exchange. **(3mks)**

c) Explain why the amoeba does not acquire an elaborate gaseous system. **(2mks)**

d) Name the respiratory disease caused by *Bordetella pertussis*. **(1mk)**

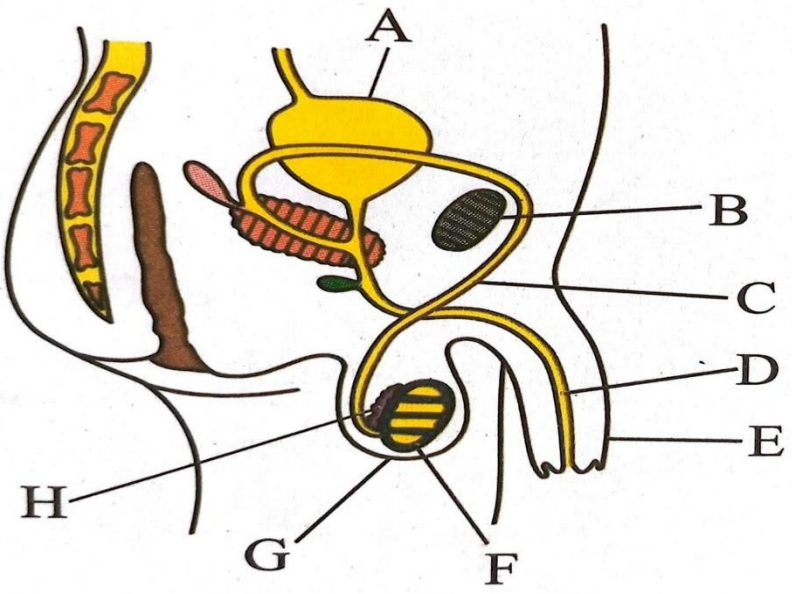
2. A man experienced non-disjunction during meiosis. If the woman he married had normal gamete formation process.

a) Work out the likely phenotypes of their off springs. **(4mks)**

b) State two characteristics of individuals with Down's syndrome. **(2mks)**

c) Give two advantages of transgenic plants. **(2mks)**

3. The diagram below is a side view of the human male reproductive system.



a) Name the parts labelled D and G. **(2mks)**

b) How are parts labelled E and H adapted for their functions? **(4mks)**

c) Give the names of two accessory sex glands and state their functions. **(2mks)**

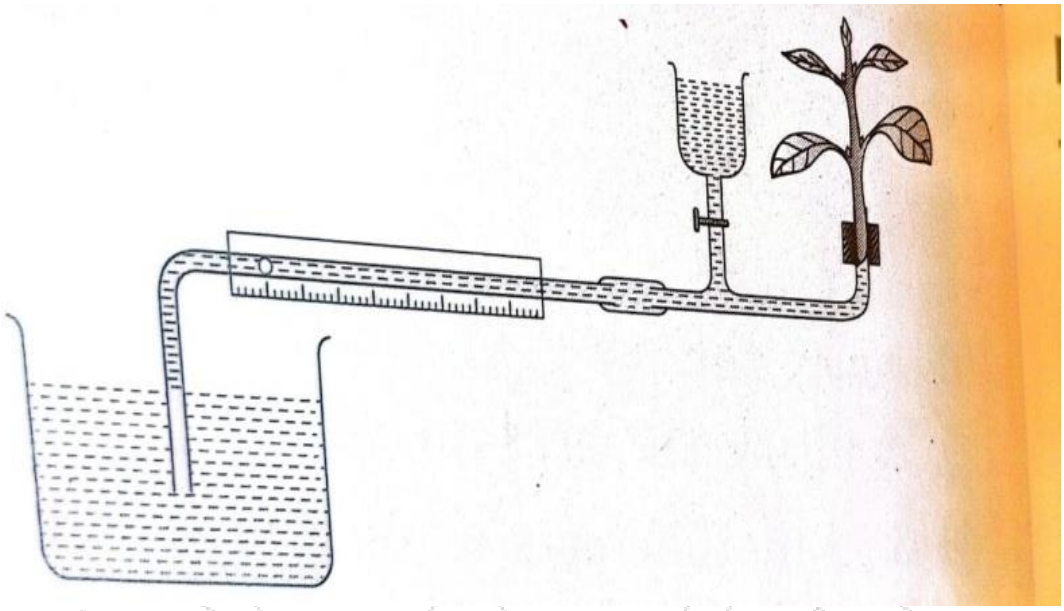
Accessory gland -

Function -

Accessory gland -

Function -

4. The set up in the figure below was used to investigate a certain process in plants. Study it and answer the questions that follow.



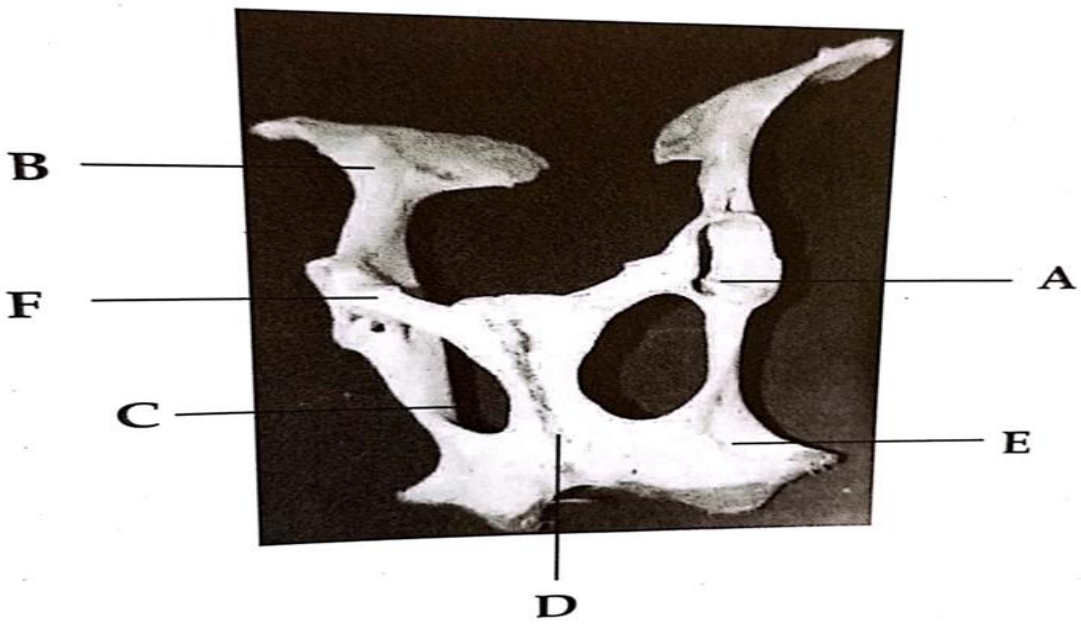
a) Name the apparatus shown in the set up. **(1mk)**

b) Name the process that was being investigated. **(1mk)**

c) Explain what would happen to the air bubble in the capillary tube if the set up was placed in windy conditions. **(2mks)**

d) Other than wind, state four environmental factors that influence the process that was under investigation. **(4mks)**

5. The diagram below represents a bone found on the lower part of the body.



a) Identify the bone. **(1mk)**

b) Identify the parts labelled E and F. **(2mks)**

c) Name and give the functions of the parts labelled A and C. **(4mks)**

d) Name the material composing structure D. **(1mk)**

6. During germination and growth of cereal, dry weight of endosperm, embryo and total dry weight were determined at 2 days intervals and results recorded as shown below.

a) Using same axes, draw graphs of dry weight of endosperm, embryo and total dry weight against time. **(7mks)**

b) What was the total dry weight on the 5th day? **(1mk)**

c) Account for the:

i. Decrease in dry weight of endosperm from day 0 to 10. **(2mks)**

ii. Increase in dry weight of embryo from day 0 to 10th day. **(2mks)**

iii. Decrease in total dry weight from day 0 to 8. **(1mk)**

iv. Increase in total dry weight after the 8th day. **(1mk)**

d) State two factors within the seed and two outside the seed that causes dormancy.

i. Within the seed. **(2mks)**

ii. Outside the seed. **(2mks)**

e) What are the characteristics of meristematic cells? **(2mks)**

7. How is the mammalian ear adapted to its functions? **(20mks)**

8. Describe how free nitrogen in the air is made available to plants and carnivorous animals and finally circulated back into the atmosphere. **(20mks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 4

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

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Kenya Certificate of Secondary Education.

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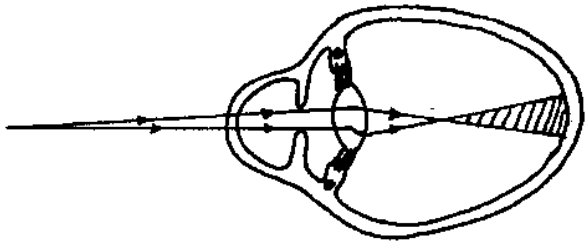
QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. A young scientist observed a bird laying her eggs in a nest and later the eggs hatched into chicks. Name two characteristics shown by the chicks that show a chick is a living thing but an egg is not. (2mks)

2. In which two ways are the organelles chloroplast and mitochondria similar. (2mrks)

3. The illustration below shows a human eye that is defective.



(a) Identify the eye defect. **(1mrk)**

(b) How would this defect be corrected? **(1mrk)**

4. (a) What is homeostasis? **(1mrk)**

(b) State three processes in humans in which homeostasis is involved. **(3mrks)**

(a) In which phase of photosynthesis are carbohydrates formed? **(1mrk)**

(b) How is the dark stage of photosynthesis dependent to light stage? **(2mrks).**

5. Why are the cooling fans of value even in a closed room**?** **(2mrks)**

6. How can the colour of the skin affect the rate of heat loss or heat gain? **(3mrks)**

7. List down three abiotic factors that would influence life in a lake. (**3mrks)**

8. Distinguish between the terms asexual and sexual reproduction **(2mrks)**

9. (a) Define the term germination. **(1mrk)**

(b) state the two types of germination in plants. **(2mrks)**

(c) when does growth start in plants**.** **(1mrk)**

10. (a) What is polyploidy. **(1mrk)**

(a) Mating a horse with a donkey produces an infertile animal, a mule. Explain. **(2mrks)**

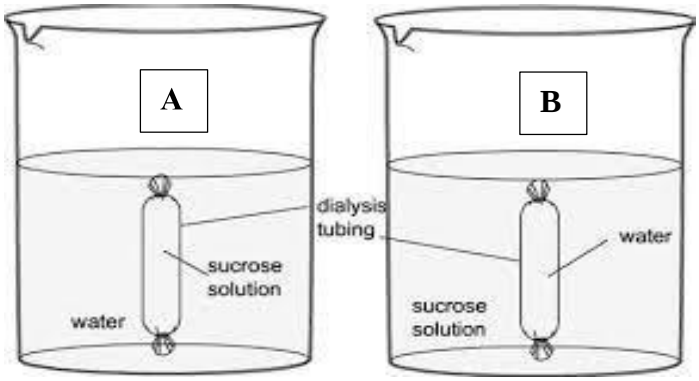
11. A part of DNA strand has the following base sequence: G-G-C-C-T-A-T-C.

(a) what is the sequence of the complimentary strand**?** **(1mrk)**

(b) what will be the sequence of m-RNA transcribed from this part of DNA**?** **(1mtk)**

(c) How does DNA differ from RNA? **(3mrks)**

12. A student made a set up shown below to study a physiological process



a) In which beaker did the dialysis tubing reduce in size? **(1mrk)**

b) Account for your answer in a) above**.** **(2mrks)**

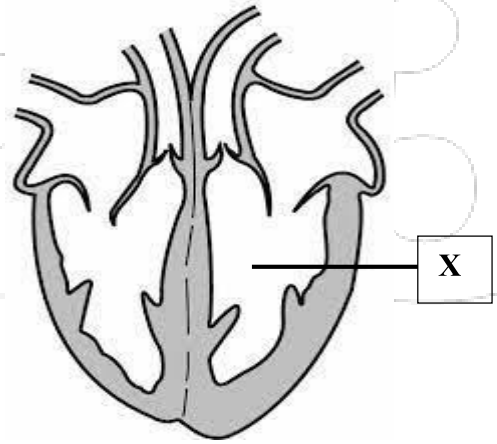
13. Give two reasons why lumbar vertebrae have long and broad transverse processes. **(2mrks)**

14. Give two ways in which seed dormancy benefit a plant. **(2mrks)**

15. State three precautions one should observe while conducting experiments in food test.

(3mrks)

16. Use the diagram of the heart shown below to answer the questions that follow



a) From the diagram, give a reason to show that **X** is the left ventricle. **(1mrk)**

b) Name a class of organisms where all members have the heart structure above **(1mrk)**

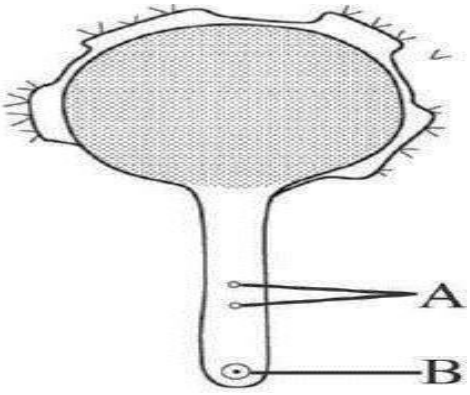
c) Why are the muscles found in the heart above said to be myogenic? **(1mrk)**

17. State the role of the following in the nitrogen cycle. **(2mrks)**

(a) *Thiobacillus denitrificans*.

(b) *Nitrococcus* bacteria.

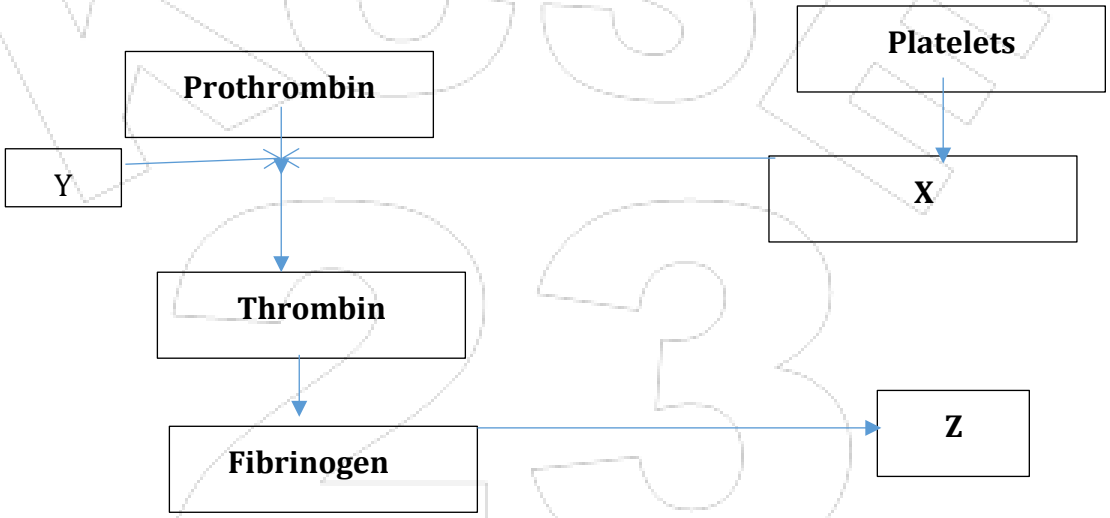
18. The diagram below shows the structure of germinating pollen grain



(a) Name the type of cell division that formed the parts labelled A. **(1mrk)**

(b) State the role of part labelled B**?** **(1mrk)**

19. The chart below is a summary of blood clotting mechanism in a man.

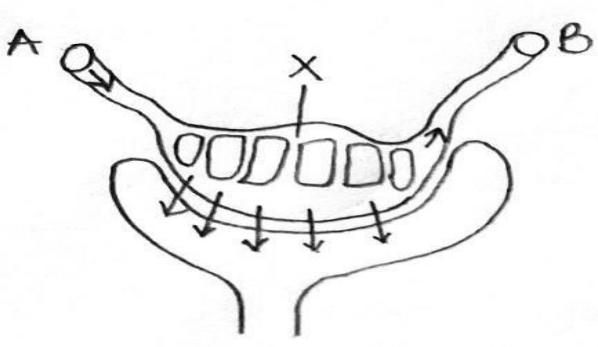


Name;

(a) The metal ion represented by Y. **(1mk)**

(b) The end product of the mechanism represented by Z. **(1mk)**

19. The following is part of a kidney nephron



(a) i) Name the process represented by the arrows. **(1mrk)**

ii) Name the conditions necessary for the process named in (a) (i) above to take place. **(1mrk)**

(b) Identify with a reason vessel A. **(1mrk)**

20. Name any two blood components that are present in vessel (A) but are absent in vessel B. **(2mrks)**

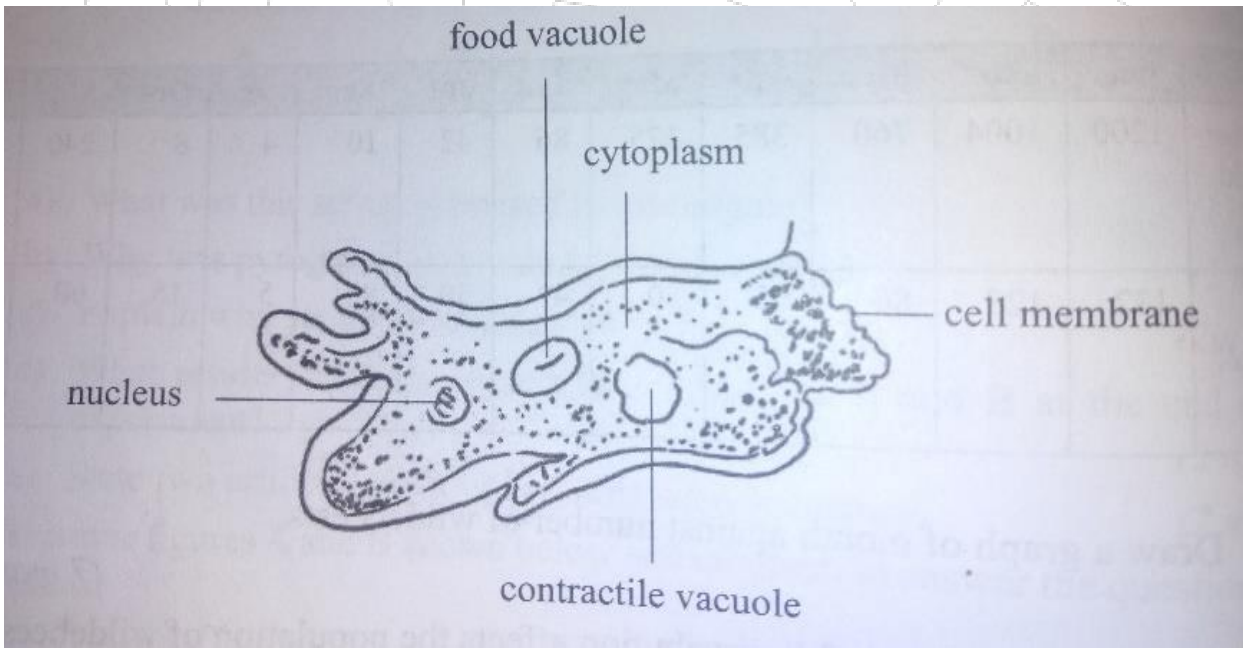
21. State the function of the following during pregnancy**.** **(3mrks)**

(a) Amnion

(b) Amniotic fluid

(c) Umbilical cord

22. Below is a diagram of an organism.



(a) Name the kingdom to which the organism belongs**.** **(1mrk)**

(b) Give a reason for your answer in (a) (i) above. **(1mrk)**

(c) Explain the process by which the food gets into the organism. **(2mrks)**

23. State two characteristics features of members of division bryophyte. **(2mrks)**

24. (a) i) Name the cartilage between the bones of the vertebral column **(1mrk)**

ii) State the function of the cartilage named in (a)(i) above. **(1 mark)**

25. Why do herbivores have large eyes on the side of their heads? **(1mrk)**

26. Suggest three measures that can be taken to control infection of man by protozoan parasites. **(3mks)**

27. In a family, all off springs have blood group AB. What are the possible blood groups of? the parents? **(1mrk)**

28. List the changes that take place during inhalation in the breathing cycle of a mammal in the following: **(3mrks)**

(a) Rib cage thoracic cavity

(b) Diaphragm

(c) External intercostal muscles

29. Evolution is an ongoing process, state two pieces of evidence which suggest that evolution is still taking place. **(2mrks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 4

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

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INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

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A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

Answer all the questions in the spaces provided.

1. A biological washing powder contains an enzyme. The enzyme removes stain such as blood from clothes by digestion when the clothes are soaked in water with powder.

(a) What is an enzyme? **(1 Mark)**

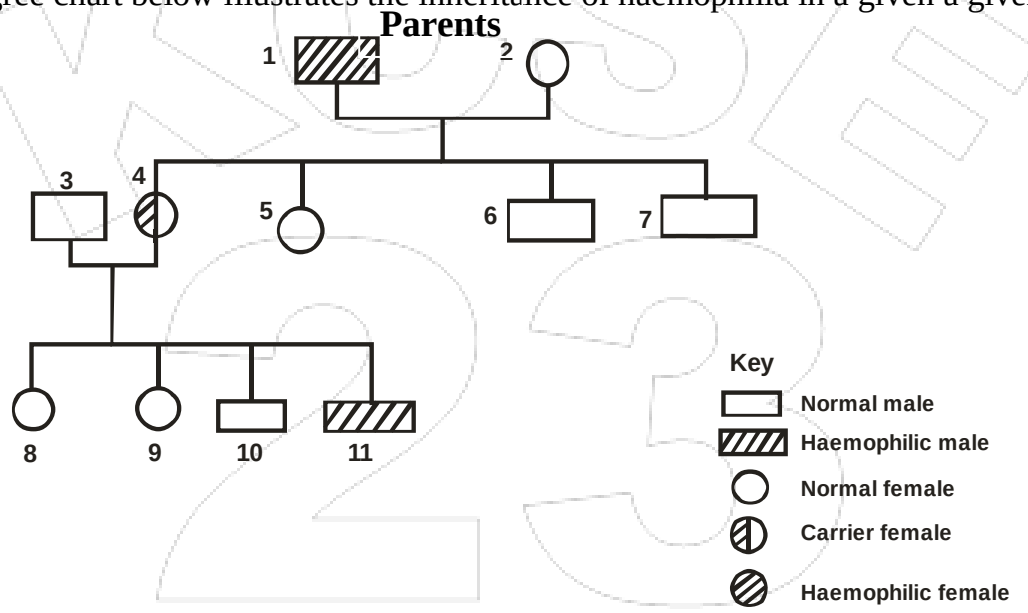
(b) Identify two possible enzymes that are found in the washing powder above. **(2 Marks)**

(c) Would the stains be removed faster with the powder in water at 30°C or 15^{0}C. **(1 Mark)**

(d) Explain your answer in (c) above **(2 Marks)**

(e) Why would boiling the clothes soaked with the washing powder do not remove the stains? **(2 Marks)**

2. The pedigree chart below illustrates the inheritance of haemophilia in a given a given family.



a) Suggest the possible genotype of: **(2 Marks)**

Individual 1 ……

Individual 4 ……

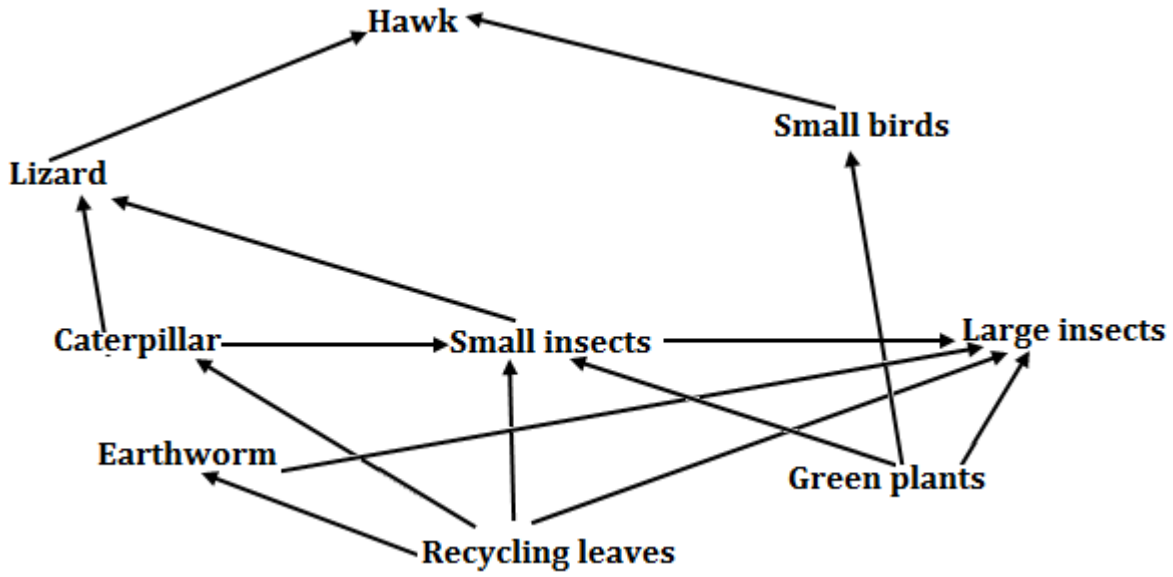
b) Using a punnet square, work out the possible phenotypes of offspring's, if individual 4 married a haemophiliac male. **(4 Marks)**

c) Explain why there are no carrier males. **(1 Mark)**

d) Name a condition in man that is due to chromosomal mutation. **(1 Mark)**

3. Distinguish between pyramid of numbers and pyramid of biomass. **(2 Marks)**

b) From an ecological study, students formed the following food web.

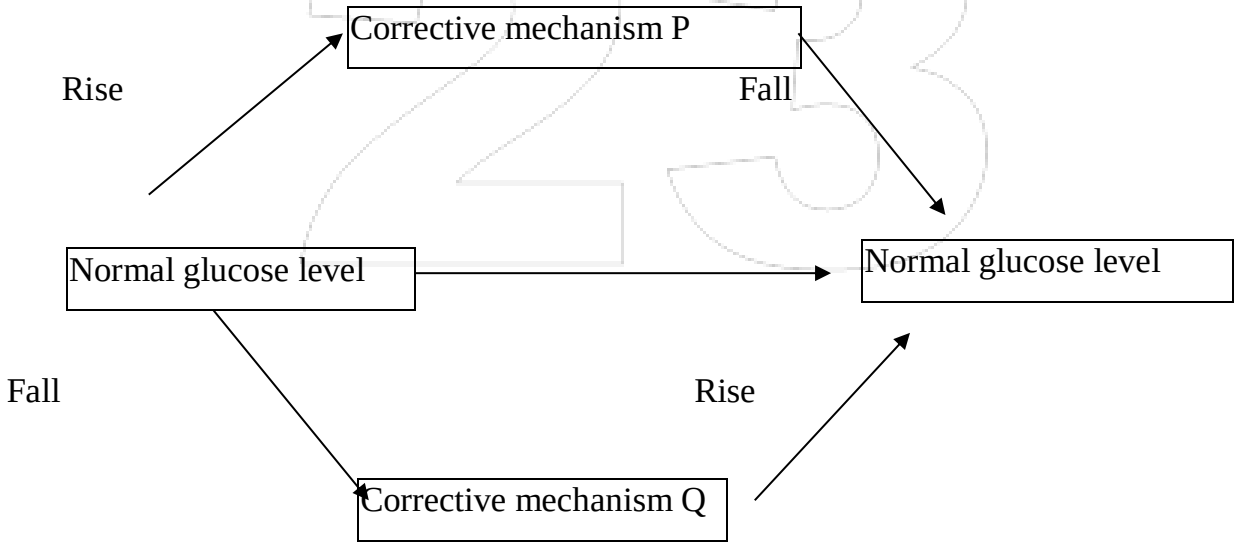


From the food web, construct two food chains with lizard as a tertiary consume. **(2 Marks)**

c) (i) Which organism has the least biomass in the ecosystem. **(1 Mark)**

(ii) Give reasons for your answer **(3 Marks)**

4. The diagram below shows how blood sugar in mammalian body is regulated.



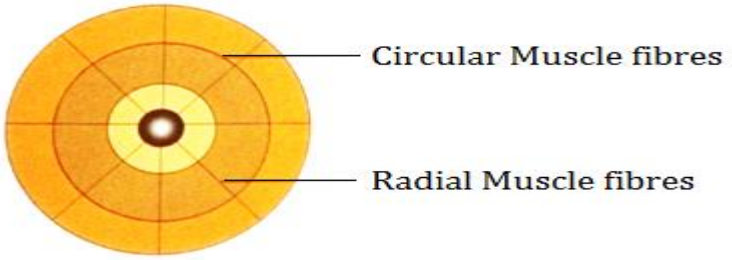
a) Explain what happens during corrective mechanism P. **(3 Marks)**

b) Name two organs involved in corrective mechanisms P and Q. **(2 Marks)**

c) State the reasons why glucose level should be maintained constant. **(2 Marks)**

d) What is osmoregulation? **(1 Mark)**

5. The diagram below shows the internal arrangement of muscles in the eye.



(a). How is the pupil affected by contraction of ;

(i) Circular muscles **(1 Mark)**

(ii) Radial muscles **(1 Mark)**

(a) Where are light sensitive cells located in the eye? **(1 Mark)**

(b) What is short sightedness? **(2 Marks)**

(c) Explain why cones have a higher visual acuity as compared to rods. **(2 Marks)**

(d) State one defect that is heritable. **(1 mark)**

SECTION B:

Answer question 6 and either question 7 or 8.

6. The diagram below is obtained from measurements of growth in the leaf petiole of a certain plant. The relative growth rate is calculated and the data is obtained as shown below.

Time in days	0	1	2	3	4	5	6	7	8	9
Relative growth rate(cm/day)	0	0.1	0.3	0.8	2.0	4.0	4.5	3.5	0.2	0

a) Plot a graph of relative growth rate against time. **(5 Marks)**

b) State two functions of a leaf petiole. (**2 Marks)**

c) State two characteristics of cells found in the region of cell division. **(2 Marks)**

d) Account for the shape of the curve between the following days **(3 Marks)**

i) 2 – 5.

ii) 6 – 8 **(3 Marks)**

iii) 8-9 **(3 Marks)**

e) Distinguish between primary growth and secondary growth in a flowering plant. **(2 Marks**)

7. Explain how abiotic factors affect plants. **(20 Marks)**

8. (a) Describe how the following supports the theory of evolution. **(4 Marks)**

(i) Geographical distribution of organisms

(ii) Comparative anatomy

(b) Describe how hormones regulate the menstrual cycle in human beings. **(16 Marks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 5

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- *Write your name and admission number in the spaces provided above*
- *Write the name of your school and the date of examination in the spaces provided above*
- *Answer **ALL** the questions in the spaces provided*
- Answers must be written in the spaces provided in the question paper.
- Additional papers must not be inserted.

FOR EXAMINER'S USE ONLY

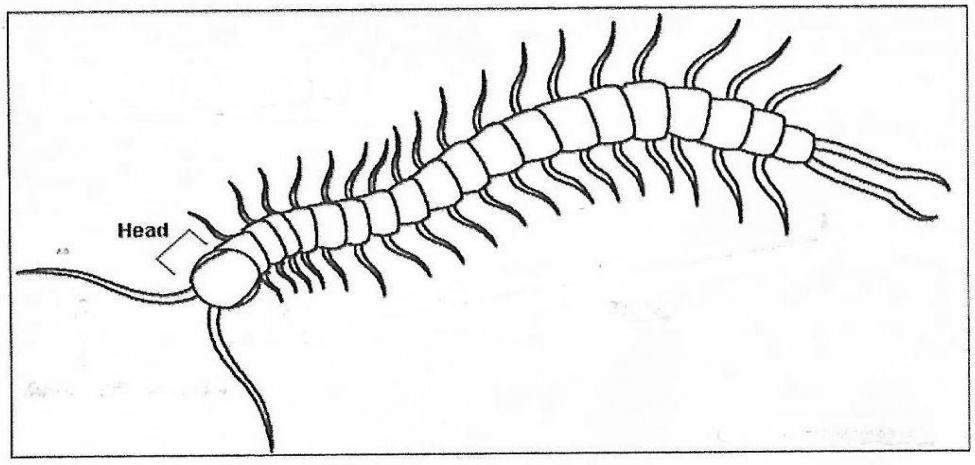
QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. State two characteristics of organisms that are easily observed in both animals and plants.

(2 marks)

2. Use the diagram below to answer the questions that follow.



With reasons name the class to which the organism belongs to. **(1 mark)**

Class.....

Reasons **(2 marks)**

3. A drop of a person's blood shows clumping in serum of blood group B but not in serum of blood group A.

(a) Identify the blood group of this person. **(1 mark)**

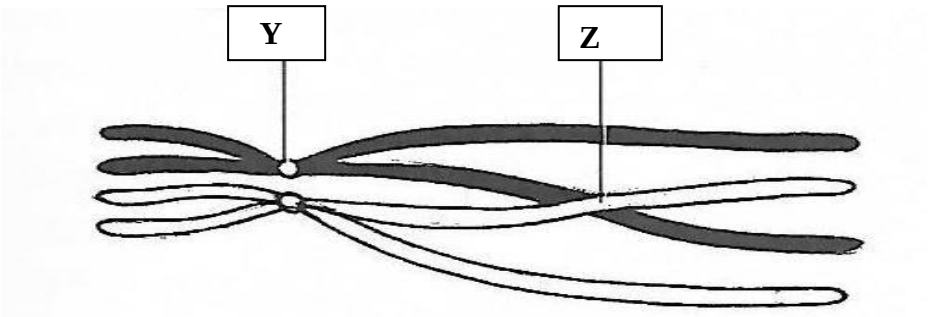
(b) Name the antibodies found in blood of the following groups. **(2 marks)**

(i) Blood group A

(ii) Blood group AB

4. Under certain conditions, the carbon(IV) oxide concentration in the blood of a mammal rises above normal level. State two physiological changes that occur in the body to lower the carbon(IV) oxide back to normal. **(2 marks)**

5. The diagram below shows a phenomenon which occurs during cell division.

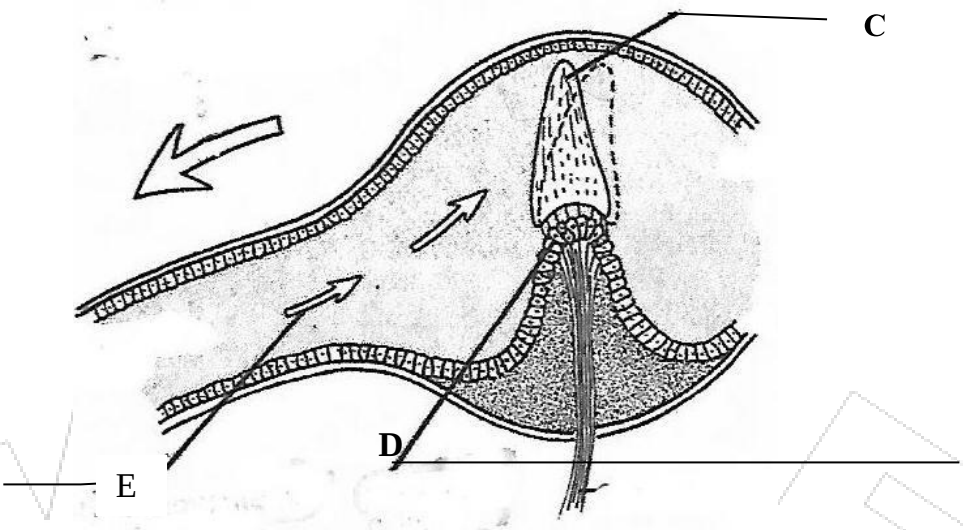


(a) What is the biological importance of the part labelled **Z**. **(2 marks)**

(b) Which cell division does the above phenomenon occur? **(1 mark)**

(c) Name the organs in human beings in which the phenomenon occurs? **(1 mark)**

6. The diagram below shows a part of the ear responsible for posture.



(a) (i) What is the name of the part shown by the diagram above? **(1 mark)**

(ii) Where in the ear is the part located? **(1 mark)**

(iii) What is the role of the part above? **(1 mark)**

(b) Name the part labelled **C** and **D**. **(2 marks)**

7. A layer of glycerine was applied on upper surface of a freshwater floating plant that had been kept in the dark for 24 hours. The plant was left undisturbed in bright light. After three hours test for starch carried out on the leaves produced a brown colour of iodine solution. Account for the observation. **(3 marks)**

8. The diagram below shows part of a starch molecule.



(a) Identify what the circles and the lines joining them represents. **(2 marks)**

Circles

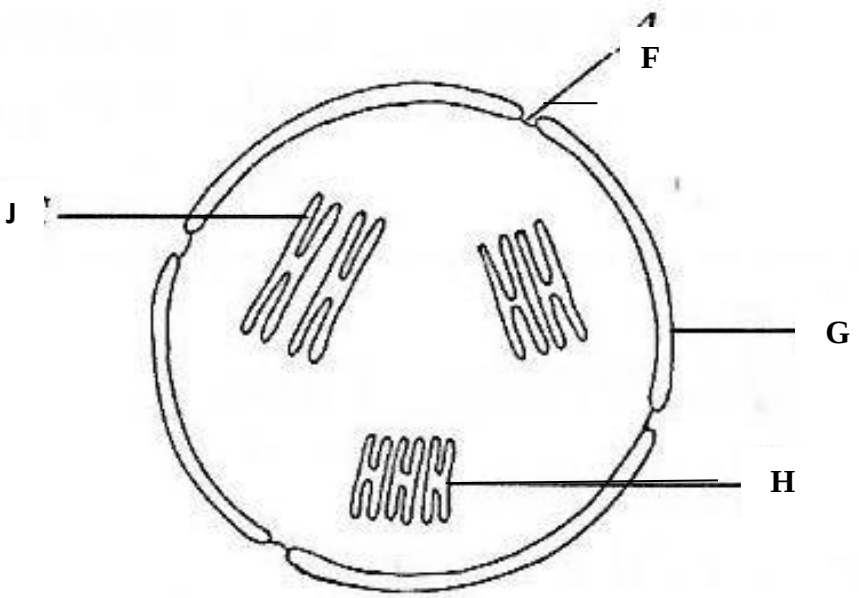
Lines

(b) Draw how the structure will appear after the enzyme amylase has acted on the starch molecule and name the products. **(2 marks)**

Drawing:

Products

9. The figure below represents a cell organelle found in the somatic cell of a certain organism.



(d) Name parts labelled **F** and **J**. **(2 marks)**

(b)(i) Name the type of mutation illustrated above. **(1 mark)**

(ii) Explain your answer in (b) (i) above. **(1 mark)**

(c) Determine the total number of chromosomes in a normal gamete cell of the organism. **(1 mark)**

10. State **two** functions of calcium in the human body. **(2 marks)**

11. Two farmers prepared two ponds **Q** and **R** and introduced equal number of fish in each pond. Thefish in pond **Q** died within seven days of being introduced into the pond. Those of pond **R** survived. On close examination of the ponds, it was found that one of the ponds was full of algae and the other had no algae.

(a) In which of the two ponds were the algae present? **(1 mark)**

(b) What was the cause of the death of fish in one of the ponds? **(1 mark)**

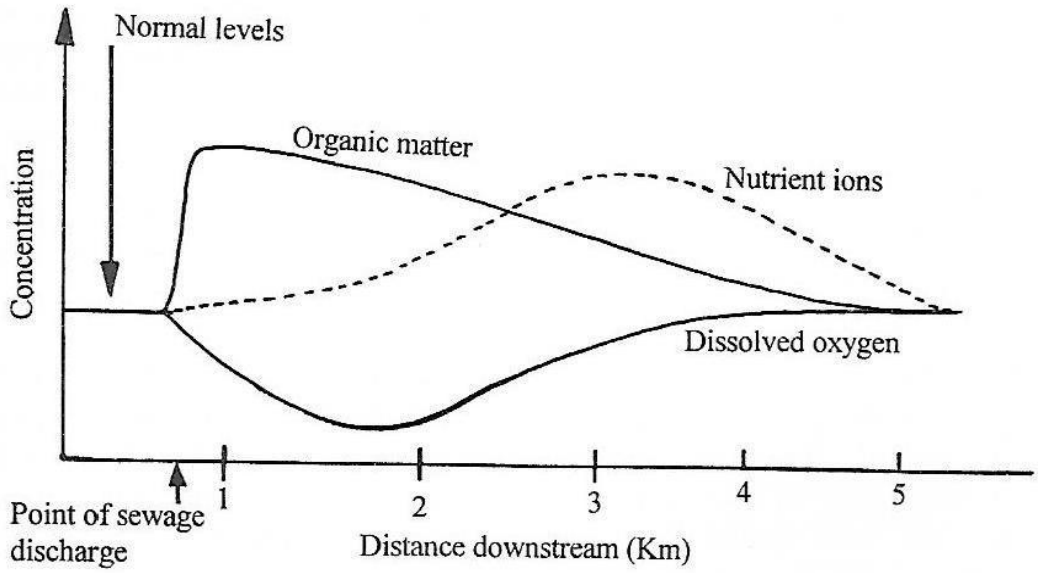
(c) State the significance of the algae in the pond? **(3 marks)**

12. A form four student was walking around the school compound and saw leaves from nandi flame tree on the ground.

(a) Name the hormone responsible for this phenomenon. **(1 mark)**

(b) State the significance of the above phenomenon to the tree. **(2 marks)**

13. The figure below shows the change in the concentration of various substances in a river followingthe discharge of untreated sewage into it.



(a) Account for the changes in concentration of:

(i) Organic matter. **(1 mark)**

(ii) Nutrient ions. **(1 mark)**

(ii) Dissolve oxygen. **(1 mark)**

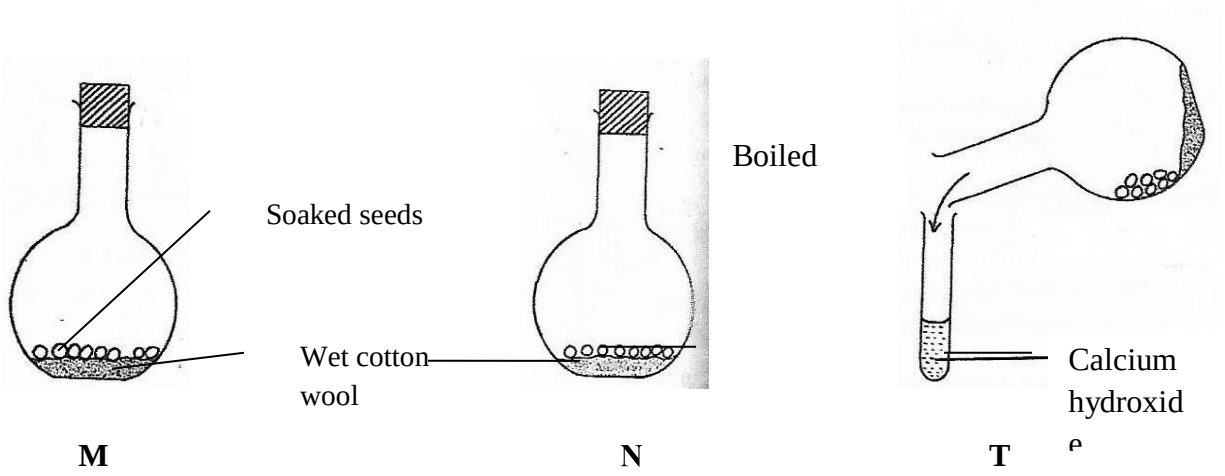
(b) Describe the changes expected in:

(iii) Fish population between the point of sewage discharge and the point where the organic matter returns to normal levels. **(1 mark)**

(iv) Water plants and photosynthetic algae about one and half kilometres downstream fromthe point of sewage discharge. **(1 mark)**

14. Short-horned grasshopper moults five times before reaching adult size. Draw the kind of growth curve you would expect for the grasshopper if the changes in its length are plotted against time. **(2 marks)**

15. Wet cotton wool was put in two flasks **M** and **N**. Soaked seeds are added to **M** and an equal number of boiled seeds to **N**. Both groups of seeds were first soaked in sodium hypochlorite solution before being put in the flasks. The flasks were securely corked and left in the same conditions of light and temperature for ten days. The cork from each flask was removed and eachtilted over a test-tube of calcium hydroxide solution as shown in **T**.

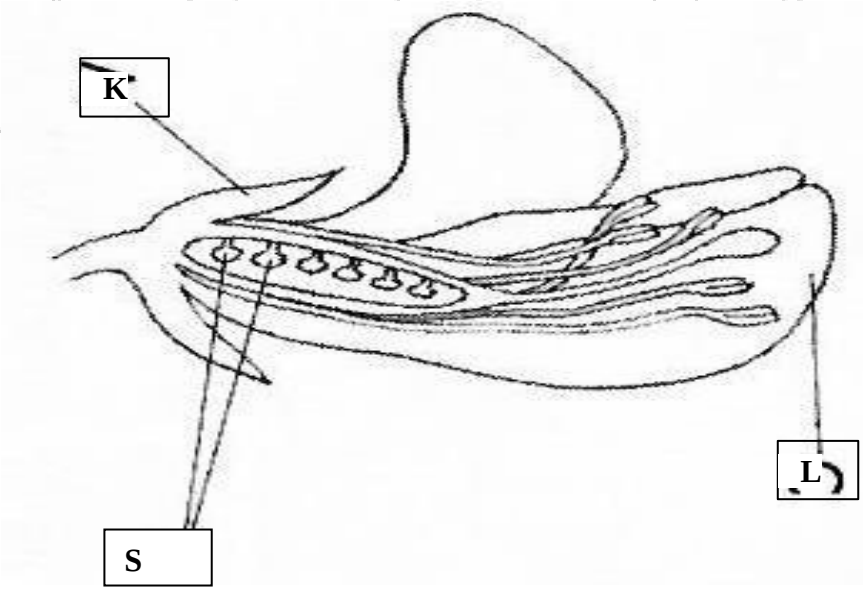


(c) What was the aim of the experiment? **(1 mark)**

(d) Explain the observations made in Flask **M** and **N**. **(3 marks)**

(e) Why were the seeds soaked in sodium hypochlorite for fifteen minutes? **(1 mark)**

16. The diagram below shows section through the flower of a certain plant.



(a) (i) To which class does the plant from which the flower was obtained belong to? **(1 mark)**

(ii) State the reason for your answer in (a)(i) above. **(1 mark)**

(b) State the placentation. **(1 mark)**

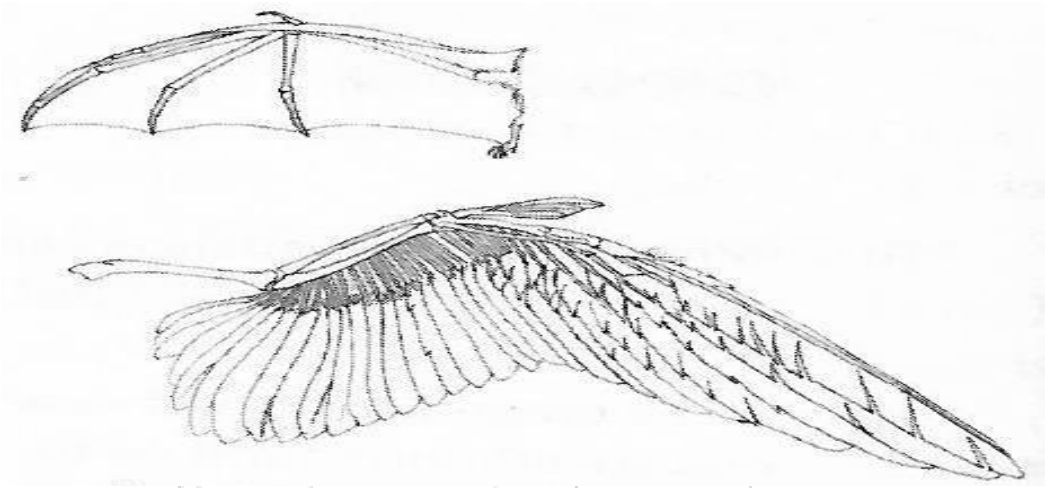
(c) (i) Name the part labelled **K**. **(1 mark)**

(ii) What is the fate of the part labelled **S** during fruit development? **(1 mark)**

17. State two ways in which the skeletal muscle fibres are adapted to their function. **(2 marks)**

18. State the functions of lymph nodes. **(2 marks)**

19. The following diagrams represent different animal structures.



(a) (i) What type of structures are represented by the diagram above? **(1 mark**

(ii) Give a reason for your answer in (a) (i) above. **(1 mark)**

(ii)Name the evolutionary phenomenon represented by the structures. **(1 mark)**

(b) Explain comparative serology as an evidence of evolution. **(2 marks)**

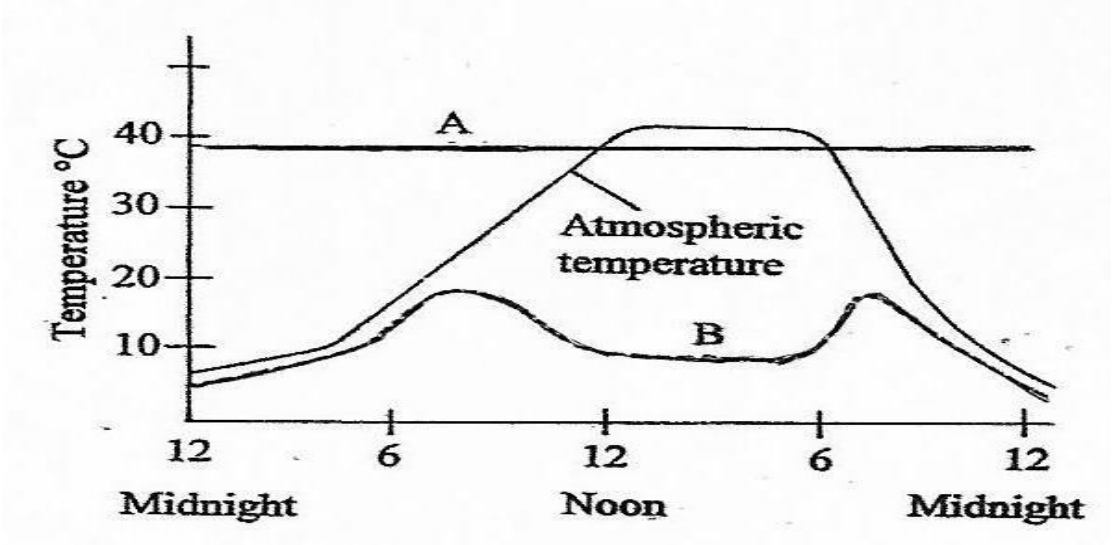
20. A form four student was found to have blood group AB^{+}.

(a) What antigens does this blood group have? **(1 mark)**

(b) What antibodies are present in the blood? **(1 mark)**

(c) The student was injured and required blood transfusion. Which blood groups can he receivethe blood from? **(1 mark)**

21. The diagram below illustrates the variation in atmospheric temperature in the course of a day andthe body temperature of two animals **A** and **B**. Study it and answer the questions that follow.



(a) Describe how animal **A** regulates its body temperature between 12 noon and 6.00 pm. **(3 marks)**

(b) State the activities that account for the body temperature of animal **B** between 9.00 am and 6.00 pm. **(1 mark)**

23. (a) State two adaptations that enable birds to fly. **(2 marks)**

(b) State two functions of the cuticle in insects. **(2 marks)**

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KCSE 23

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 5

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

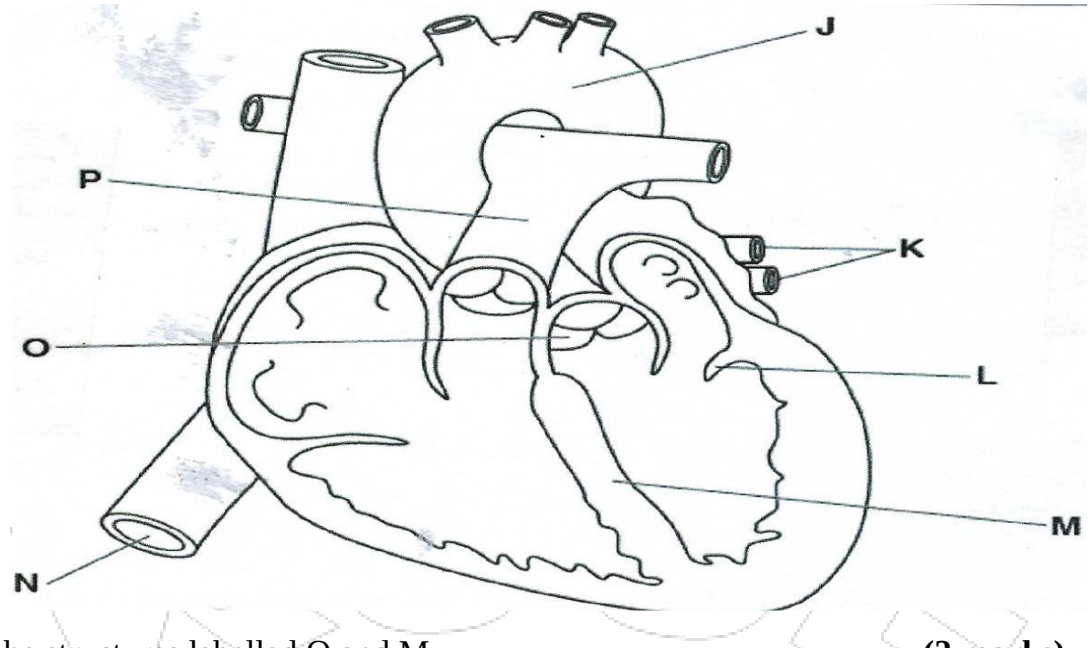
- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
- *In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8*

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. Study the diagram below and answer questions that follow;



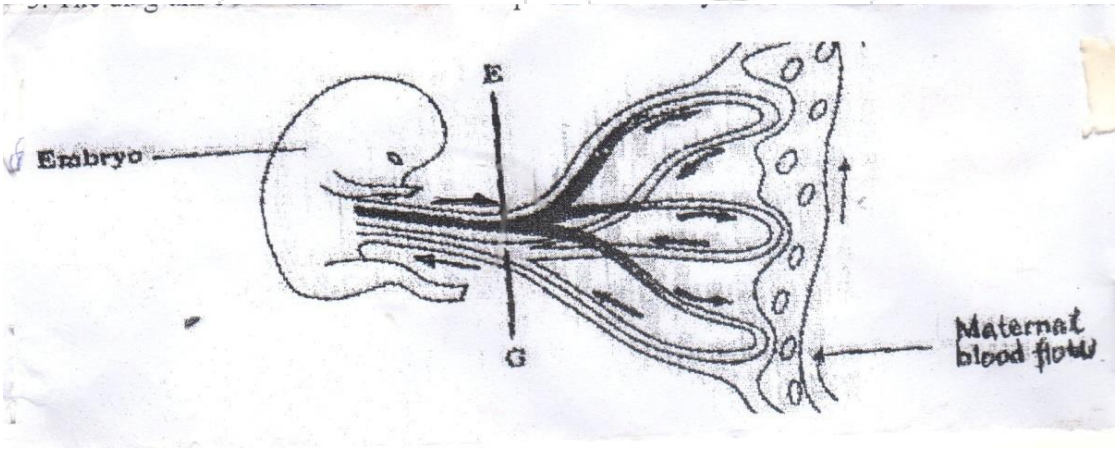
(a) Name the structures labelled O and M **(2 marks)**

(b) Identify a letter in the diagram that represents blood with the highest concentration of carbon (iv) oxide **(1 mark)**

(c) Describe how blood is moved by the heart from blood vessel k to blood vessel J. **(3 marks)**

(d) State two features of blood vessel K **(2 marks)**

2. The diagram below shows exchange of materials between embryo's bloodstreams and mother's blood stream



(a) (i) Give the names of the parts labelled E and G

E.....**(1mark)**

G.....**(1mark)**

(ii) Name one substance that is in high concentration in E **(1mark)**

(iii) In which organ does this kind of exchange shown occur? **(1mark)**

(b) Suggest the biological significance of each of the following

i) Development of the pollen tube in fertilization in plants. **(1mark)**

ii) Fusion of petals to form funnel-shaped corolla tube in certain flowers. **(1mark)**

(c) Give 2 advantages of cross-pollination over self-pollination. **(2marks)**

3. Form two students subjected an orange plant growing outside the laboratory to the Following;

i) Selected two sized leaves and gently brushed them clean on both sides.

ii) Placed two strips of dry cobalt chloride paper on both sides of each leaf and opposite each other and covered the cobalt chloride papers with cello tape. They observed the time taken for any colour change to occur and recorded the following.

Side of leaf	Upper epidermis		Lower epidermis
Time taken	5 minutes		2 minutes

Use the above information to answer the following questions.

a.i) What was the aim of the above experiment. **(1mark)**

ii) What was the purpose of brush cleaning the leaf **(1mark)**

iii) What was the role of cello-tape in this experiment? **(1mark)**

b.i) What was the original colour of dry cobalt chloride paper. **(1mark)**

ii) What colour change did the students observe? **(1mark)**

c. Explain the difference in time taken for the colour change observed. **(3marks)**

4. The micrographs below is of a tissue showing mitosis. Examine it and answer the questions.

R **T**



a.) i. Identify the tissue from which the micrographs were obtained **(1mark)**

ii.Give a reason for your answer in a) i above **(1mark)**

Name the stages represented by **R** and **T**. **(2marks)**

b.) State two significance of mitosis to an organism **(2 marks)**

c.) Name two regions in higher plants where cells actively undergo mitosis **(2marks)**

5. The diagram below shows samples of blood obtained from two different persons A and B



PERSON A



PERSON B

(a) What genetic disorder is person B suffering from? **(1mark)**

(b) State one advantage and one disadvantage of the disorder exhibited in person A **(2marks)**

(c) Work out the genotype and phenotypes of the resulting offspring of a marriage between person A and B. Show your working **(5marks)**

SECTION B (40 Marks)

Answer question 6 (Compulsory) and either question 7 or 8 in the spaces provided

6. During germination and growth of wheat, the dry weight of endosperm, embryo and total dry weight were determined at two-day intervals. The results are shown in the table below.

Time after planting days	Dry weight of endosperm(mg)	Dry weight of embryo(mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6	33	39

a) Using same axes draw graphs of dry weight of endosperm, embryo and the total dry weight against time. **(8marks)**

b) What was the total dry weight on day 5? **(1mark)**

……

c) (i) Account for the dry weight of endosperm from day 0 to day 10 **(3marks)**

(ii) Increase in dry weight of embryo from day 0 to day 10 **(2marks)**

(iii) Decrease in total dry weight from day 0 to day 10 **(2marks)**

(iv) Increase in total dry weight after day 8 **(2marks)**

(v)State one factors within the seed and one outside the seed that cause dormancy

Within the seed

Outside the seed

7. Explain how the following plants are adapted to their habitats.

a) Xerophytes **(14marks)**

b) Halophytes. **(6marks)**

8.a) Describe the mechanism of inhalation in man. **(8marks)**

b) State **three** factors affecting breathing rate in human beings. **(6marks)**

c) Describe how the brain regulates breathing. **(6marks)**

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KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 6

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- *Write your name and admission number in the spaces provided above*
- *Write the name of your school and the date of examination in the spaces provided above*
- *Answer **ALL** the questions in the spaces provided*
- Answers must be written in the spaces provided in the question paper.
- Additional papers must not be inserted.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. Name the branch of biology that involves the study of

(a) Organisms for the sake of classifying them **(1mark)**

(b) Microscopic organisms **(1mark)**

2. What is the role of Seechi disk in experimental biology? **(1mark)**

3. What role does the blood play in the following in human body;

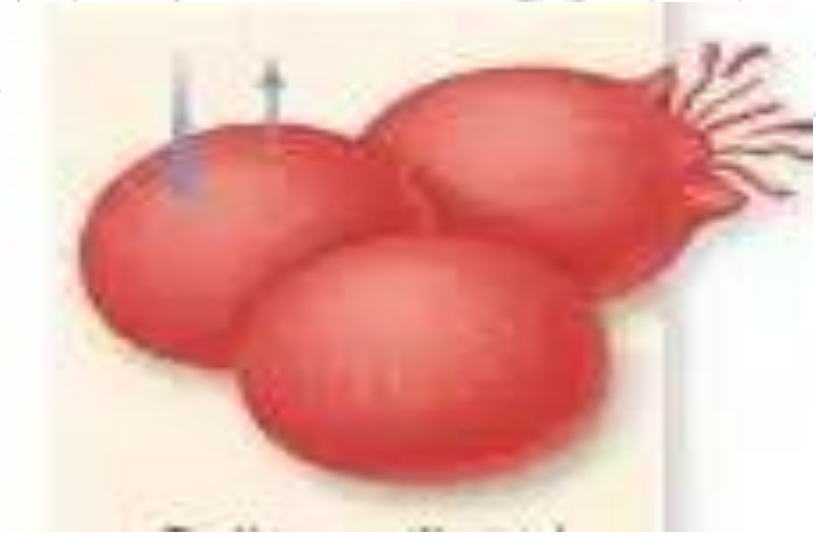
a) Nutrition **(1mark)**

b) Thermoregulation **(1mark)**

c) Development and coordinatiom **(1mark)**

4. You have set up your light microscope for use to observe epidermal cells. However, upon looking through the eyepiece lens, you are not able to see the field of view. Suggest three possible adjustments you can make the microscope to rectify the case **(3 mrks)**

5. **Below** is red blood cell appearance after treatment in a given solution



a) Account for the appearance of the red blood cell **(3marks)**

b) Even with the damage to the sympathetic and vague nerves, the heart beat continues.

Explain this observation **(1mark)**

6. **a)** Define apical dominance **(1mark)**

b) Abscisic acid is known to promote leaf fall through formation of the abscission layer.

Give two beneficial advantages of leaf fall to plants. **(2 marks)**

7. Despite the best efforts to make and use the most effective pesticides, bedbugs have not been eradicated from most homes. Give an explanation for this observation **(2 marks)**

8. Explain how the structure of the blood vessels entering and leaving the glomerulus contribute to presence of glucose in the Bowman's capsule **(2 marks)**

9. Some entomophilies flowers do not have brightly coloured petals but they still attract insects. Give two reasons **(2 marks)**

10. **Give two** differences between a human male gamete and male gamete from an angiosperm. **(2 marks)**

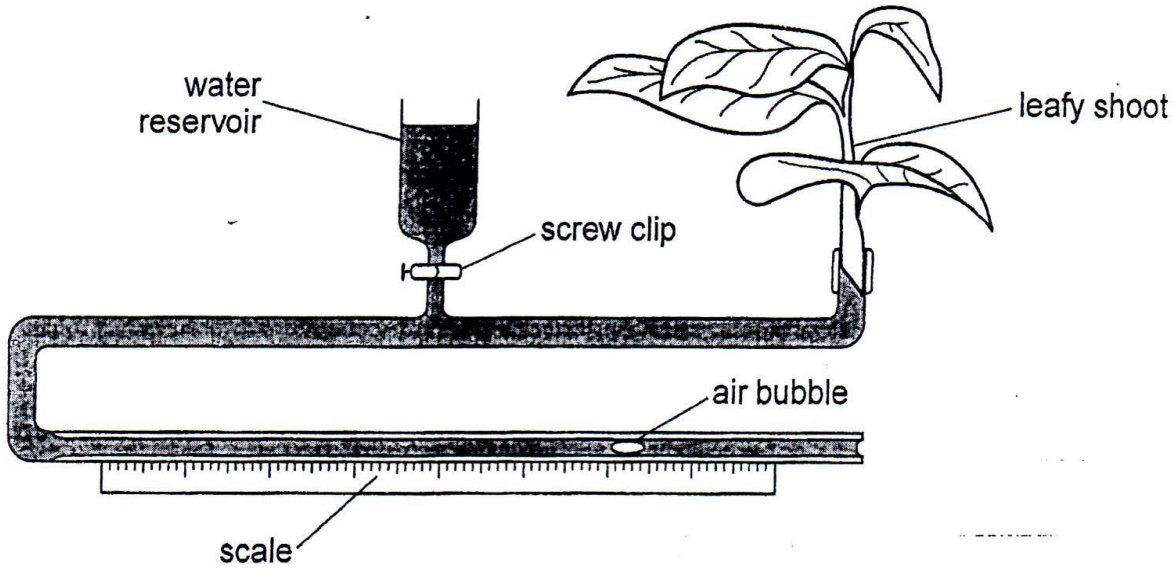
11. During hyper glymercemia, what is the effect of insulin on the muscles: **(1 marks)**

12. **a)** For what purpose in experiment al biology do we use Biuret's reagent **(1mark)**

b) Give the interpretation of the test/procedure you have identified above. **(2 marks)**

13. Poor support system s in plants affects vital process in plants. Highlight two ways in which a leaf achieves support (2 marks)

14. Below is a setup that was used to investigate a certain process in plants



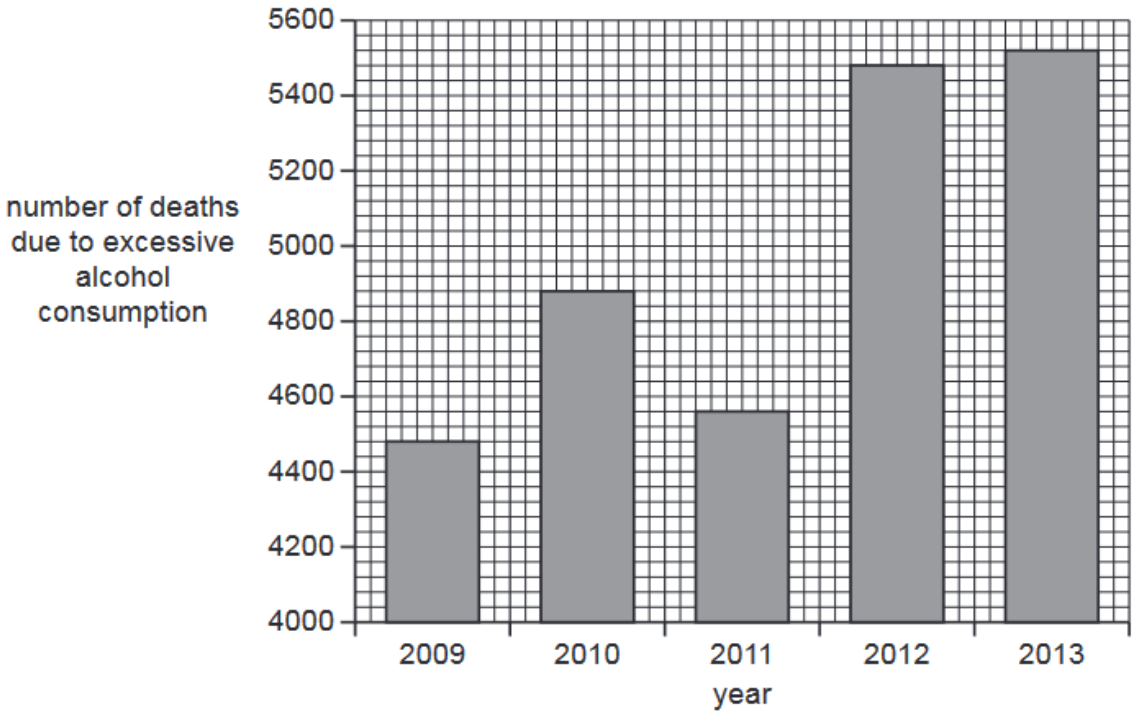
a) What was the aim of the experiment **(1mark)**

b) What is the limitation of this apparatus in investigating the aim you have stated above. **(1mark)**

c) What is the role of the water reservoir? **(1mark)**

d) Suggest a control experiment for the setup above? **(1mark)**

15. The figure below shows the number of deaths in one county that were due to excessive alcohol consumption.

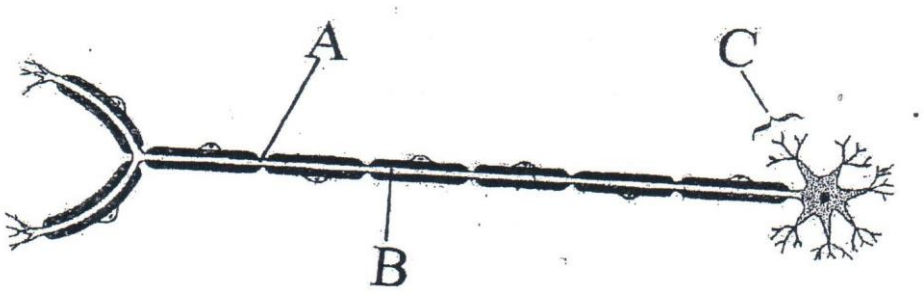


a) Briefly discuss the results Use the data to support your answer **(1 mark)**

b) Describe two short-term effects of excessive alcohol consumption on the nervous system **(2 marks)**

c) State the name of one organ damaged by long-term excessive alcohol consumption **(1 mark)**

16. Study the diagram below representing a neurone and answer the questions that follow



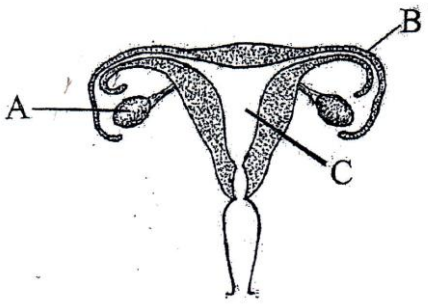
a) Give function of A **(1 mark)**

b) Place an arrow on the diagram to show the direction of the impulse **(1mark)**

a) On the diagram indicate with X a point at which there will be secretion of a neurotransmitter. **(1mark)**

b) What is the role of neurone above **(1mark)**

17. The diagram below represents a female reproductive system



a) Identify the part affected by both pituitary hormones regulating the menstrual cycle **(1mark)**

b) Label with Letter M , the part of the diagram most sensitive to oxytocin **(1mark)**

c) Suggest why implantation on part B must be terminated **(1mark)**

d) Highlight two functions of the female reproductive system **(2 marks)**

18. The flow diagram below represents the process of photosynthesis. Study the diagram and answer the questions that follow.

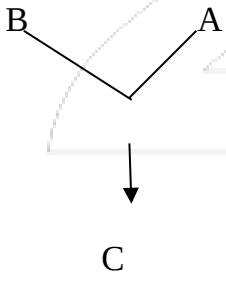
Sunlight

↓

H_2O

↙↘

Oxygen



a) Name the substances labelled A,B C **(3 marks)**

b) Write an equation to show the process illustrated above. **(1 mark)**

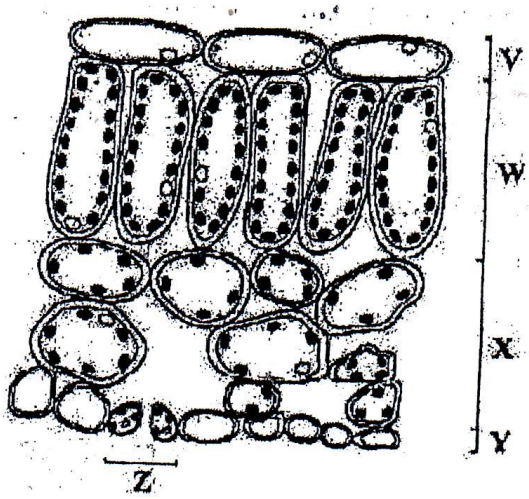
19. Give two differences between respiration and gaseous exchange **(2 marks)**

20. Your class is to embark on a practical lesson to study the digestive system of a rabbit.

a) Name any three instruments you are likely to use during the dissection **(3 marks)**

b) Give two factors determining energy requirements in man **(2marks)**

21. Below is a leaf cross section



a) Name one tissue type found at both points V and Y **(1mark)**

b) Give two adaptations of cells at point Z **(2marks)**

22. The table below contains information about various components of mammalian circulatory system.

	Blood in aorta	Tissue Fluid	Lymph	Blood in Vena Cava
Red blood Cells	Many		None	Many
White blood cells	Many	Some	Some	Many
Glucose Concentration	High	High		High
Pressure	High	Low	Low	Low

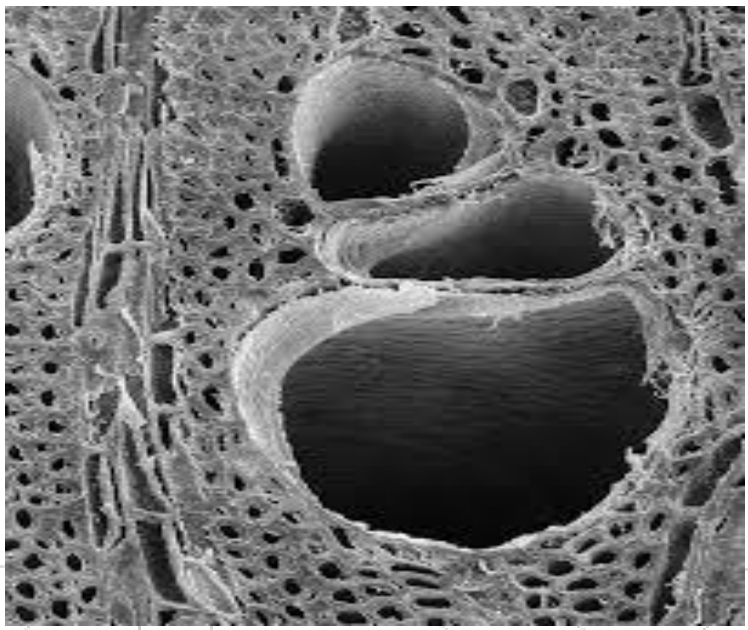
a) Complete the unfilled boxes in the table with the most appropriate word. **(2 marks)**

b) Explain the difference in glucose concentration in the tissue fluid and **lymph** **(2 marks)**

23. Mr. Kamau sues Neema Hospital for exchanging his son 15 years ago. Mr. Kamau's son is colour blind while both the parents have normal colour vision. According to Mr. Kamau this means the son must have been exchanged at birth. Explain why Mr. Kamau may lose the case **(2 marks)**

24. State two ways in which bryophytes are of ecological significance in an ecosystem **(2 marks)**

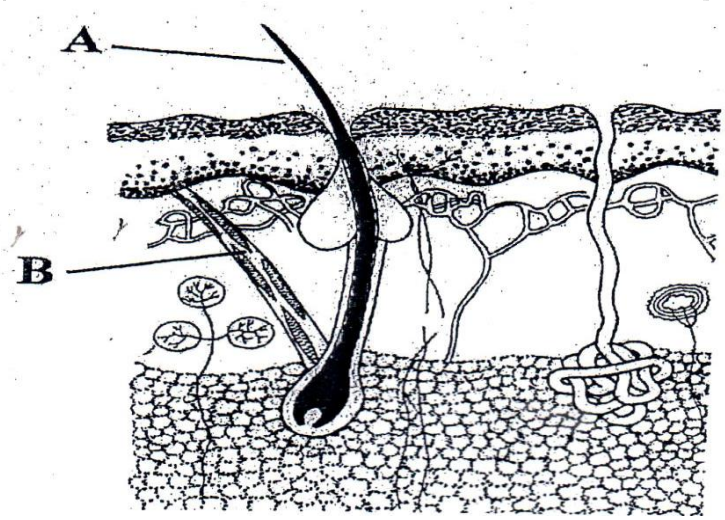
25. The diagram below is a scanning electron micrograph of some xylem vessels



Give two adaptations visible in the picture that adapts the tissue to its function **(4 marks)**

26. Distinguish between chemical evolution and organic evolution theories **(2 marks)**

27. Below is representation of one of the organs of the mammalian body



a) Name the part labelled B **(1mark)**

b) The opening through which structure A emanates provides a possible path way for bacteria to get into a mammalian body. How is this possible risk minimized in the organ above **(1 mark)**

c) John, a class five pupil wondered why a hot day his puppy appeared "smaller" than on a cold day. What could be the reason for this? **(2 marks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 6

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

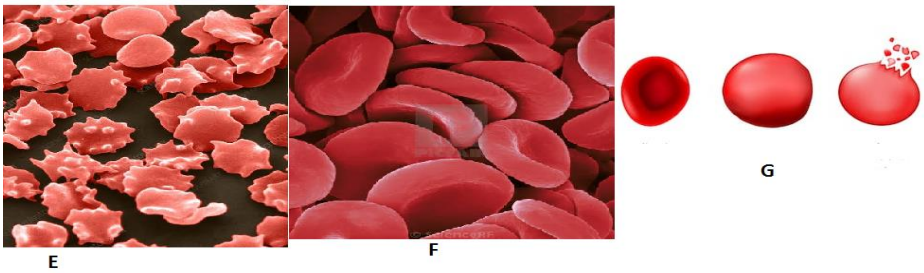
- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
- *In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8*

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. The photograph below shows red blood cells that have been put in different solutions. Examine them and answer the questions that follow.



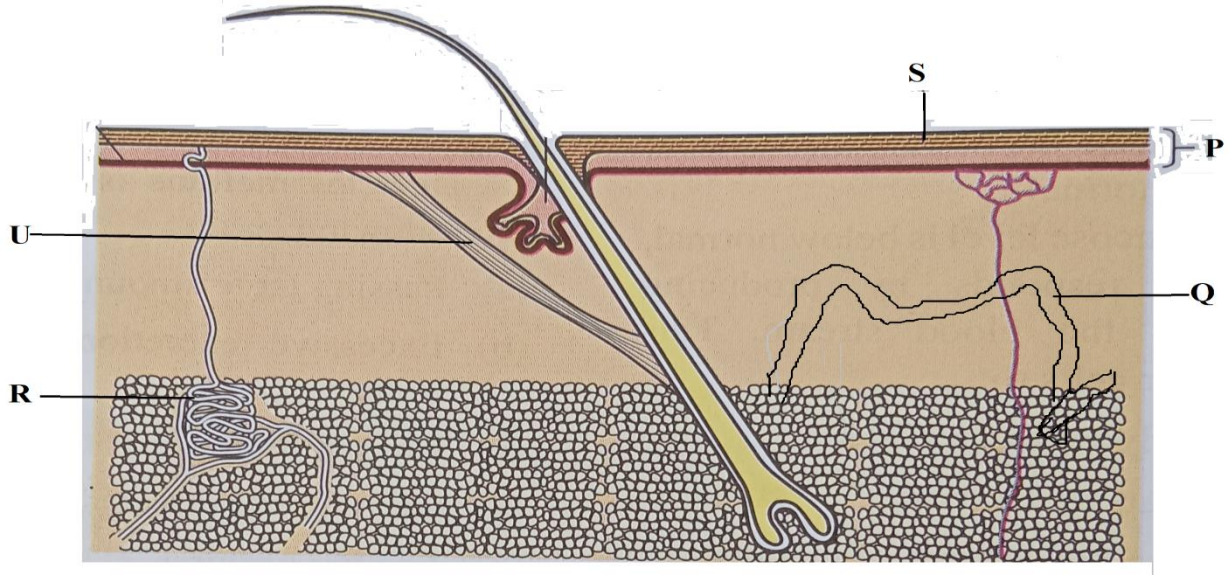
a) i)Identify the type of solution in which F was placed. **(1mark)**

ii) State the process which the red blood cells underwent in illustration G. **(1mark)**

b) Account for the appearance the red blood cells underwent in illustration E. **(3marks)**

c) Explain what would happen if plant cells are placed in the solution in which the cells in G were immersed. **(3marks)**

2. The diagram below represents a vertical section through a mammalian skin.



(a). Name the structures labelled P,Q,R and **U** **(4 marks)**

(b) What is the function of S and T **(2marks)**

S

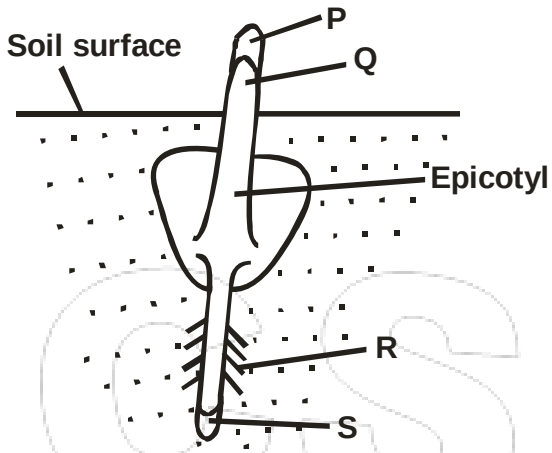
T

(c) State the physiological changes that would occur in the following structures if the environmental temperature was raised gradually from 22℃ to 40℃ **(2 marks)**

R ……

Q……

3. Diagram below represents a germinating seedling.



a) What is germination? **(1 mark)**

b) Name the part labelled P, Q and R. (**3 marks)**

c) Identify the type of germination shown in the diagram. **(1 mark)**

What is the role of the following in germination of the above seedling?

i) Oxygen **(1 mark)**

ii) Enzymes **(1 mark)**

iii) Water **(1 mark)**

4. The table below gives information about an aquarium which is ecologically balanced.

Type of organism	Dry weight
Insect	500gms
Fishes	1200gms
Water plants	5000gms
Bacteria	10gms

a) What do you understand by the term ecological balance? **(1 mark)**

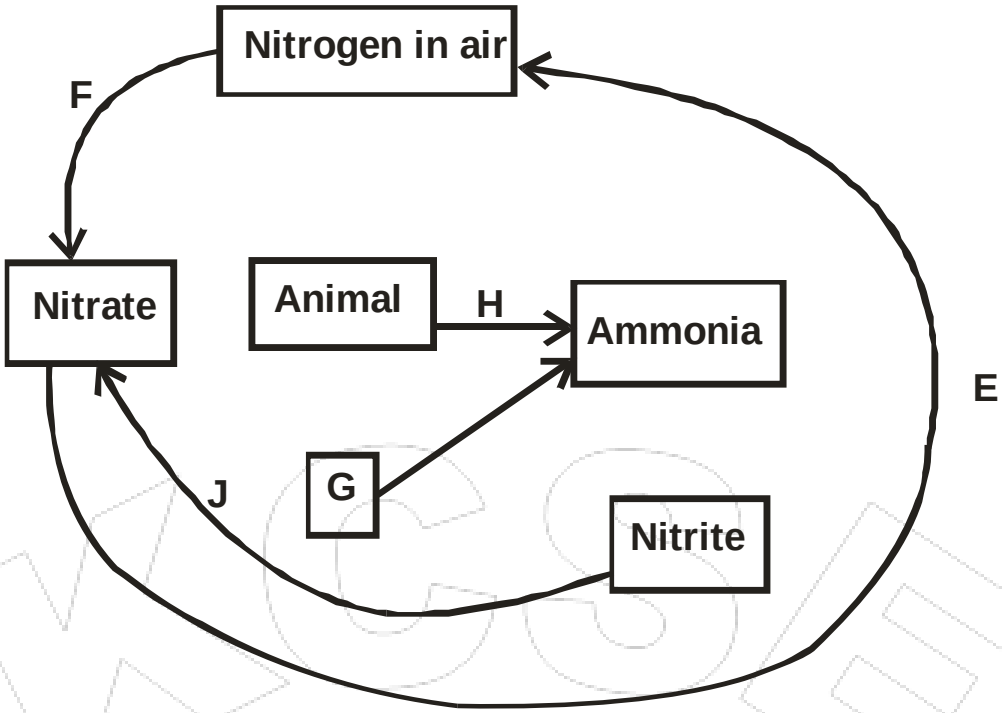
b) Calculate the total biomass of the aquarium. (Answer in kgs) **(3 marks)**

c) Which organism in the table is:

i) Primary producer. ..... **(1 mark)**

ii) Secondary consumer. ..... **(1 mark)**

d) The diagram below represents a simple nitrogen cycle.



i) Name the organisms that cause processes E and J. **(2 marks)**

E .....

J .....

5. When the offspring of purple and white flowered pea plants were crossed, they produced purple and white flowered plants in the ratio of 3: 1

Using letter H to represent the gene for purple colour

(a) State the genotype of:

(i) Parents **(2 marks)**

(ii) F_1 Generation **(1 mark)**

(b) Work out the cross between plants in the F_1 generation **(4 marks)**

(c) Account for the colour the flowers in plants of the F_1 generation **(1mark)**

6. The data below represents levels of progesterone hormone produced in a female's body within a period of 34 days. Study the data and use it to answer the questions that follow

NB: The days were counted from the 1st day that menstruation was noticed.

Day	Progesterone hormone concentration in arbitrary units
1	6
2	5
3	3
4	2
5	1
6	1
8	1
10	2
12	4
14	7
16	8
20	9
22	10
24	10
26	10
28	10
30	11
32	11
34	11

(a) Plot a graph of progesterone concentration against time using a suitable scale. **(6marks)**

(b) Account for the progesterone levels in the blood between

i) Day 1 - day 5 **(2marks)**

ii) Day 14 – day 20 **(2marks)**

iii) Day 28 – day 35 **(2marks)**

(c) Name two structures that produce progesterone in females . **(3marks)**

(d) Suggest the process that usually takes place at day 14. **(1mark)**

(e) Suggest two other hormones that were in high concentration in the body of the female between day 10 – 15 . Give reasons for your answer. **(4marks)**

7. Describe the

(i) Process of inhalation in mammals **(10 marks)**

(ii) Mechanism of opening and closing of stomata **(10 marks)**

8. How is the human eye adapted to its functions **(20 marks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 7

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- *Write your name and admission number in the spaces provided above*
- *Write the name of your school and the date of examination in the spaces provided above*
- *Answer **ALL** the questions in the spaces provided*
- Answers must be written in the spaces provided in the question paper.
- Additional papers must not be inserted.

FOR EXAMINER'S USE ONLY

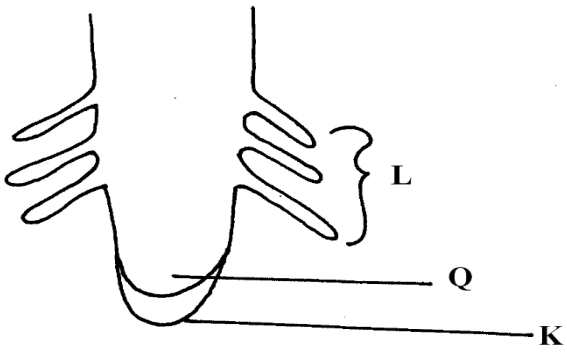
QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. Define the term Entomology. **(1mk)**

2. What is meant by the term Natural Selection. **(2mks)**

3. The diagram below shows regions of a root-tip

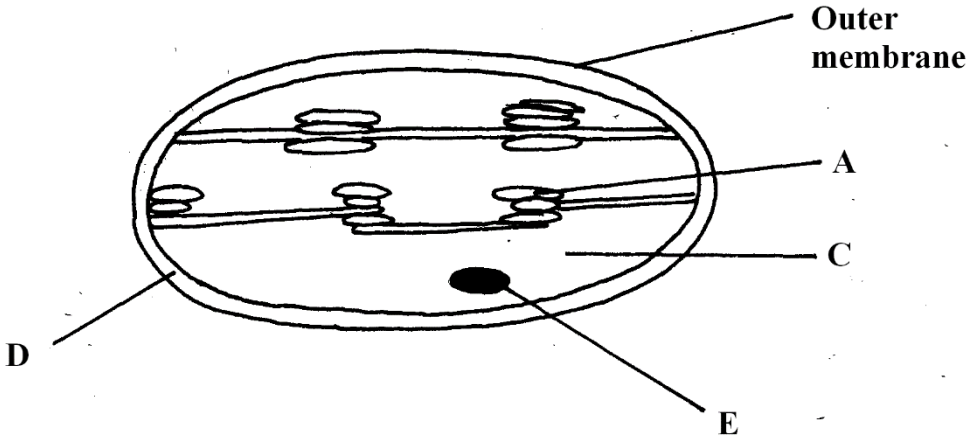


a) What is the function of the part labeled K**.** **(1mk)**

b) Name the region labeled L. **(1mk)**

c) Give ONE characteristics of the cells in the part labeled Q. **(1mks)**

4. **The** organelle below is important in the process of Nutrition.



a) Identify the organelle. **(1mk)**

b) Name the part labeled C. **(1mk)**

c)Identify the structure within the organelle that would make the leaf to be variegated. **(1mk)**

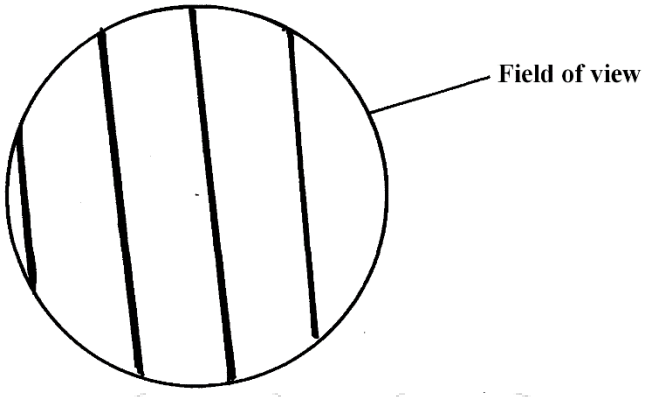
5. **A** Rhinocerous in a game park was found to be infested with ticks. State the trophic level occupied by **Ticks** **(2mks)**

6. State the causative agent of the following diseases. **(2mks)**

a) Typhoid

b) Pneumonia

7. A student estimating a cell size of an onion epidermal cells observed the following on The microscope field of view using a transparent ruler.



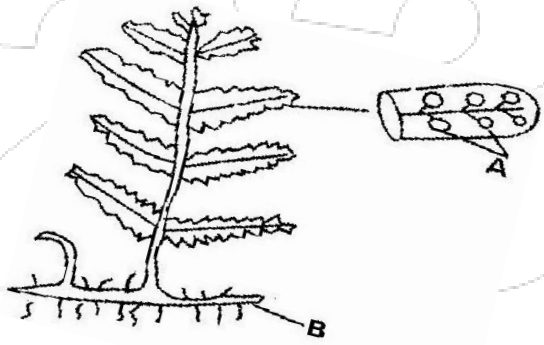
The student identified 20 cells across the field of view. Calculate the size of the cell in Micrometers (show your working) **(3mks)**

8. Name the tissues whose cells are thickened with:

a. Cellulose and pectin. **……** **(1mk)**

b. Lignin. ……**…** **(1mk)**

9. The diagram below represents a fern.



(a) Name Parts labeled A and B. **(2mk)**

(b) To which division does the plant belong? **(1mk)**

10. Explain how the following factors hinder self-pollination in plants:

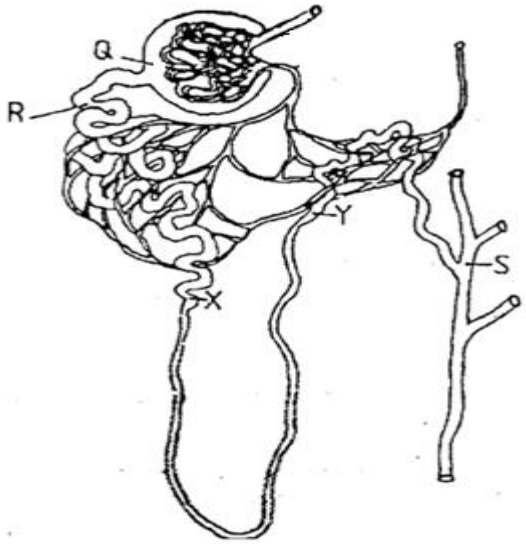
(i) Protogyny **(1mk)**

(ii) Dioecism **(1mk)**

11. Explain the likely effect on humans and other organisms of untreated sewage discharged into water body that supplies water for domestic use. **(3mk)**

12. State TWO differences between osmosis and active transport. **(2mk)**

13. The diagram below illustrates part of a nephron from a mammalian kidney.



a) Name the fluid found in the part labeled Q. **(1mk)**

b) Identify the process responsible for the formation of the fluid named in (a) above. **(1mk)**

c) Which two hormones exert their effect in the nephron**?** **(2mk)**

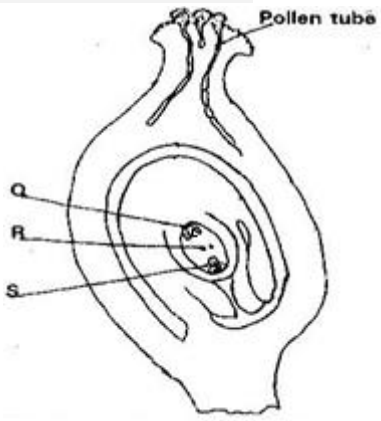
14. State TWO characteristics of members of kingdom Monera that are not found in other kingdoms. **(2mk)**

15. What is meant by the following biological terms?

i) Crenation **(1mk)**

ii) Haemolysis **(1mk)**

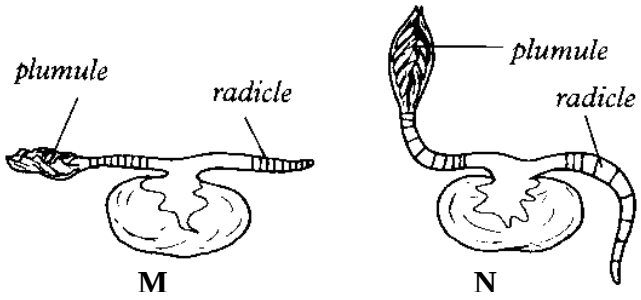
16. The diagram below shows a stage during fertilization in flowering plant.



a) Name the parts labeled Q, R, and S. **(3 mk)**

b) State the function of the pollen tube. **(1 mk)**

17. An experiment was set to investigate a certain aspect of response. A seedling was put on a horizontal position as shown in figure M below. After 24 hours, the set up was as shown in figure N.



a) Name the response exhibited. **(1mk)**

b) Explain the curvature of the shoot upwards. **(3mk**

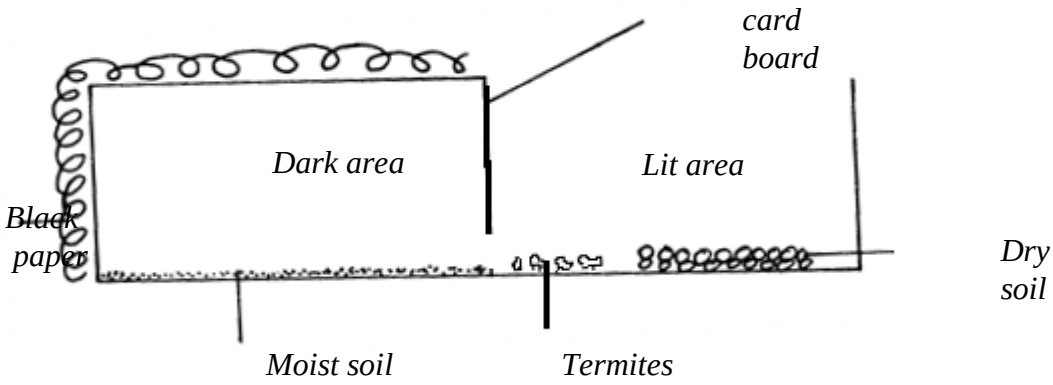
18. The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

a) Name the evolutionary process that may have given rise to these structures. **(1mk)**

b) What is the name given to such structures? **(1mk)**

c) Give ONE examples of vestigial organs in man. **(1mk)**

19. A group of Form four students set up an experiment to investigate a biological process using termites. They used a small box in which a portion was covered with black paper and had moist soil. The open part had dry soil. Termites were placed inside in open area of the box.



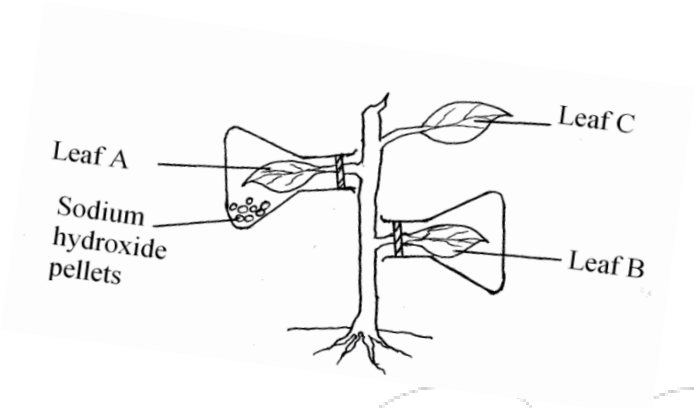
a) Predict what happened to the termites after 30 minutes. **(1mk)**

b) What form of response is exhibited by termites? **(1mk)**

c) State one biological significance of the above response to termites. **(1mk)**

20. The diagram below represents an experimental set up to investigate a certain scientific concept.

The potted plant was first destarched by keeping it in dark for four days.



The set up was then placed in sunlight for five hours and leaves were tested for starch.

a) What scientific concept was being investigated? (1mk

b) i) Give the results likely to be obtained after starch test for A and B.

A and B.

A …… (1mk)

B …… (1mk)

ii) Account for the results in leaf A in b (i) above. **(1mk)**

c) Why was leaf C included in the set-up? **(1mk)**

21) Explain why a pregnant woman excretes less urea compared to a woman who is not- pregnant. **(2mk)**

22. a) Outline the main features of Lamarckian theory of evolution. **(2mk)**

b) In view of modern genetics, explain why Lamarck's theory is unacceptable. **(1mk)**

c) Name one factor in nature that increases the process of evolution. **(1mk)**

23. Explain why fresh water Protozoa like amoeba do not burst when placed in distilled water. **(2mks)**

24. The equation below shows an oxidation reaction of flow food substance

$5C_{51}H_{98}O_6 + 145O_2 \longrightarrow 102CO_2 + 98H_2O + Energy$

(a) Determine respiratory quotient of the oxidation of the food substance above**.** **(2mks**

(b) Identify the food substance **(1mk)**

25. Give the one aspect of dichogamy in flowers **(1mk)**

26. The table below shows the concentration of important plant nutrients

Ion	Concentration in pond water (ppm)	Concentration in cell sap (ppm)
Chloride	200	50
Potassium	1	15

Name the process by which the above ions could have been taken up by the plants

(i) Potassium ……**…… (1mk)**

(ii) Chloride……**……..(1mk)**

27. In an experiment **<u>Drosophila</u> <u>melanogaster</u>** (fruit flies) with broad abdomens were crossed with those having narrow abdomens. All the offspring (F1 generation) from the crosses had broad abdomens. Using A to denote the genes for abdomen size,

(a) Give the genotypes of the parents **(2mks)**

(b) If 150 fruit flies had narrow abdomens in the second filial generation (F2) how many fruit flies with broad abdomens were in the same generation (show your working) **(2mks)**

28. Give a reason why two species in an ecosystem cannot occupy the same niche. **(1mk)**

29. A person was found to pass out large volume of dilute urine frequently. Name the:

(a) Disease the person was suffering from? **(1mk)**

(b) Hormone that was deficient **(1mk)**

30. Identify the processes X and Y and the unknown product Z in the chemical equations below;

[i] Glucose + Galactose $\xrightarrow{X}$ Lactose + Z **(2mks)**

[ii] G + water $\xrightarrow{Y}$ Glucose + Fructose **(2mks)**

Y _____

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 7

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

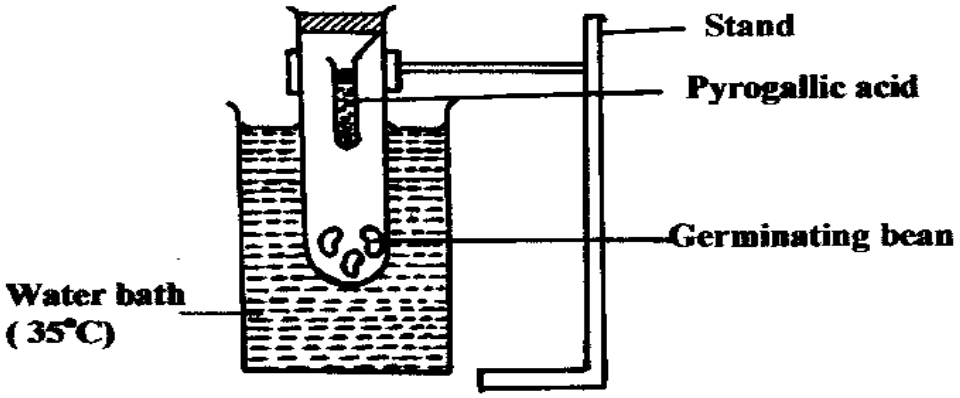
- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
- *In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8*

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1 The diagram below shows a set up to investigate a factor necessary for germination.



a) **Name** the factor under investigation. **(1mk)**

b) **State** the role of pyrogallic acid in the set up. **(1mk)**

c) **Which** type of respiration is taking place in the beans? **(1mk)**

d) **Write** a word equation for the process named in (c) above. **(1mk)**

e) **Explain** why plants can only carry out the above respiration process for a short while**.** **(1mk)**

f) **State** other **three** factors necessary for germination. **(3mks)**

2 a) Birds have beaks which are structurally modified to different modes of feeding.

(i) What is the name given to such structures in evolution? **(1 mark)**

(ii) What is the name given to the evolution of beaks of birds? **(1 mark)**

b) (i) What is meant by "vestigial structures"? **(1 mark)**

(i) Name two vestigial structures present in man**.** **(1 mark)**

c) Bacteria tend to develop resistance to antibiotics after they have been subjected to them for a long period of time. Explain**.** **(2 marks)**

d) Explain continental drift as an evidence of evolution. **(2 marks)**

3 a) What is internal fertilization ? **(1mk)**

b) Suggest two disadvantages of internal fertilization in most mammals. **(2mks)**

c) State two roles of placenta in mammals. **(2mks)**

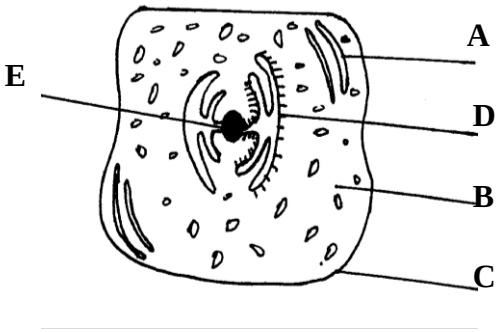
d) Mention one role played by each of the following hormones in human menstrual cycle.

i) Oestrogen

ii) Luteinizing hormone

iii)Follicle stimulating hormone **(3mks)**

4. Below is a cell obtained from a living organisms. Study it and answer the questions that follow



(a) From which kingdom of organism was the cell obtained? **(1mk)**

(b) Give **two** reasons for your answer in 4 (a) above **(2mks)**

(c) On the diagram identify parts **A,B** and **C**. **(3mks)**

(d) State the role of parts **D** and **E**. **(2mks)**

5 a) What is meant by the term linked genes**?** **(1mk)**

b). Haemophilia is a genetic condition transmitted through a recessive gene linked to **X** chromosome. The normal gene may be represented by $\mathbf{X^H}$**.**

i) What is the genotype of a haemophilic female? **(1mk)**

ii) A woman who is a carrier for the haemophilia gene marries a normal man. Work out the phenotypic ratio for their offspring**.** **(4mk)**

iii) Haemophilia is more common in males than in females. Explain this phenomenon**.** **(2mks)**

SECTION B (40 MARKS)

Answer question 6 (compulsory) and either question 7 or 8

6. The table below shows how the quantities of sweat and urine vary with external temperature.

External temperature	Urine cm^3/hr	Sweat cm^3/hr
0	100	5
5	90	6
10	80	10
15	70	20
20	60	30
25	50	60
30	40	120
35	30	200

(a) On the same axis plot graphs of the quantities of urine and sweat produced against the external temperature. **(7mks)**

(b) At what temperature are the amounts of sweat and urine produced equal? **(1mk)**

(c) What happens to the amount of sweat produced as the temperature rises? Explain the observation. **(3mks)**

(d) Account for the observation made on the amount of urine produced as the temperature increases **(3Mks)**

(e) (i) How is the kidney adapted to its function **(4mks)**

(ii) Differentiate between excretion and egestion. **(2mks)**

7. Explain how the following organisms are adapted to their mode of feeding

(a) Herbivores **(10mks)**

. (b) Carnivores **(10mks)**

8. (a) (i) State **two** significances of transpiration**.** **(2mks)**

(ii Discuss the forces involved in movements of water from roots to the leaves **(8mks)**

(b) Describe the mechanism of opening and closing of stomata using photosynthetic theory **(10mks)**

END.

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 8

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- *Write your name and admission number in the spaces provided above*
- *Write the name of your school and the date of examination in the spaces provided above*
- *Answer **ALL** the questions in the spaces provided*
- Answers must be written in the spaces provided in the question paper.
- Additional papers must not be inserted.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. State the name given to the study of: **(2marks)**

(i) Chemical changes in living organisms.

(ii) Insects.

2. State the category of variation into which the following traits fall. **(2marks)**

a)(i) Skin pigmentation.

(ii) Blood group .

b) Give two possible genotypes of blood group A. **(2marks)**

3. Give two differences between scientific names and common names. **(2marks)**

Scientific Names	Common Names

4. **Explain** two adaptation that enable the halophytes to survive in their habitats. **(2marks)**

5.(i) What is parthenogenesis. **(1mark)**

(ii) Monocotyledonous plants do not undergo secondary growth. Explain, **(1mark)**

6. **Name** two classes of Phylum Arthropoda whose members' head is fused with the thorax.**(2mks)**

7. **Name two** excretory products produced by both plants and animals. **(2marks)**

8. **The shirt** of a student was stained by a solution of DCPIP. A friend advised him to wash with lemon juice. Explain. **(1mark)**

9. Two freshly cut banana peels A and B measuring 4cm long were cut, which were later placed in solutions of different concentrations in two separate beakers for 30minutes. The appearance after 30minutes is as shown below.



(a) What is the nature of the solution in which piece B was placed. **(1mark)**

(b) Account for the appearance of piece A. (3marks)

10.I The ovum is fertilized only by one sperm yet there is millions of sperm surrounding the ovum. Explain. **(1mark)**

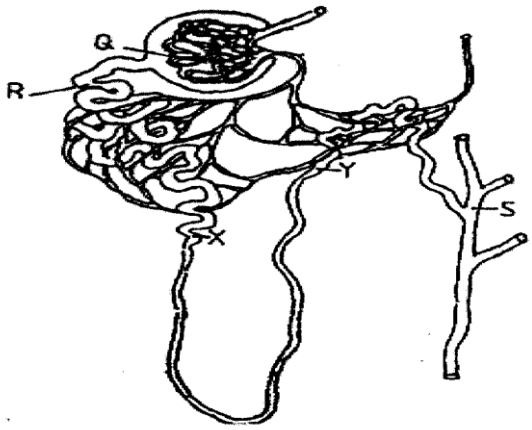
II Give the role of the following parts of the male reproductive system.

(a) Epididymis **(1mark)**

(b) Prostate gland **(1mark)**

11. When a person has oxygen debt the heart beat increases. Give two importance of the increase in heart beat. **(2marks)**

12. The diagram below shows part of a nephron from the human kidney.



a) Give two factors that lead to creation of higher pressure in the structure labelled Q. (2marks)

b) **On the diagram above label the part** where the sodium ions are reabsorbed and write down the hormone involve in regulating the level of this ions **(2marks)**

Name of the hormone;

13. Explain how the following parts of a light microscope are modified to perform their function

(i) Diaphragm **(1mark)**

(ii) Mirror. **(1mark)**

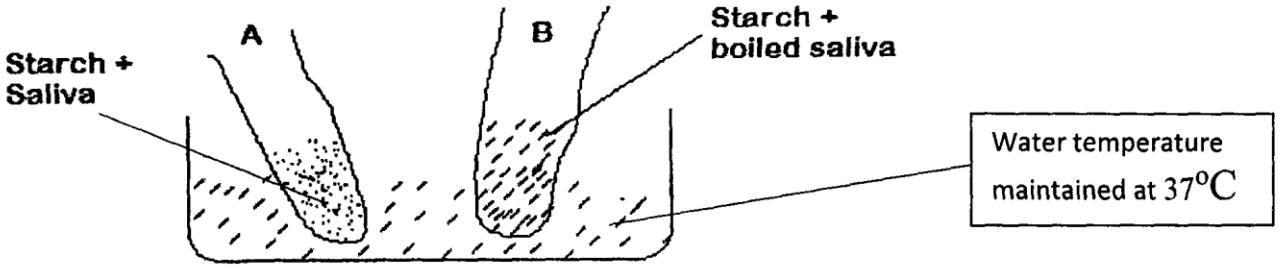
14.a) Explain two adaptations of cell membrane to its function. **(2marks)**

b) Why is oxyhaemoglobin formation is highly preferred during transportation of oxygen in the body. **(2marks)**

15. I Explain how smoking of tobacco lead to lung cancer. **(1mark)**

II. How does age affect the breathing rate in human? **(2marks)**

16. In an experiment to investigate an aspect of digestion, two test tubes A and B were set as shown below. The set up was left for 30 minutes and the temperature of water was maintained at 37^0C.



The resulting content in each test tube A and B were placed into two separate visking tubing which were then placed in a beaker containing iodine solution, for 20 minutes.

(a) What was the observation that was made in the visking tubing containing contents of test tube A. **(1mark)**

(b) Account for the result in visking tubing which was containing contents of test tube B. **(3marks)**

17. During a biological excursion a group of form 4 students collected plant specimen whose reproductive organ is shown below.



(i) Name the sub-division of the plant in which the above specimen was obtain**ed.** **(1mark)**

(ii) Other than the presence of the above characteristics, state two characteristics of plants in the sub-division named above. **(2marks)**

18. Enzymes are important in various physiological processes in living things.

(a) Differentiate between an enzyme and a hormone **(1mark)**

(b) Name one property of an enzyme exhibited by the lock and key hypothesis **(1mark)**

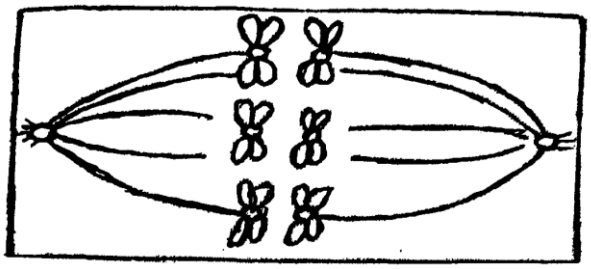
19. I The transverse section of a young dicotyledous root was cut and iodine solution was applied. One of the part of the section turned to blue-black colour. Identify the part of the root and give a reason for your answer.

Part …… **(1mark)**

Reason **(1mark)**

II. Distinguish between transpiration and guttation. **(1mark)**

20. The diagram below shows a cell undergoing a stage in cell division.



With a reason, identify this stage **(2mark)**

Identify

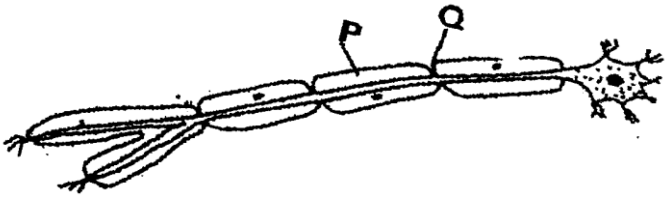
Reason

21.a) Define the term immunity. **(1mark)**

b) Identify one immunizable disease in Kenya **(1mark)**

c) State two ways in which lymphocytes kill disease causing microorganism. (2marks)

22. Study the diagram below and answer the questions that follow.



(i) With an arrow, **indicate on the diagram** the direction of the impulse through the neuron. **(1mark)**

(ii) State the function of the parts labelled P **(1mark)**

23. Name the type of response exhibited by;

(i) Sperm cell when it swims towards the ovum. **(1mark)**

(ii) Leaves of Mimosa pudica when they fold their leaves after being touched. **(1mark)**

24.a) Distinguish between hypogeal and epigeal germination. **(1mark)**

b) State two internal factors necessary for germination **(2marks)**

25.a) Give two importance of divergent evolution to animals **(2marks)**

b) Explain two limitations of fossil record as an evidence for evolution **(2marks)**

26. What causes the following diseases?

a) Diabetes mellitus **(1mark)**

b) Diabetes inspidus **(1mark)**

27. Study the diagram below and answer the questions that follows.



a) Identify the tooth. **(1mark)**

b) Give a reason for your answer in 27(a) above **(1mark)**

c) State two mineral ions deposited on the bones to harden them. **(2marks)**

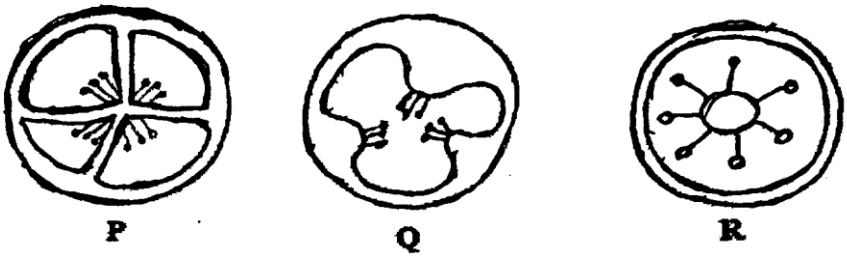
28. I. The following is food chain that was presented by a student in class.

Grasshopper → Lizard ← Chicken → Hawk

State two errors that are made in the food chain **(2marks)**

II. Give a reason why pyramid of biomass is considered to be more accurate over the pyramid of numbers. **(1mark)**

29. Below are cross section of diagrams of fruits.



Identify the type of placentation present in each of the three diagrams **(3marks)**

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KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 8

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

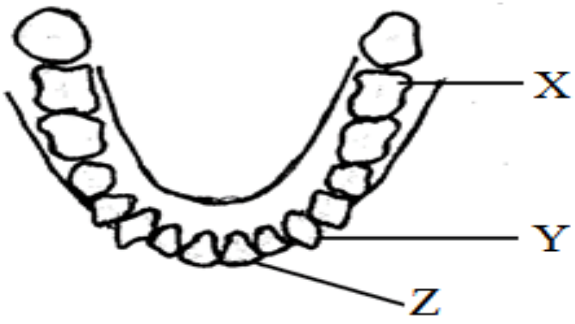
- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
- *In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8*

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. The figure below shows the teeth in the lower jaw of an adult human



a)(i) Name the teeth labelled X and Z **(2marks)**

(ii) Describe the functions of teeth Y and Z **(2marks)**

b) Name **one** mineral and one vitamin that are essential for the healthy development of teeth **(1mark)**

c) The figure below shows a section through a tooth.



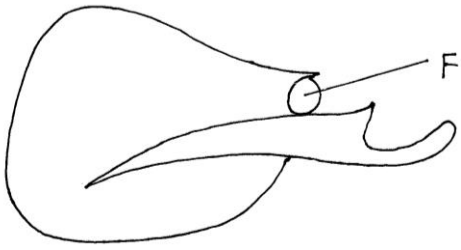
(i) Tooth decay is caused by bacteria getting into the dentine. Explain how bacteria can enter the dentine **(2marks)**

(ii) List **one** action you could take to reduce the risk of tooth decay **(1mark)**

2. a) What are the analogous structure as used in evolution **(1mark)**

b) How do disease causing micro-organisms become resistant to drugs **(3mark)**

c) The diagram below represents a bone of a mammal

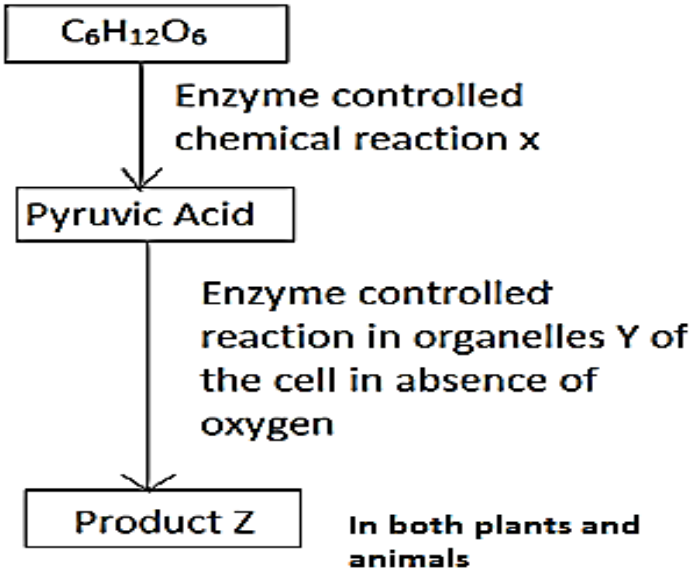


(i) Identify the bone **(1mark)**

(ii) Name the bone that articulate at the point labelled F **(1mark)**

(iii) Explain two adaptations of the bone identified in (i) above **(2marks)**

3. Study the flow chart below of a process that takes place in both plants and animals



a) Name the above process **(1mark)**

b)(i) In the above process name the chemical reaction represented by X **(1mark)**

(ii) Name the part of the cell where the enzyme controlled reactions in b(i) above takes place **(1mk)**

c) Name the product Z in

(i) Plants **(1mark)**

(ii) Animals **(1mark)**

d) What would be the fate of pyruvic Acid if oxygen supply is availed in the mitochondria of an animal cell **(2marks)**

e) What is meant by the term oxygen debt (1mark)

4.a) Differentiate between the following terms

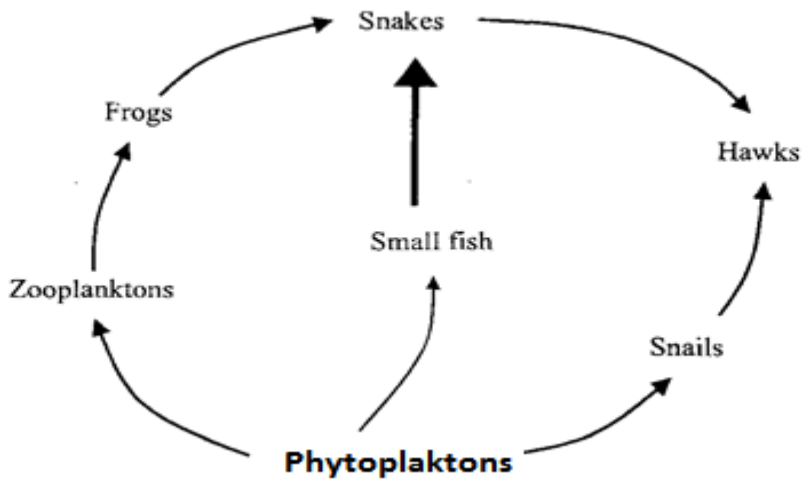
(i) Dominant gene and recessive gene (1mark)

(ii) Continuous variation and discontinuous variation **(1mark)**

b) In *Drosophila melanogaster* the gene for eye colour is sex linked. The gene for red eye is dominant. A cross was made between homozygous red eyed female and a white eyed male. Work out the phenotypic ration of the F_1 generation.(use R to represent the gene for red eyes) **(4marks)**

c) **Suggest** two reasons to explain why *Drosophila melanogaster* is most preferred for studies in modern genetics. **(2marks)**

5. **The** diagram below represents a feeding relationship in an ecosystem



a) **Name** the type of ecosystem represented by the above food web **(1mark)**

b) **Name** the organism in the food web that:

(i) Are producers **(1mark)**

(ii) Occupies the highest trophic level **(1mark)**

c)(i) Write a food chain that ends with the hawk as quaternary consumer **(1mark)**

(ii) State two short term effects on the above ecosystem if all the small fish were killed **(2marks)**

d) How does oil spills lead to death of fish **(1mark)**

e) Name one other cause of water pollution apart from oil spills **(1mark)**

SECTION B: 40 MARKS

Answer question 6(compulsory) and either question 7 or 8 in the spaces provided

6. **Two** species of parasitic wasps X (*Vespula vulgaris*) and Y (*Vespula acadica*) were introduced in an orchard in order to control the population of aphids. The numbers of each species of wasps were counted at two-month intervals and recorded. The table below shows the population of the two wasps over a 18-month period in the orchard.

Time		0	2	4	6	8	10	12	14	16	18
Population	Species X	40	100	280	440	540	600	640	640	620	640
	Species Y	40	180	240	220	180	140	80	60	40	60

a) Plot a graph of population of wasp against time **(7marks)**

b) State the type of relationship between the two wasps population **(1mark)**

c) Account for the differences in population of the two wasp populations:

(i) 0 – 3 years **(3marks)**

(ii) 4 – 14 years **(3marks)**

d) The experiment was continued for another 8 months. On the 18th month the population of species X increased and surpassed that of Y. Account for this observation (3marks)

e) Explain how the population of the wasps was determined **(3marks)**

7. Describe how the structure of mammalian eye is adapted to its function **(20marks)**

8. a) State four characteristics of gaseous exchange surfaces **(4marks)**

b) Describe the mechanism of gaseous exchange in a mammal **(16marks)**

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KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 9

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- *Write your name and admission number in the spaces provided above*
- *Write the name of your school and the date of examination in the spaces provided above*
- *Answer **ALL** the questions in the spaces provided*
- Answers must be written in the spaces provided in the question paper.
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FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. a) Photosynthesis takes place in two stages. Name the part of the chloroplast where the light stage occurs. **(1mark)**

b) How is the dark stage dependent on the light stage of photosynthesis **(2marks)**

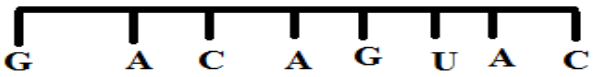
2. a) Name the enzyme that speeds up transport of Carbon (IV) Oxide in the red blood cells. (1 mark)

b) Explain the role of haemoglobin in transport of Carbon (IV) Oxide in the body. **(2 marks)**

3. a) Explain why excessive use of pesticides in the soil lowers concentration of nitrates. **(1 mark)**

b) It has been observed that 1000 wild animals including giraffes, Lions, zebras and hyenas can occupy 10 acres of land without depletion of the available food. However, 1000 cattle will deplete the available resources in the same piece of land. Explain. **(2 marks)**

4. The illustration below represents the base sequence of a section of a nucleic acid.



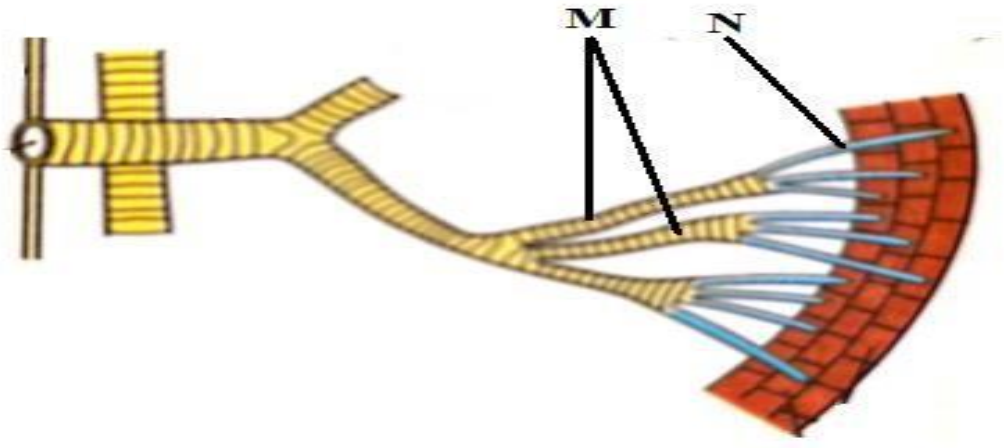
.

a) i) Identify the nucleic acid whose section is represented by the illustration. **(1 mark)**

ii) Give a reason for your answer in (a) (i). **(1 mark)**

b) Name the part of the cell where the section of the nucleic acid shown would be used. **(1 mark)**

5. The diagram below shows part of the gaseous exchange system of a given animal.



a) What is the importance of the bands of chitin observed in the part labelled M? **(1 mark)**

b) How is the part labelled N adapted to it`s function. **(2marks)**

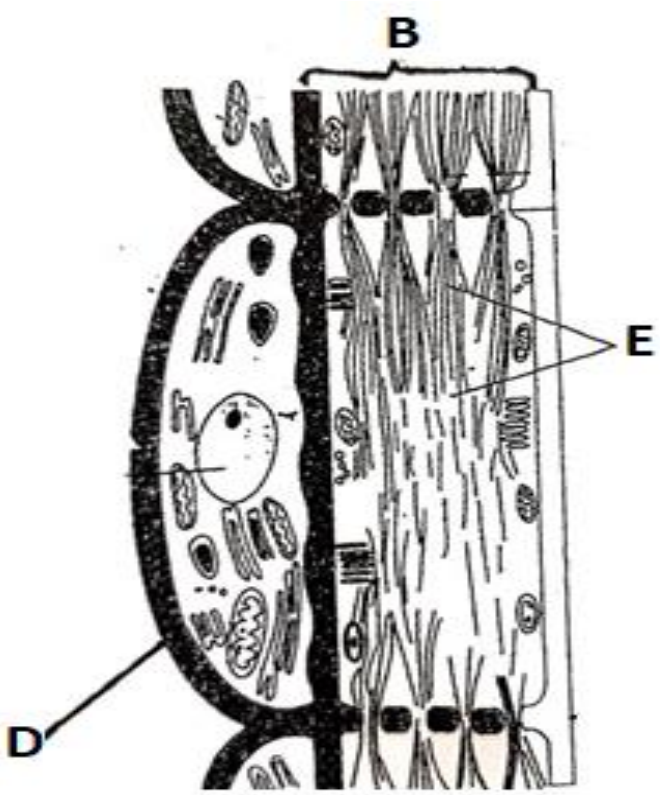
6. The paddles of a whale and the fins of fish are both used for swimming in water.

a) i) Name the evolutionary phenomenon that may have given rise to the two structures. **(1 mark)**

ii) What name is given to such structures? **(1 mark)**

b) Give **one** example of a vestigial structure in human beings. **(1 mark)**

7. Below is a diagram of a plant tissue. Use it to answer the questions that follow.



a) Identify the tissue. **(1 mark)**

b) Name the specialized cell marked **B**. **(1 mark)**

c) Explain how the parts labelled **D** and **E** adapt the tissue to their functions. **(2 marks)**

8. State the functions of the following parts of a tooth.

i) Enamel. **(1 mark)**

ii) Pulp cavity**.** **(1 mark)**

9. State and explain what happens to the thigh muscles in case of oxygen debt when one is running.

(2marks)

10. a) Name the method by which the following excretory products are removed from plants.

i) Excess water..... **(1 mark)**

ii) Carbon (IV) Oxide from respiration..... **(1 mark)**

b) Identify the plant excretory product obtained from raw paw paw fruits and used as a meat tenderizer. **(1 mark)**

11. An experiment was carried out to study the effect of pH on hydrolysis of starch by saliva. The results are shown in the table below.

Test tube	pH	Time taken (Min)
1	8	1
2	7	4
3	6.5	12
4	6	10
5	3	

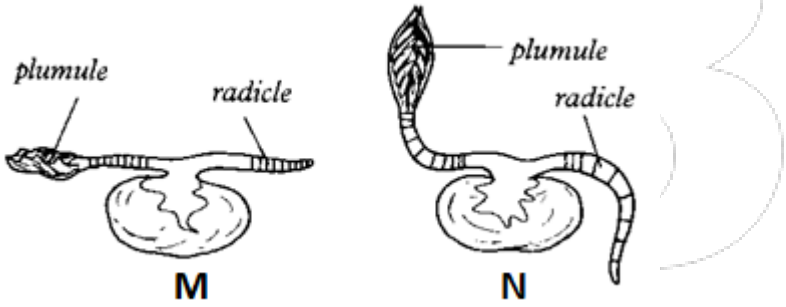
a) At what PH value was hydrolysis of starch most rapid? **(1 mark)**

b) What is likely to be the time taken to hydrolyse starch in test tube 5. **(1mark)**

c) Starch is hydrolysed by Ptyalin present in the saliva. Explain why the activity of ptyalin stops in the stomach. **(2marks)**

12. Explain how the human sperm cell is structurally adapted to perform its function. **(2marks)**

13. In an experiment, a seedling was placed in a horizontal position as shown if figure **M** below. After 48 hours, the set up was as shown in figure **N**.



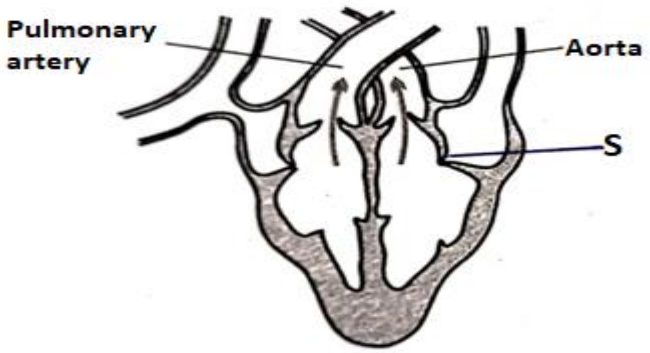
a) Name the response exhibited by the radicle of the seedling**.** **(1 mark)**

b) Explain how the plumule formed a curvature upwards. **(3 marks)**

14. a) If fruit flies with broad abdomens were crossed with those having narrow abdomens, all the offspring in F1 generation had broad abdomens. Using letter **A** to represent the gene for abdomen size, write the genotypes of the parents**.** **(2 marks)**

b) In the F2 generation, 150 fruit flies had narrow abdomens. How many fruit flies with broad abdomen were in the same generation? (Show your working) **(2 marks)**

15. The diagram below shows a state of the mammalian heart during a heartbeat.

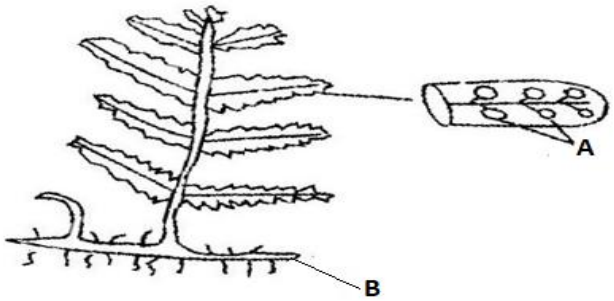


a) i) Identify the stage of the heart beat cycle illustrated in the diagram. **(1 mark)**

ii) Give **two** reasons for your answer. **(2 marks)**

b) Name the valve labelled **S.** **(1 mark)**

16. The diagram below represents a fern plant.



a) To which division does the plant belong? **(1 mark)**

b) Name the parts labelled **A** and **B**. **(2 marks)**

c) Give **two** differences between a fern plant and a moss plant. **(2 marks)**

17. During germination of seeds, there is production of heat.

a) Name the process that leads to heat production in the seeds. **(1 mark)**

b) Describe how heat is produced by germinating seeds. **(3 marks)**

18. Below are photographs of plants taken at different times of the day.


6:00 am


12:00 pm

a) Give a term used to describe the nature of cells obtained from the plant at:

i) At 6.00am **(1 mark)**

ii) At 12.00pm **(1 mark)**

b) Explain the significance of drooping of leaves in plants. **(2 marks)**

c) Name the tissue that provides support in herbaceous plants. **(1 mark)**

19. a) Apart from protection of underlying tissues, give **two** other functions of the mammalian skin. **(2 marks)**

b) Explain what makes the cornified layer of the skin to offer protection against mechanical injury. **(1 mark)**

20. Name **two** mechanisms that hinder self-fertilization in flowering plants. **(2 marks)**

21. Explain why growing grass dies a few days after salt is sprinkled on it. **(2 marks)**

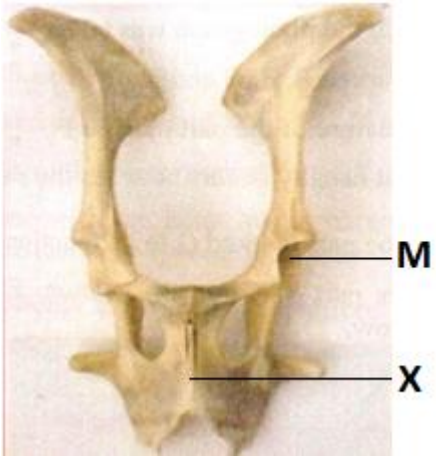
22. List **three** differences between the nervous system and endocrine system. **(3 marks)**

23. Name the tissue in plants that carries out the following functions:

a) Leads to primary growth**.** **(1 mark)**

b) Manufacture of food. **(1 mark)**

24. The diagram below represents a mammalian bone from the appendicular skeleton.



a) Identify the bone **(1 mark)**

b) State the function of the part labelled **M**. **(1 mark)**

c) Explain how the part labelled **X** is adapted to its function**.** **(2 marks)**

25. Give **three** functions of diffusion in living organisms. **(3marks)**

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KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 9

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
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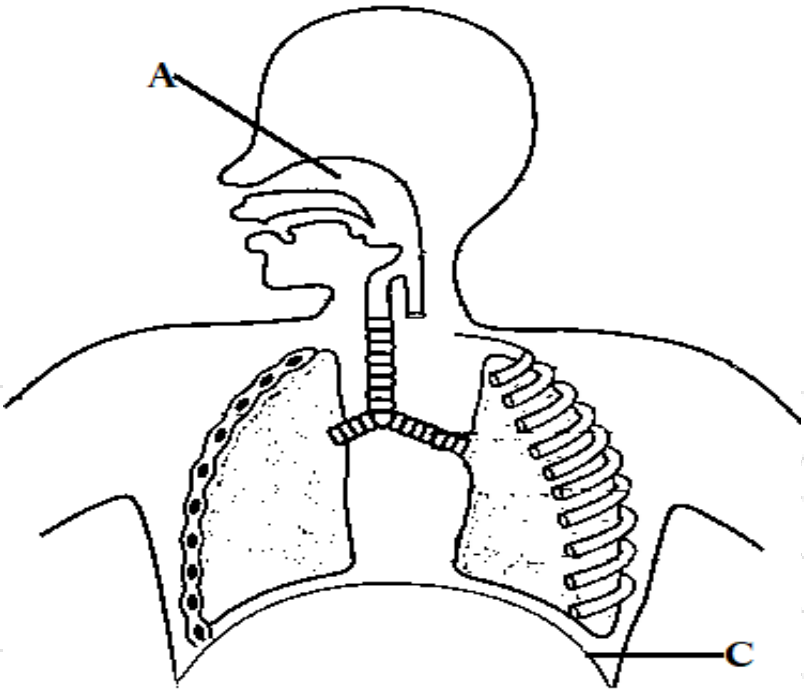
SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

*Answer **all** the questions in this section in the spaces provided.*

1. The diagram below represents the human respiratory system.

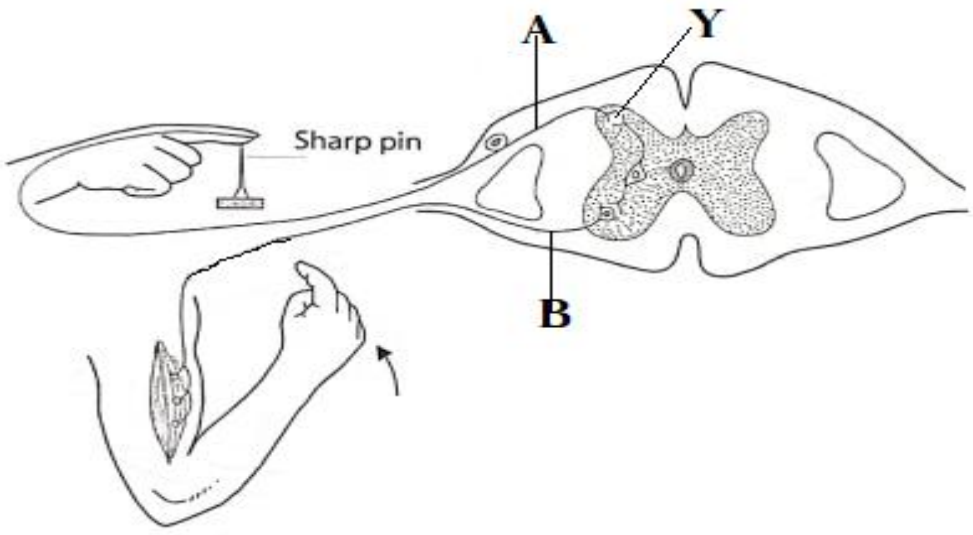


a) How is structure labelled **A** adapted to its function? **(4 marks)**

b) What would be the effect of contractions of the muscles of the structure labelled C during breathing in. **(3 marks)**

c) Give the scientific name of the organism that causes whooping cough? **(1 marks)**

2. The diagram below represents a section of the spinal cord.



a) State ***one*** structural and functional differences between **A** and **B**. **(2 marks)**

Structural

Functional

b) State ***three*** differences between a simple and a conditioned reflex? **(3 marks)**

c) Explain how an impulse is transmitted across region **Y**? **(3 marks)**

3. Form 3 students were assigned to study a particular ecosystem around the school.

a) Distinguish between an ecosystem and ecological niche. **(2 marks)**

b) Name a suitable method they would have used to estimate the population of wild animals. **(1 marks)**

c) State ***three*** methods which could be used to determine the diet of the wild animals.**(3 mrks)**

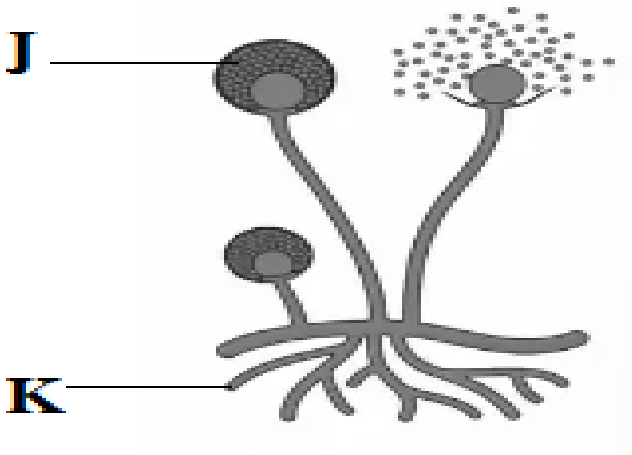
d) Name biotic factors that could have regulated the animal population? **(2 marks)**

4. a) How is sex in humans determined. **(3 marks)**

b) In human, hairy ears is controlled by a gene on the Y chromosome. Using letter Y^H to represent the chromosomes carrying the gene for hairy ears, work out a cross between a hairy eared man and his wife. **(4 marks)**

c) Girls will not display hairy ears, explain. **(1 mark)**

5. The diagram below illustrates the structure of bread mould.



a) State the function of the structure labelled K. **(2 marks)**

b) Describe the mode of reproduction. **(5 marks)**

c) State any ***one*** economic importance of members of this kingdom **(1 mark)**

SECTION B

Answer question 6 (compulsory) and either question 7 or 8 in the space provided after question 8.

6. In an experiment carried out in a tropical country, carbon (IV) oxide concentration was measured around a plant in an open air at two hours in travels for a period of 24 hours. The results were as shown in the table below.

Time	%of co2 concentration($x10^{-2}$)
3am	3.40
5am	3.60
7am	3.90
9am	3.20
11am	2.95
1pm	2.90
3pm	2.90
5pm	2.92
7pm	3.02
9pm	3.10
11pm	3.20
1 am	3.30
3 am	3.40

a) Plot a graph of % carbon (IV) oxide concentration against time on the grid provided. **(5 marks)**

b) Calculate the rate of change in CO_2 concentration between 4 a.m. and 7 a.m. **(2 marks)**

c) Give a reason for the change in CO_2 concentration between:-

i) 7 a.m. to 11a.m **(2 marks)**

ii) 12 noon to 4 p.m. **(2 marks)**

iii) 5p.m. and 5 a.m. **(3 marks)**

d) With reasons identify ***three*** environmental factors that are likely to affect the results. **6 mks)**

e)

7. Describe how the male reproductive system is adapted to perform its functions. **(20 marks)**

8. Explain the role of the following hormones in growth and development:

(a) (i) Indole acetic acid. **(5 marks)**

(ii) Gibberellin. **(5 marks)**

(iii) Cytokinnin. **(5 marks)**

(b) Describe role of hormones in insect metamorphosis. **(5 marks)**

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 10

231/1

BIOLOGY

PAPER 1 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

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FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
	80	

*Answer **ALL** the questions*

1. Name the reagent used for testing presence of **(3 marks)**

(a) Starch
(b) Reducing sugars
(c) Vitamin c

2. State the processes which occur in each of the following organelles. (2 **marks**)

(a) Chloroplast
(b) Mitochondrion
(c) Ribosomes

3. A student observed a specimen through a light microscope. He used the objective lens marked X40.If he indicated the magnification of the image as x 400, what was the eye - piece magnification?(Show your working). (3 **marks**)

4. State the function of the following in mammalian trachea. (3 **marks**)

(a) Rings of cartilage

(b) Mucus

(c) Cilia

5. (a) What do you understand by the term biological control? (1 **mark**)

(b) Explain why all the energy produced by producers does not flow to the tertiary consumers. (2**marks**)

6. Name any three forces that maintain the transpiration stream (3 **marks**)

7. Give the form in which the following gases are transported in blood. (3 **marks**)

(a) Oxygen

(b) Carbon (IV) oxide

(c) Carbon (II) oxide

8. (a) Name the main group of organisms which comprise the Kingdom Monera. (1**mark**)

(b) State any three ways in which the organisms named in 8 (a) above affect human lives. (3**marks)**

(d) State the main characteristics of Monera which distinguish it from all other kingdoms. (1 **mark)**

9. Seed germination is affected by certain plant growth regulators.

Describe two actions of gibberellins during seed germination (2**marks**)

10. Why is it necessary for an athlete to breathe heavily after running? (2 **marks**)

11. State ways in which the following diseases can be prevented

(a) Typhoid (2 **marks)**

(b) Malaria (2 **marks**)

12. A person fell from the third floor of a storey building and had part of his brain damaged indicate the part of the brain damaged if the person suffers from the following 4**marks**)

I. Loss of memory and speech……

II. Inability to regulate body temperature……

III. Irregular heartbeat and breathing……

IV. Inability to maintain proper body balance and posture……

13. (a) Name the main product of the dark stage of photosynthesis. (1**mark**)

(b) What is the role of chlorophyll during photosynthesis (2**mark**)

14. Name three mechanisms that prevent self-pollination in flowers that have both male and female parts. (3 **marks**)

15. State three applications of anaerobic respiration. (3 **marks**)

16. What is the significance of highly folded inner membrane of a mitochondrion? (2 **marks**)

17. Why is it necessary for blood from the gut to pass through the liver before joining general circulation? (2 **marks**)

18. A person's urine tested positive for reducing sugars.

(a) Name the type of sugar present in the urine. (1**mark**)

(b) Name the gland and the hormone which failed to control the above condition. (2**marks**)

Gland

Hormone

(c) Which disease was the person suffering from? (1**mark**)

19. State two roles played by the process of reproduction. (2**marks**)

20. (a) Name the genetic disorder in humans that is characterized by inability of blood to clot (**1mark)**

b)A female human was found to have an extra sex chromosome in her cells.

I.Give the total number of chromosome in the male individuals cells **(1mark)**

II.Explain the possible causes of this condition **(2marks)**

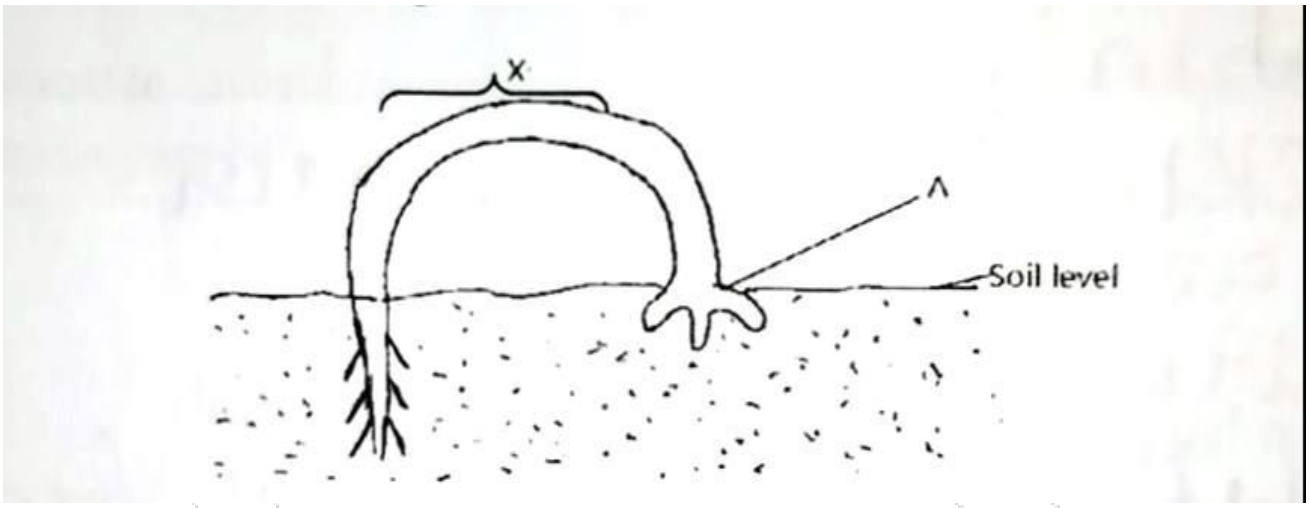
III. State two physical characteristics observed in the male individual with such a condition **(2marks)**

21. (a) State ways in which molars are adapted to their functions. 2**marks**)

22. (a) Explain why fossil records as evidence of organic evolution are usually incomplete(3 **mks**)

(b) Name the evidence of organic evolution exhibited by occurrence of similar amino acid molecules in a range of organisms **(1mark)**

23. The diagrams below represent germination of a certain seed



a) Name the type of germination exhibited by the seedling above **(1mark)**

b) Name the region labeled x **(1mark)**

c) Explain how the part labeled x of the seedling straightens after exposure to sunlight **(3marks)**

24. State any one characteristic common to all living organism? (1**mark**)

25. (a) State one event that occurs in prophase of meiosis I which does not occur in prophase of mitosis. (1 **mark**)

(b) What are the results of the above phenomena? (2 **marks**)

26. Explain why growing grass die a few days when salt is sprinkled on it. (3**marks**)

KCSE 2023 FINAL PREDICTION

EXPECTED TRIAL 10

231/2

BIOLOGY

PAPER 2 (THEORY)
TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

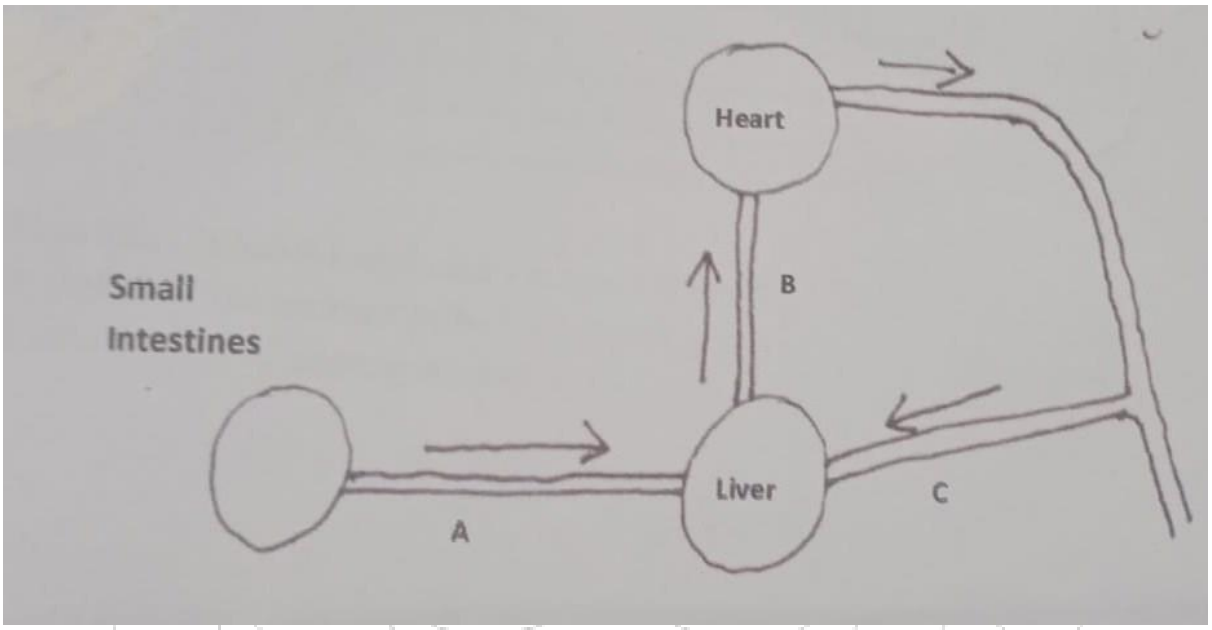
- *This paper consists of **TWO** sections A and B.*
- *Answer **ALL** questions in section A in the spaces provided*
- *In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8*

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1-5	40	
B	6	20	
	7/8	20	
	TOTAL	80	

SECTION A 40 MARKS

1. The diagram below illustrates circulation in certain organs of the mammalian body.



(a) Identify the blood vessels represented by A, B and C. **(3mks)**

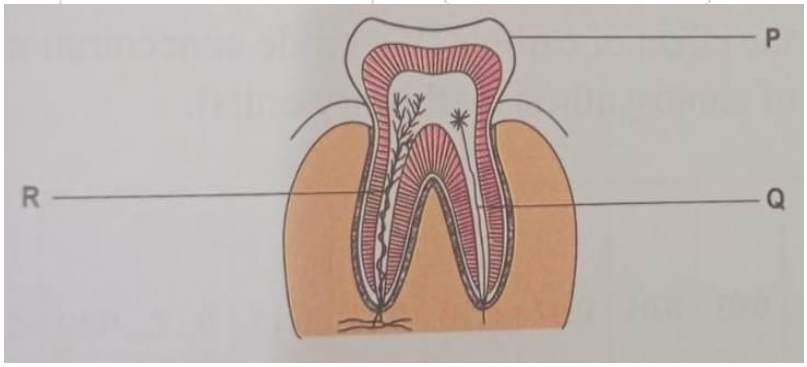
(b) Explain why blood from the small intestines goes to the liver before it goes to any other organ of the body**.** **(2mks)**

(c) Compare the blood in vessels B and C (1mk)

B - **C -**

(d) Outline how a glucose molecule in vessel A finally reaches the heart. **(2mks)**

2. The diagram below represents a section through a human tooth.



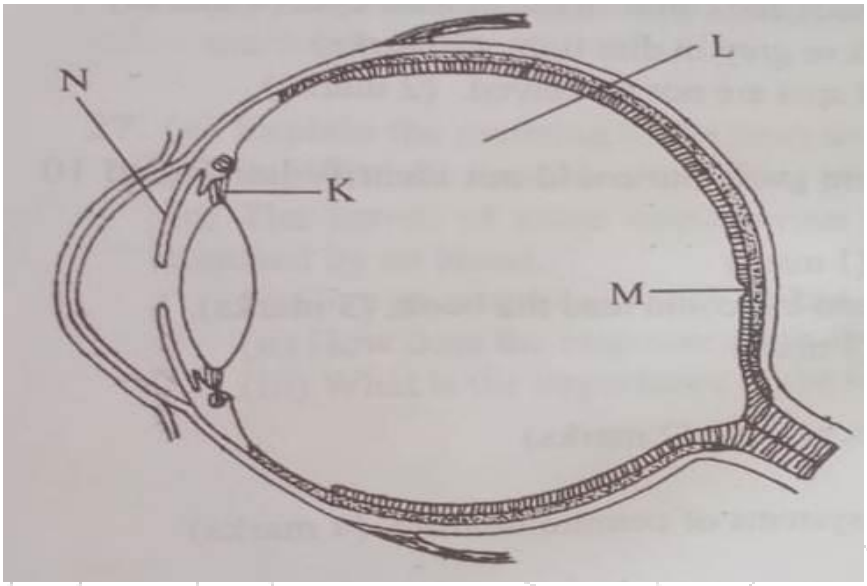
i) Name the type of tooth shown **(1mk)**

ii) Give a reason for your answer (i) above**.** **(1mk)**

iii) Name the structures **P, Q, R.** **(3mks)**

iv) State three ways of keeping teeth healthy. **(3mks)**

3. The diagram below represents a longitudinal section through the human eye.



(a) Name the structures labeled K and L **(2mks)**

(b) State the changes that would occur in the structure labeled N when a person in a dark room switches on the lights**.** **(2mks)**

(c) Name the part labeled M and state how it is adapted to its function**.** **(2mks)**

(d) How does the human eye obtain nutrients? **(2mks)**

4. An investigation was carried out to study the effects of the concentration of sucrose solutions on pieces of tulip stem 44mm in length. The pieces were placed in different concentrations of sucrose solutions and measured after two hours of immersion. The results are shown in the table below.

Sucrose concentration (moles per litre)	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Length after 2 hours (mm)	50	48	46	44	42	42	42

(a) Explain the effects of the 0.2 moles per litre sucrose solution on the length of the pieces of tulip stem**.** **(3mks)**

(b) Use information from the table to predict the concentration of a sucrose solution isotonic to the cells in the tulip stem**.** **(1mk)**

(c) (i) Give the term which would be used to describe the cells in the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre**.** **(1mk)**

(ii) Draw the appearance of a cell from the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre. **(2mks)**

(d) State one role of the process being investigated in plants/ **(1mk)**

5. (a) How many sex chromosomes are there in each human somatic(body) cell. **(1mk)**

(b) What is meant by the term sex-linkage? **(1mk)**

(c) Haemophilia is due to a recessive gene. The gene is sex linked and located on the X chrosome. In a family where both parents were normal, one of the sons was haemophiliac.

(i) Using letter H for normal blood clotting gene, work out the genotype of the children. **(4mks)**

(ii) What is the probability of a child born by this couple being a boy and haemophiliac. **(4mks)**

(d)Explain why haemophilia is more common in males than in females. **(1mk)**

SECTION B (40MARKS)

Answer questions 6(compulsory) and either question 7 or 8:

6. The mean dry weight in milligrams of germinating barley grains was worked out for whole grain, endosperm and the embryo. The means were determined at two day intervals for twelve days. The results are shown in the table below;

Time in days	Dry weight of whole grain (mg)	Dry weight of endosperm (mg)	Dry weight of embryo (Mg)
0	49	45	6
2	46	42	6
4	44	35	9
6	42	24	17
8	40	12	25
10	41	8	32
12	45	8	40

(a) Using the same axes, draw graphs for dry weight of endosperm, embryo and the total dry weight against time. **(7mks)**

(b) What was the average dry weight of the embryo on day 9**?** **(1mk)**

(c) Account for the dry weight of;

(i) Endosperm from day 0 to 12. **(4mks)**

(ii) Whole grain from day 0 to 12. **(4mks)**

(d) Other than water which other factors are necessary for germination. **(2mks)**

(e) Name the two types of germination. **(2mks)**

7. (a) Describe the mechanism of opening and closing of the stomata using the following theories. **(12mks)**

a) Photosynthetic theory.

b) Starch sugar inter-conversion theory.

c) The potassium ion theory.

(b)Explain how respiratory surfaces in animals are adapted to their functions**.** **(8mks)**

8. (a) Define pollution**.** **(2mks)**

(b) Describe water pollution under the following:-

(i) Causes **(6mks)**

(ii) Effects of pollutants on plants and animals**.** **(6mks)**

(iii) Methods of controlling pollution **(6mks)**