KCSE 2025 TOP SCHOOLS MOCKS

BIOLOGY

(MOCKS EXAMS 1-10)

To encourage academic excellence, top-performing national schools collaborate on the "National Schools" joint mock exam compilation. The goal of this collaborative effort is to push students and enhance their readiness for national exams through the use of challenging tests. The goal of participating schools' resource and strategy sharing is to raise student achievement and promote an achievement-focused culture.

KEY TO SUCCESS!

For Marking Schemes

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MWALIMU CONSULTANCY

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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 CANDIDATES

a) *Write your name, admission number, date, and signature and school name in the spaces provided.*

b) *Answer all the questions.*

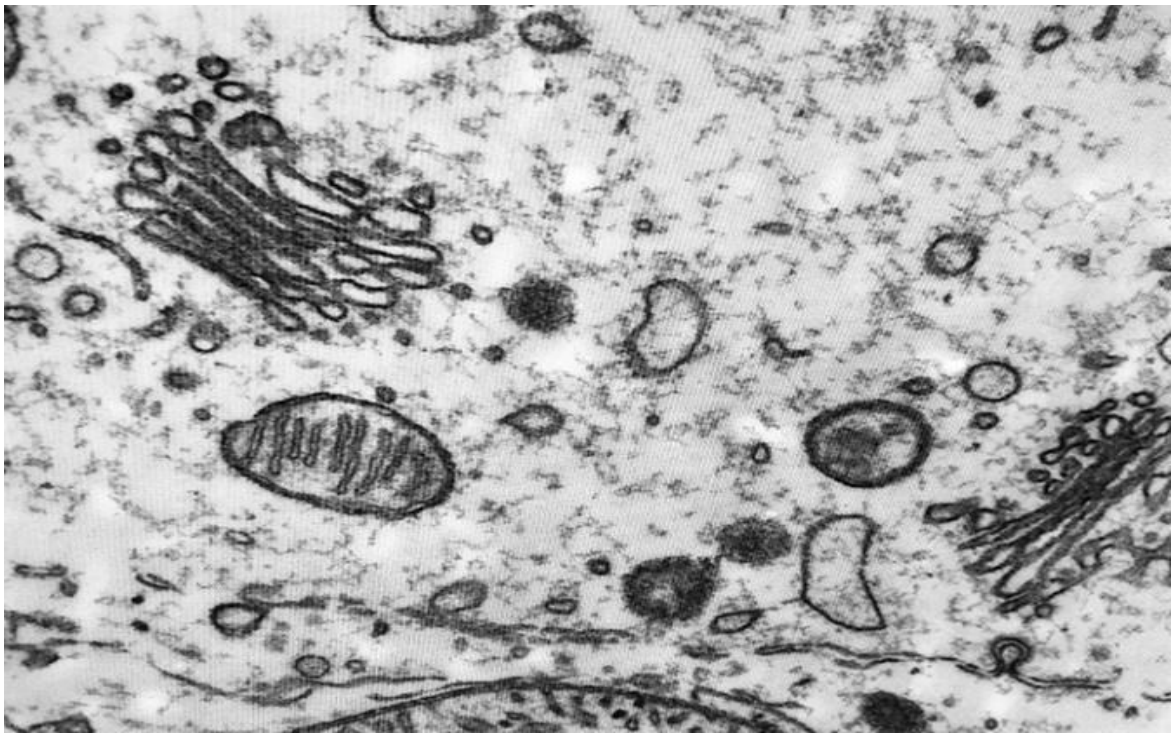
c) *Answers must be written in spaces provided.*

FOR EXAMINERS USE ONLY

SECTION	MAXIMUM SCORE	STUDENTS SCORE
1-24	80	

Answer all the questions

1. The photomicrograph shown below is a section of a cell



a) Using the letters provided, label the organelle that: **(2mks**

i) Is found in high number in kidney cells (**KC**)

ii) Is abundant in secretory glands (**SG**)

b) State the importance of cytoplasmic streaming to a cell **(1mk**

2. An athlete experienced a muscle cramp after a sprint race

a) Name the acid that accumulated in her muscles to bring about the discomfort **(1mk**

b) Describe the fate of this acid when the athlete takes a rest **(2mks**

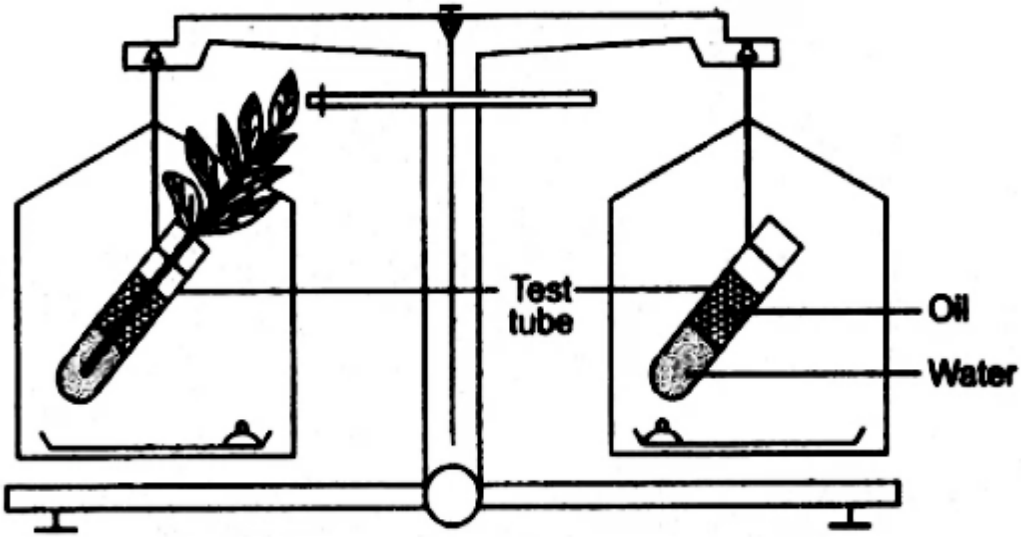
3. State the functions of the following cells **(3mks**

i) Sertoli cells

ii) Interstitial cells

iii) Guard cells

4. The experimental set up shown below was placed in the sunshine for 2 hours to study a particular phenomenon in plants



a) What is the expected result after the 2hours of experiment? **(1mk**

b) Account for the answer given in a) above **(2mks**

c) What is the expected result if the experiment was done under high humidity? **(1mk**

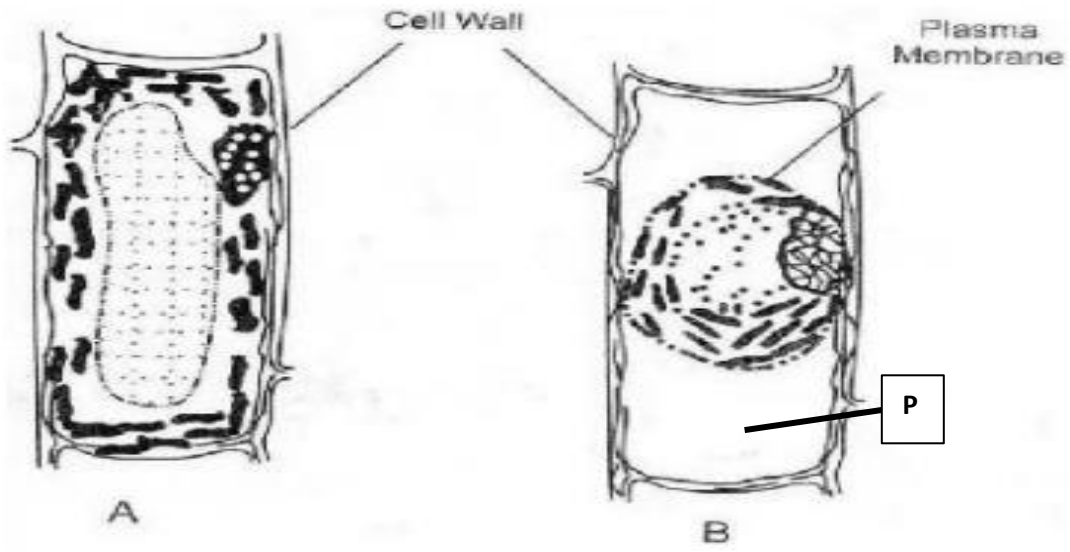
5. Name **(2mks**

a) A cell in the human body that lacks mitochondria

b) A Kingdom whose members lack mitochondria

6. Fill the table below to show differences between guttation and transpiration **(2mks**

7. A plant cell was placed in solution **X** and after a while it appeared as cell **B** shown below



a) Which **TWO** features show that cell **B** is plasmolysed? **(2mks**

b) Which process facilitated the presence of solution **X** in part **P**? **(1mk**

c) What is the nature of solution **X**? **(1mk**

8. Name the tissue that forms the following hormones **(2mks**

a) Glucagon ……

b) Progesterone ……

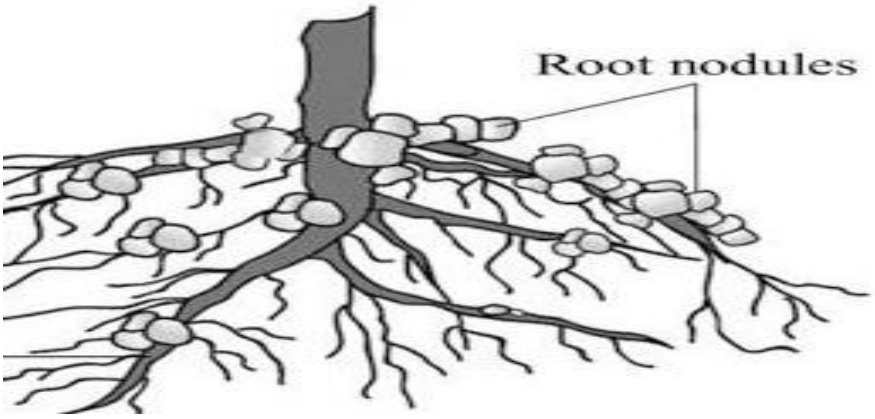
9. Learners suspected that a liquid they found in the laboratory contained starch

a) Describe a procedure they will use to determine whether starch was present **(2mks**

b) State the expected colour change for them to conclude that starch was present **(1mk**

c) What is the advantage of plants storing carbohydrates as starch? **(1mk**

10. The diagram below shows the root of a leguminous plant



a) Name the bacterium found in the root nodules **(1mk**

b) How are the bacteria named in a) important to the legume? **(1mk**

11. The following data was collected from study of same crop grown in different temperature

Plot ID	Temperature(°C)	Yield (kg)
A	19	115
B	22	146
C	27	132
D	30	94

a) Which is the ideal temperature for the growth of this crop? **(1mk**

b) Account for the yield obtained in plot **D** **(2mks**

12. Explain the ways by which movement of the ovum is achieved along the oviduct. **(2mks**

13. a) Name the salivary gland found beneath the tongue **(1mk**

b) Outline **TWO** ways in which saliva is suited to its function **(2mks**

14. The picture below shows a disorder that affects blood vessels in humans

a) Name the disorder shown above **(1mk**

b) Which blood vessel is affected by this disorder? **(1mk**

15. A tall garden pea plant was crossed with a dwarf garden pea plant.

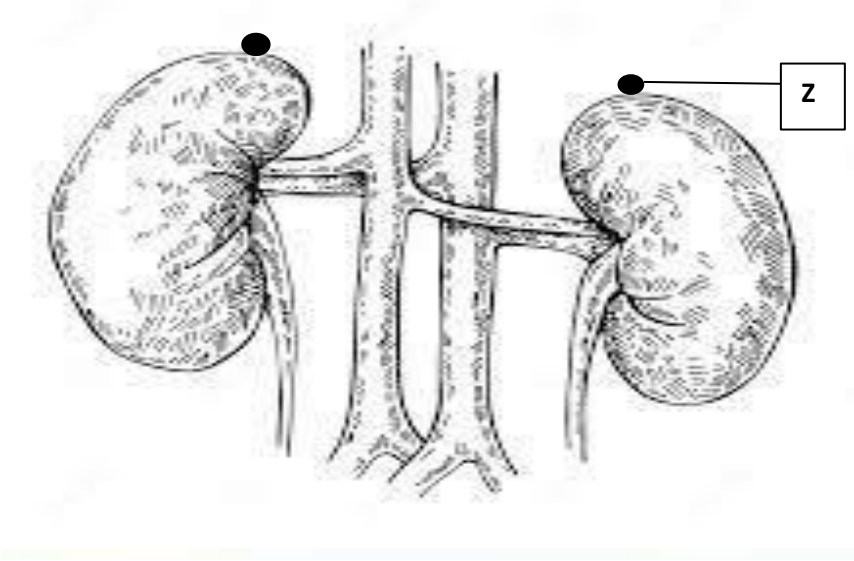
a) Given that the allele '**d**' for dwarfness is recessive, write the genotype of the offspring if the tall garden pea used was: **(2mks**

i) Pure breed **……**

ii) Heterozygous **……...**

b) Write the base sequence of the DNA from which the messenger-RNA shown below was derived. **ACUGAACCGUAU** **(1mk**

16. Use the illustration shown below to answer the questions that follow



a) Why is the right kidney slightly pushed higher up compared to the left kidney? **(1mk**

b) Explain how gland labelled **Z** help raise amount of Sodium ions (Na+) in the blood **(2mks**

17. The illustration shown below is of a common organism

a) Why is the above organism medically important globally? **(2mks**

b) Name the class to which the organism belongs. **(1mk**

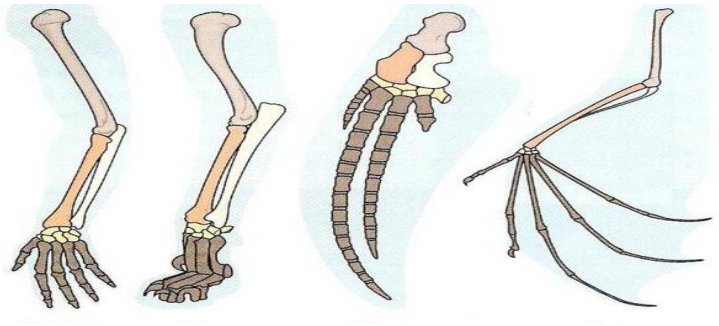
c) Give **TWO** reasons for your answer in b) above **(2mks**

18. How are the following significant to the development of seeds

a) Seed dormancy **(2mks**

b) Seed dispersal **(2mks**

19. Use the images shown below to answer questions that follow



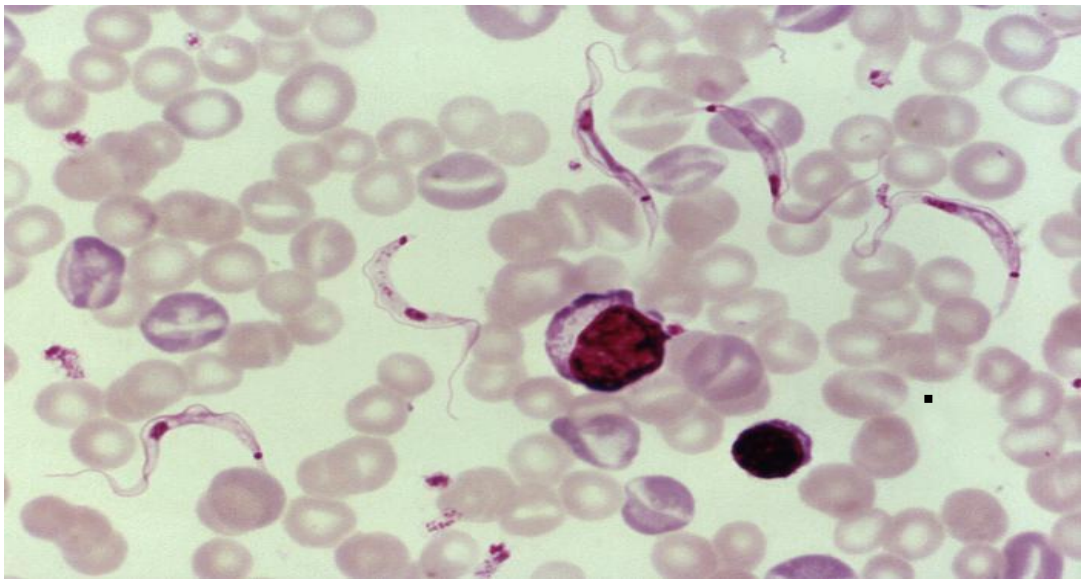
a) Why are the structures above said to be homologous structures? **(1mk**

b) Which type of evolution is represented above? **(1mk**

c) What is the significance of the type of evolution named in b) to animals? **(1mk**

20. A protein has 100 amino acids. Calculate the number of nitrogenous bases in the gene for this protein **(2mks**

21. Study the photomicrograph shown below and answer the questions that follow



100µm

a) Name the parasite shown in the photo above **(1mk**

b) Which organism is the vector of the parasite? **(1mk**

c) Calculate the magnification used to obtain the image shown above **(3mks**

22. a) Name the chemical form in which the following are transported in the blood **(2mks**

i) Carbohydrates

ii) Carbon (IV) Oxide

b) Explain why transfusion of blood from a blood group **B** donor to a recipient with blood group **A** may be fatal. **(2mks**

23. Use the photograph shown below to answer questions that follow

a) Explain the role of prothoracic gland during this phase of metamorphosis **(2mks**

b) State the significance of this process to the life of the insect **(1mk**

24. An animal has 6 molars, 2 canines, 4 incisors and 6 premolars in the lower jaw while the upper jaw has 6 molars, 4 premolars, 0 incisors and 2 canines in the upper jaw

a) What is the significance of absence of incisors in the upper jaw to the feeding of the animal **(2mks**

b) Write the correct dental formula for the animal **(1mk**

c) Why do such animals have a longer alimentary canal? **(2mks**

25. Describe double fertilization in flowering plants **(4mks**

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KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 1

231/2

BIOLOGY

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

1. *Write your name, admission number, school and sign in the spaces provided above.*
2. *Answer all the questions in the spaces provided.*
3. *This paper contains **two sections** **A** and **B**. Answer **ALL** questions in section **A**. In section **B**, answer question **6** **(Compulsory)** and **EITHER** question **7** **or** **8**.*

FOR EXAMINERS USE ONLY

Section	Question	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total score	80	

SECTION A: 40MKS

Answer All the Questions

1. A cross between red flowered plant and white flowered plant produced plants with pink flowers. Using letter **R** to represent the gene for red color and **W** to represent white color;

a. Work out a cross between F_1 **plants** **(4mks)**

b. Give the;

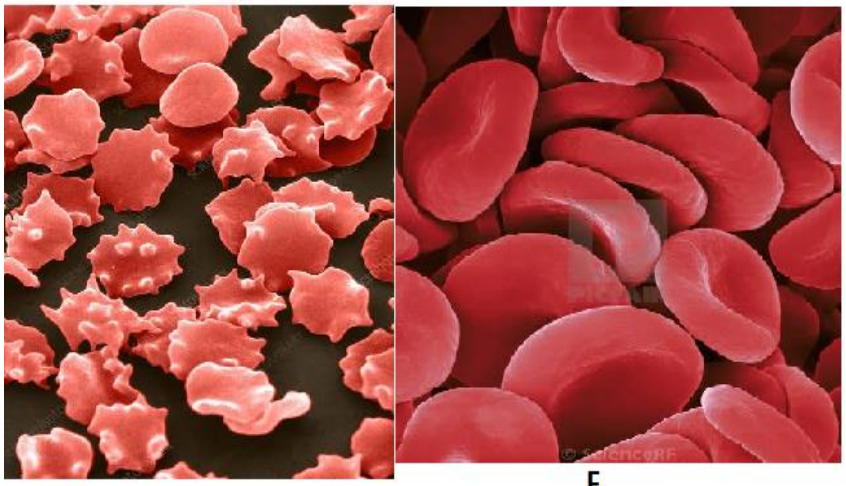
i. Phenotypic ratio of F_2 **plants** **(1mk)**

ii. Genotypic ratio of F_2 plants **(1mk)**

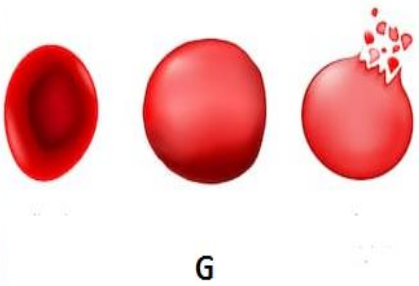
c. Name a characteristic in humans which is controlled by multiple alleles. **(1mk)**

d. Which is the biological term used to refer to the condition exhibited by F_1 plants**.** **(1mk)**

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



E F



G

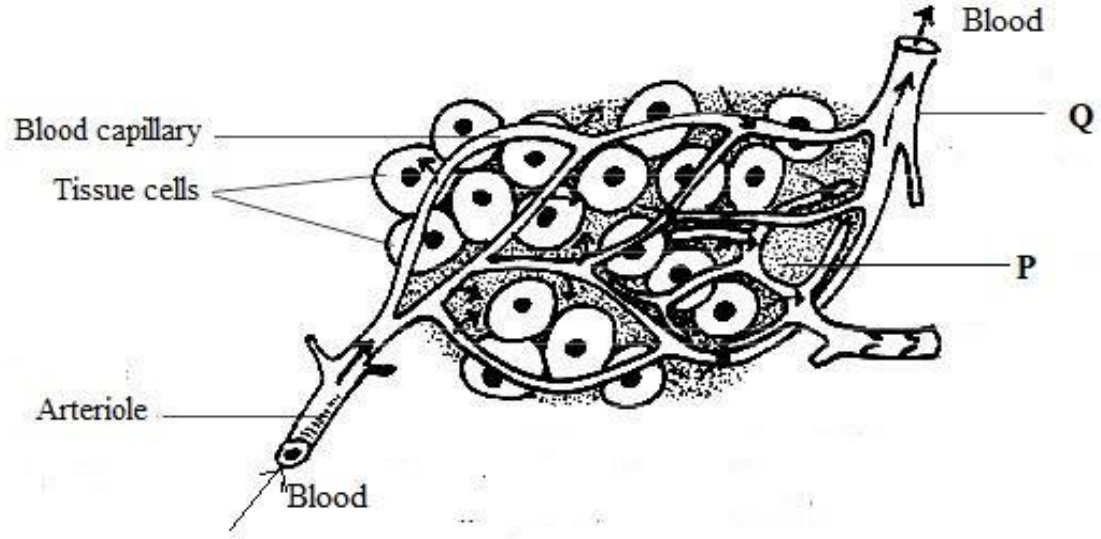
a) i)Identify the type of solution in which F was placed. **(1mk)**

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

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

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

3. The diagram below shows blood circulation in a mammalian tissue.



a. Name the parts labelled **P** and **Q.** **(2mks)**

b. Name the substances that are:

i. Required for respiration that move out of capillaries**.** **(1mk)**

ii. Removed from tissue cells as a result of respiration**.** **(1mk)**

c. Explain how substances move from the blood capillaries into the tissue cells**.** **(3mks)**

d. Name **one** blood component that is not found in the part labeled **P.** **(1mk)**

4. a. The diagram below represents a member of kingdom Animalia.

i. Name the phylum to which the organism belong. **(1mk)**

ii. Using observable features in the diagram, give **three** reasons for the answer in 4a (i) above.

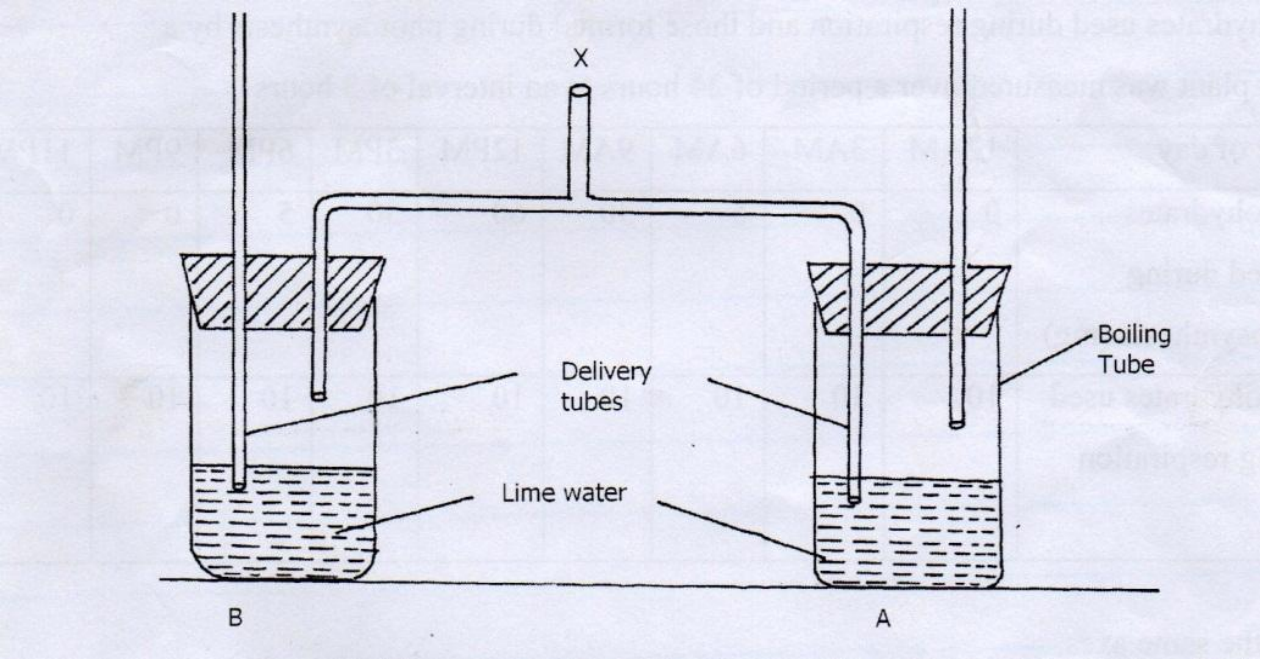
(3mks)

b. To estimate the population size of crabs in a certain lagoon, traps were laid at random. 400 crabs were caught, marked and released back into the lagoon on the first day. Four days later, traps were laid again at random. Out of the 374 crabs caught the second time, 80 were found to have been marked.

i. Calculate the population size of the crabs in the lagoon. **(3mks)**

iii. What is the name given to this method of estimating the population size**?** **(1mk)**

5. An experiment was set up as show below.



(a) A student blew air in and out through point X. Using arrows indicate how air gets in and out of the set up**.** **(2mks)**

(b) [i] In which of the tube would lime water form white precipitate first. **(1mk)**

ii] Give a reason. **(1mk)**

(c)What is the effect of lactic acid in the thigh muscle of an athlete after a short fast race? **(2mks)**

(d) Identify the type of muscle in human being where the formation and effect of lactic acid is not felt. **(1mk)**

(e) What is the biological significance of boiling milk. **[1mk]**

SECTION B: 40 Mks:

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

6. An experiment was carried out to investigate the effect of temperature on the rate of reaction catalyzed by an enzyme. The results are shown in the table below.

Temperature ^{0}c	Rate of reaction in mg of product per unit time
5	0.2
10	0.5
15	0.8
20	1.1
25	1.5
30	2.1
35	3.0
40	3.7
45	3.4
50	2.8
55	2.1
60	1.1

(a) On the grid provided draw a graph of rate of reaction against temperature. **(6marks)**

(b) When was the rate of reaction 2.6 mg of product per unit time? **(2 mks)**

(c) Account for the shape of the graph between

(i) 5^0 C and 40^0 C **(2 mks)**

(ii) 45^0 C and 60^0C **(3 mks)**

(d) Other than temperature name **two** ways in which the rate of reaction between 5^0C and 40^0C could be increased. **(2 mks)**

(e) (i) Name one digestive enzymes in the human body which works best in acidic condition **(1 mk)**

(ii) How is the acidic condition for the enzyme named in (e) (i) above attained? **(2 mks)**

(f) The acidic conditions in (e) (ii) above is later neutralized

(i) Where does the neutralization take place? **(1 mk)**

(ii) Name the substance responsible for neutralization **(1 mk)**

7. Describe:

a. How the structure of mammalian heart is adapted to its function. **(15mks)**

b. The process of blood clotting. **(5mks)**

8. a) After a meal of carbohydrate, the glucose level in the blood rose to 150mg/ cm^3 . Explain the role of the liver in bringing the sugar level down back to normal. **(8mks)**

b) Explain six importance of plants excretory products**.** **(12mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 2

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

1. *All Questions are Compulsory*
2. *Write your Answers in the Spaces Provided*
3. *Wrong Spelling of Technical Terms shall be Penalized*

MAX SCORE	STUDENT'S SCORE
80	

Answer All the Questions

1.a) Define the term specimen. **(1mk)**

b) Give two significances of collecting specimens in biology. **(2mks)**

2. Give three reasons why *Drosophila melanogaster* is considered suitable for use in genetic experiments. **(3mks)**

3. List two factors you would consider before selecting a microscope for use in a biological study. **(2mks)**

4. A group of form two students placed a fresh leaf in warm water. They observed that air bubbles formed on the surface of the leaf.

a) What biological process were they investigating? **(1mk)**

b) Name the structures from which the air bubbles were coming from. **(1mk)**

c) Explain the distribution of the structures named in (b) above on the leaf surfaces of an aquatic plant. **(2mks)**

5. Differentiate between hydrolysis and condensation. **(2mks)**

6. (a) Which sets of teeth would be used in chewing sugarcane for maximum extraction of sap? **(2mks)**

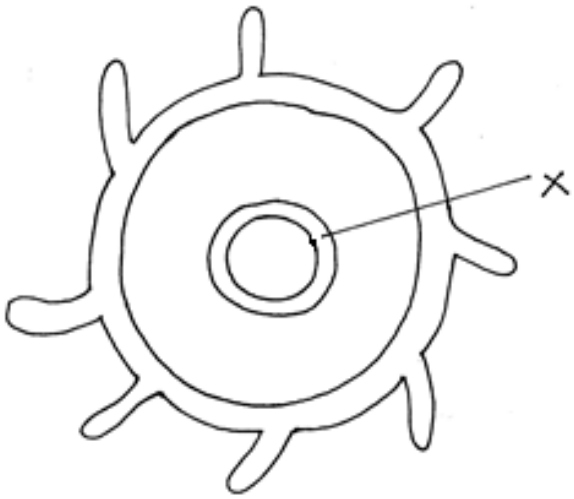
(b) What is the advantage of heterodont dentition over homodont dentition? **(1mk)**

(b) During digestion name the enzyme that acts on the sugarcane sap and give the final products. **(2mks)**

Enzyme

Final products

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



a) The part labelled X turned blue black after iodine solution was applied on the cut cross section of the above specimen

i) Name part X **(1mks)**

ii) Give a reason for your answer. **(1mks)**

b) State two phenomenons of stomata which reduce the rate of transpiration. **(2mks)**

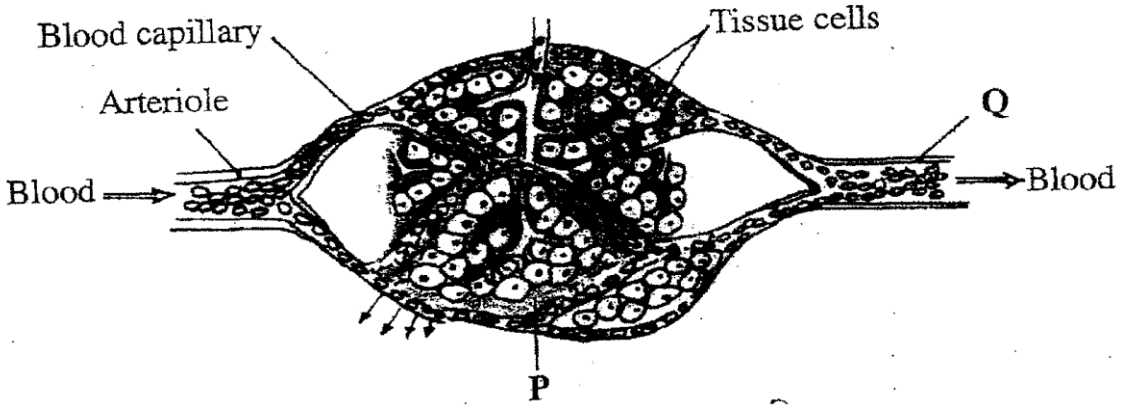
8. a) What is respiratory quotient? **(1mks)**

b) Explain why it is difficult to measure respiratory quotient in plants. **(2mks)**

9. Study and complete the table below. **(3mks)**

Character	Monocot	Dicot
a) Number of stamens		
b) Arrangement of vascular bundle in stem		
c) Type of root		

10. The diagram below shows blood circulation in a mammalian tissue.



a) Give the name of the above section of the blood circulation system. **(1mks)**

b) Explain two the adaptation of the above section to its function. **(2mks)**

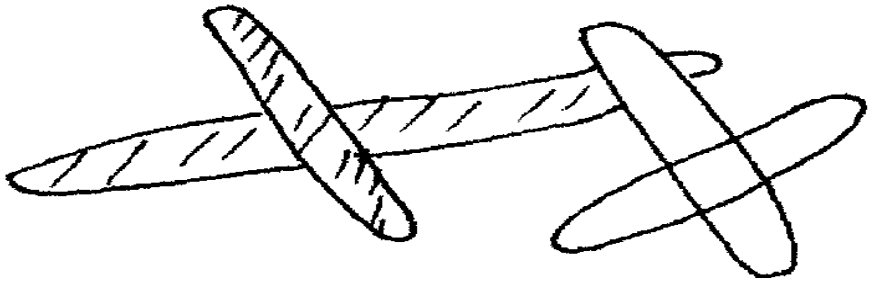
c) What is the name of blood vessel Q. **(1mk)**

11. Differentiate between dioecious and monoecious plants. **(2mks)**

12.a) Why does endosperm weight of a germinating seed decrease as the weight of the shoot increases. **(l mks)**

b) State three importance of the pupa stage of metamorphosis to insects. **(lmks)**

13. The diagrams below show a pair of homologous chromosomes. Study them and answer the questions that follow.



i) State the phenomenon shown above. **(lmk)**

ii. What is the genetic significance of the phenomenon above? **(lmk)**

iii. Name the type of mutation caused by the above phenomenon. **(2mks)**

14. In an experiment to determine the population of Tilapia fish in a school fish pond, students of Canada school decided to use capture-recapture method.

a) Name three vital tools the students would need for the exercise. **(3mks)**

b) State two factors that might affect the accuracy of their results. **(2mks)**

15. The table below show description of sizes of glomeruli and renal tubules of two animals, which are in different environments.

	Animal Q	Animal W
Glomeruli	Few	Many
Renal tubules	Long	Short

a) Name the likely environment in which each animal lives. **(2mks)**

Q –

W-

b) Suggest the main nitrogenous waste produced by animal W. **(lmk)**

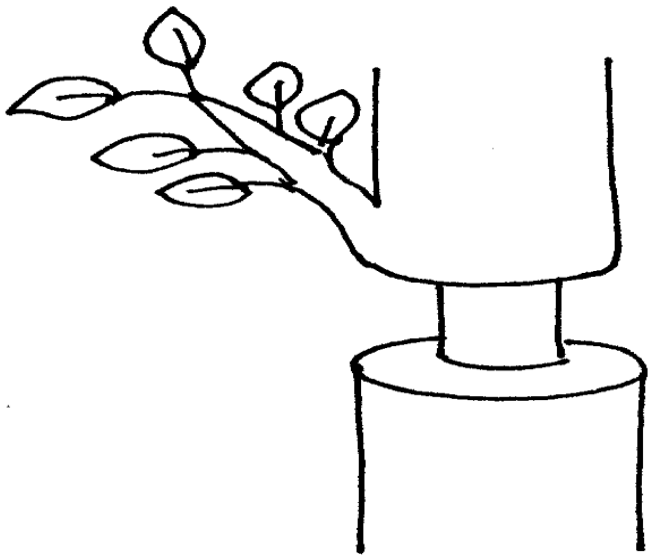
c) What is the importance of the renal tubules being long? **(lmk)**

16. What is the role of the following hormones in human reproduction?

i) Follicle stimulating hormone in male **(lmk)**

ii) Luteinizing hormone during menstrual cycle. **(lmk)**

17. Below is representation of an experiment that was carried out on a tree in Kayombe forest.



a) Which two tissues are removed in a ring bark experiment? **(2mks)**

b) Removal of the tissues above leads to some effects to the plant. Name these 2 effects. **(2mks)**

c) State and explain the observation that would be made in the plant above after some time. **(3mks)**

18. A section of nucleic strand contains the following sequence.

A — C — G — A — G — A — T — A— C

a) i) Write the complimentary DNA stand. **(lmk)**

ii) Write the mRNA strand of the strand in (a) above. **(lmk)**

b) Name the site for protein synthesis in a cell. **(lmk)**

c) State one disorder caused by non-disjunction mutation. **(lmk)**

19. i) State the importance of rings of chitin in the tracheal system of insects. **(lmk)**

ii) Explain the significance of maintaining a steep concentration gradient in the respiratory surfaces of animals. **(lmk)**

iii) Explain why a bony fish dies shortly after being removed from water. **(3mks)**

20. Explain why Lamark's theory of evolution is not accepted by modern scientist. **(2mks)**

21. Name the branch of biology that deals with;

a) Relationship between antelopes and gazelles in their environment. **(lmk)**

b) Study of Ebola virus. **(lmk)**

c) Explain what would happen if a given of living things lose their ability to reproduce. **(lmk)**

22. Explain the following when testing a leaf for starch.

i) Boiling the leaf in hot water. **(lmk)**

ii) Destarching **(lmk)**

iii) Boiling the leaf in methylated spirit. **(lmk)**

23. Explain why osmosis is a special type of diffusion. **(lmk)**

24. Explain three protective functions of the blood. **(3mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 2

231/2

BIOLOGY

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES:

1) *Write **your name** and **index number** in the spaces provided.*

2) *Answer **all** the questions in Section **A** in the spaces provided.*

3) *In section **B** answer questions **6** (compulsory) and either question **7** or **8** in the spaces provided*

FOR EXAMINER'S USE ONLY:

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	**80**	

SECTION A: (40 MARKS)

Answer all questions in the spaces provided.

1. The diagrams below show samples of blood obtained from two different persons **A** and **B**.

PERSON A

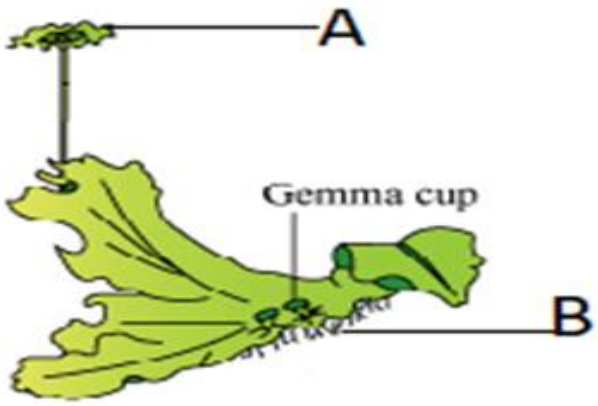
PERSON B

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

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

c) Work out the genotypes and phenotypes of the resulting offsprings of a marriage between person A and person B **(5 marks)**

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



a) Name the division to which the organism belongs giving two reasons for your answer**(3 marks)**

Division:**……**

Reasons**……**

b) Name the function of the parts labelled

A …… **(1 mark)**

B …… **(1 mark)**

c) State **three** differences between the process of fertilization in the above named division and in a flowering plant. **(3 marks)**

3a). Explain the meaning of the term tropism or tropic response . **1mk**

b) Explain how tendrils of climbing plants coil around a support**.** **4mks**

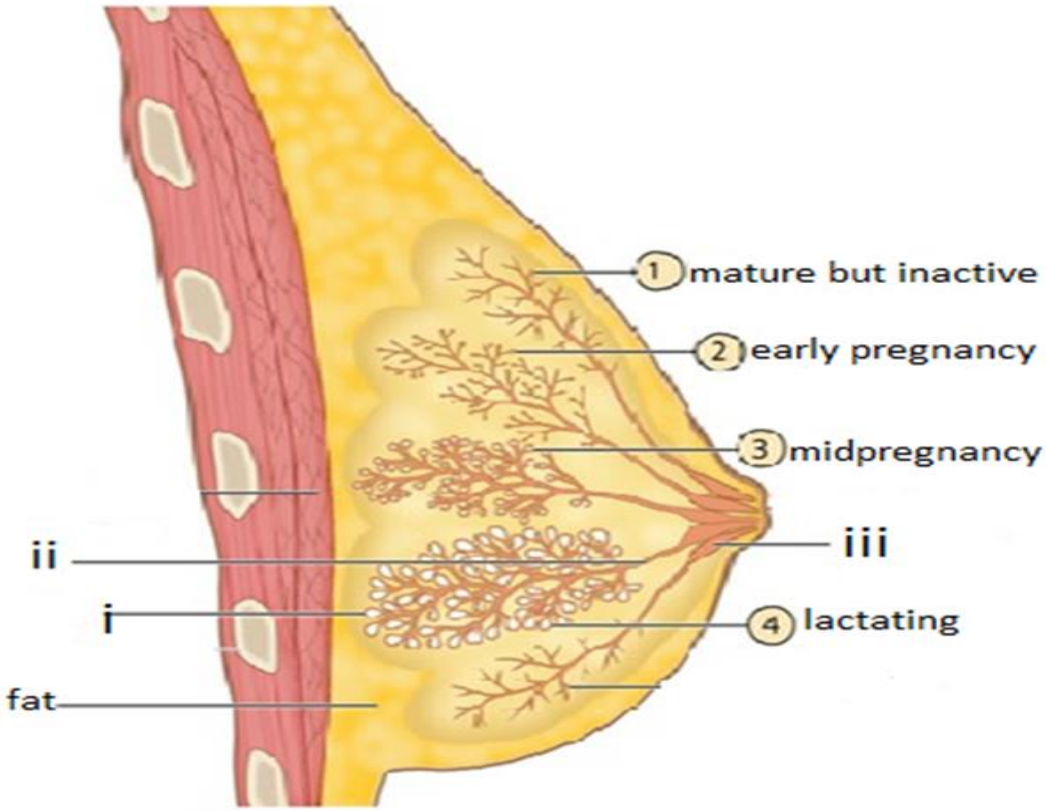
c) The leaves of some insectivorous plants make very rapid movements when they are touched byan insect.

i) Give an example of such plants. **1mk.**

Ii) How does the response come about? **1mk.**

iii) What is the importance of the response? **2mks**

4. The diagram below is a section from the mammalian body. Study and use it to answer the questions that follow.



a) Name the parts labelled;

(i)…… (1 mark)

(ii)……(1 mark)

(iii)……(1 mark)

b) Describe the process of milk letdown **(5 marks)**

5. (i)In an experiment, food sample A was respired by an organism and the gaseous product was directed into a test tube containing calcium hydroxide solution through a glass capillary tube. The same experiment was repeated using the same amount of food sample B. It was noted that it takes 15 minutes for the gaseous product of food sample A to turn calcium hydroxide solution white and 50 minutes by gaseous product of food sample B to do the same.

a) Suggest with a reason, the possible identity of food sample A and B **(4 marks)**

b) Suggest the possible identity of the gaseous product of food samples A and B**.** **(1 mark)**

ii) Explain how anaerobic respiration has been applied in making of beer and wines. **(3 marks)**

SECTION B: (40 MARKS

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

6. The table below shows results of an experiment in which small pieces of tradescantia stems were placed in different salt concentrations. After 6 hours they were removed from the solutions, wiped to dry and weighed. The results are as shown below. Study the table and answer the questions that follow.

Salt concentration (mg)	Percentage change in weight
2.5	+11
5.0	+8
7.5	+5
10.0	+3
12.5	+2
15.0	+1
17.5	-2
20.0	-8
22.5	-9.5
25.0	-11

a) i)Draw a graph of the percentage change in weight against salt concentration **(6 marks)**

ii) From the graph determine the salt concentration that is equal to the concentration of the tradescantia cell sap. **(1 mark)**

b) Account for the following changes in the weight.

(i) Percentage positive change **(4marks)**

(ii) Percentage negative change **(3 marks)**

c) Briefly describe how the above physiological process brings about upright posture in seedlings **(3 marks)**

d)i) Define the physiological process in (c) above **(1 mark)**

ii)State any **two** differences between the physiological process above and the physiological process that root hairs use to absorb mineral salts from a soil solution that is hypertonic to their cell saps **(2 marks)**

7.a) Explain the biological importance of abiotic factors in seed germination. **(12 marks)**

b) Explain the following evidences of organic evolution.

(i) Comparative anatomy **(5 marks)**

(ii) Geographical distribution **(3 marks)**

8.In terms of homeostatic balance in the body, describe the function of the following body systems in regulation of blood sugar level. **(20 marks)**

a) Digestive system

b) Circulatory system

c) Respiratory system

d) Nervous system

e) Hormonal system

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 3

231/1

BIOLOGY

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

a) *Write your **Name, Class** and **Adm no** in the spaces provided above.*

b) *Answer **all** the questions in this paper in the spaces provided.*

FOR EXAMINER'S USE ONLY:

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1 - 25	80	

QUESTIONS

1. (a) Define the term '**parthenocarpy**' in Biology. **(1mk)**

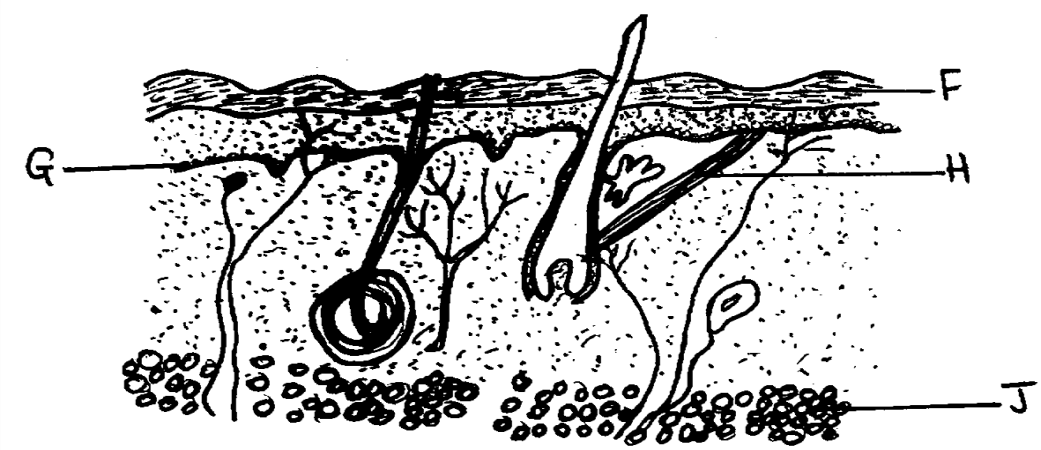
(b) Name **two** plant growth hormones that promote parthenocarpy. **(2mks)**

2. Name the organelle that performs each of the following functions in a cell

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

(ii) Transport of cell secretions. **(1mk)**

3. The diagram below shows a longitudinal section of mammalian skin.



a) Name the parts labelled **F** and **G.** **(2mrks)**

b) State **one** function of each of the parts labelled **H** and **J** **(2mrk**

4. Other than carbon (IV) oxide, name other products of anaerobic respiration in plants **(2mks)**

5. (a) Name the fluid that is produced by sebaceous glands. **(1mk)**

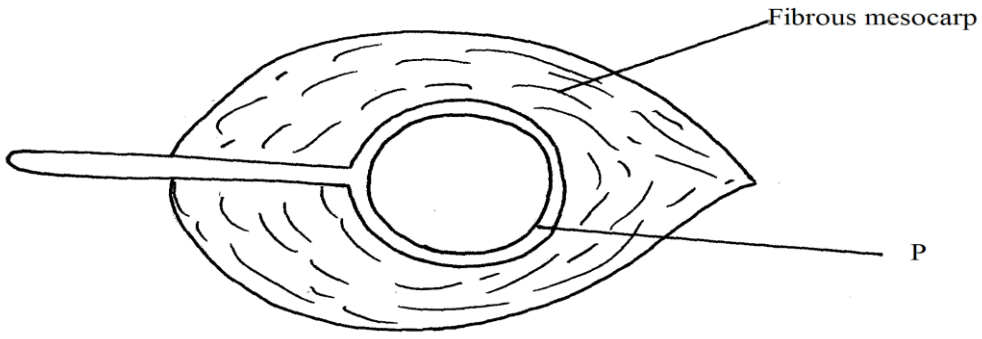
(b) State **two** functions of sweat on the human body. **(2mks)**

6. (a) State **two** characteristics that are used to divide the phylum arthropoda into classes. **(2mks)**

(b) Name the class with the largest number of individuals in the phylum Arthropoda. **(1mk)**

7. Why are people with blood group **O** referred to as universal donors? **(1mk)**

8. The diagram below represents a longitudinal section of a fruit



(a) Name structures labeled P **(1mk)**

(b) Describe two adaptations of the fruit for its mode of dispersal **(3mks)**

(i) Mode of dispersal

(ii) Adaptation

9. (a) What causes the following diseases?

(i) Diabetes mellitus. **(1mk)**

(ii) Diabetes insipidus. **(1mk)**

b) An individual shows the symptoms for diabetes mellitus, how would you determine in the school laboratory whether they are positive for the condition? **(3mks)**

10. In an attempt to estimate the number of weaver birds in a small woodland 435 were captured , marked and released. Three days later, 620 were captured 75 of which were marked.

a) What is the name of the sampling method described above? **(1mk)**

b) Calculate the approximate size of the weaver bird population in the woodland. **(2mks)**

c) Give one disadvantage of this method. **(1mk)**

11. Identify the nucleic acid whose base sequence is shown below.

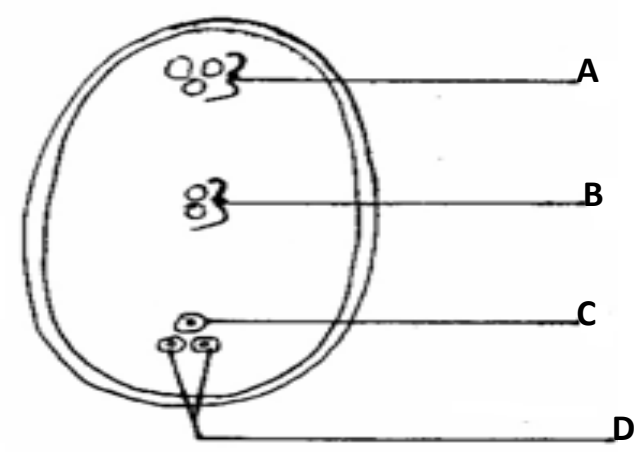
G-A-C-U-A-G-A-C-G

i) Identify the type of nucleic shown above **(1mk)**

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

iii) Write the base sequence of a DNA strand for the nucleic acid shown above **(1mk)**

12. The diagram **below** shows a mature embryo sac of a flowering plant.



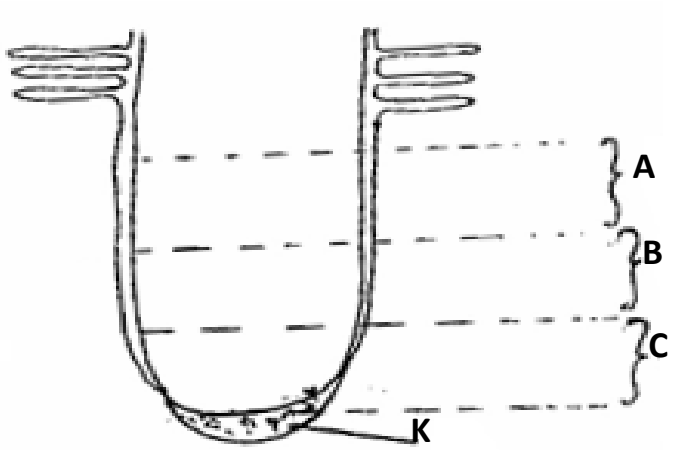
(a) Name the parts labeled **A** and **B** **(2mks)**

(b) What is the function of the structure labeled B? **(1mk)**

13. (a) Name the tissues that transport water in plants. **(1mk)**

(b) State why the tissue above is said to be dead. **(1mk)**

14. The diagram **below** shows regions of growth in a root. Study it and answer the questions that follow.



(a) Name the zone labeled **B** **(1mk)**

(b) State the function of part **K** **(1mk)**

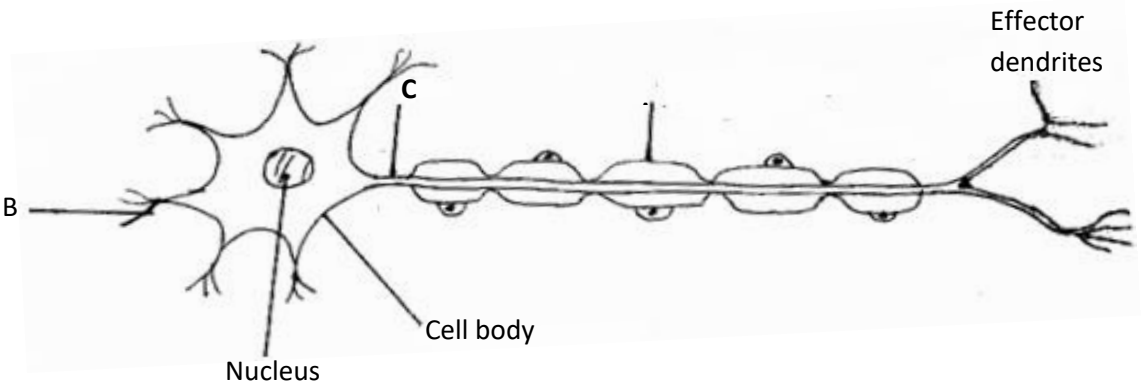
(c) State three characteristics of the cells found in zone **C** **(3 mks)**

15. The enzymes pepsin and trypsin are secreted in their inactive forms. Explain why they are secreted in these inactive forms. **(1mk)**

16. (a) Give two examples of natural selection in action. **(2mk)**

b) List three features that make man the most dominant species on earth. **(3mks)**

17. Study the diagram **below** of a neurone in human being.



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

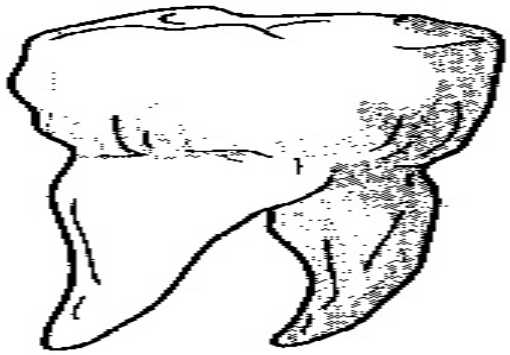
(b) Name the parts labeled.

A _____ **(1mk)**

B _____ **(1mk)**

(c) Using an arrow indicate the direction of movement of a nerve impulse along the neuron **(1mk)**

18. Study the diagram of the mammalian tooth **below** and answer the questions that follow.



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

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

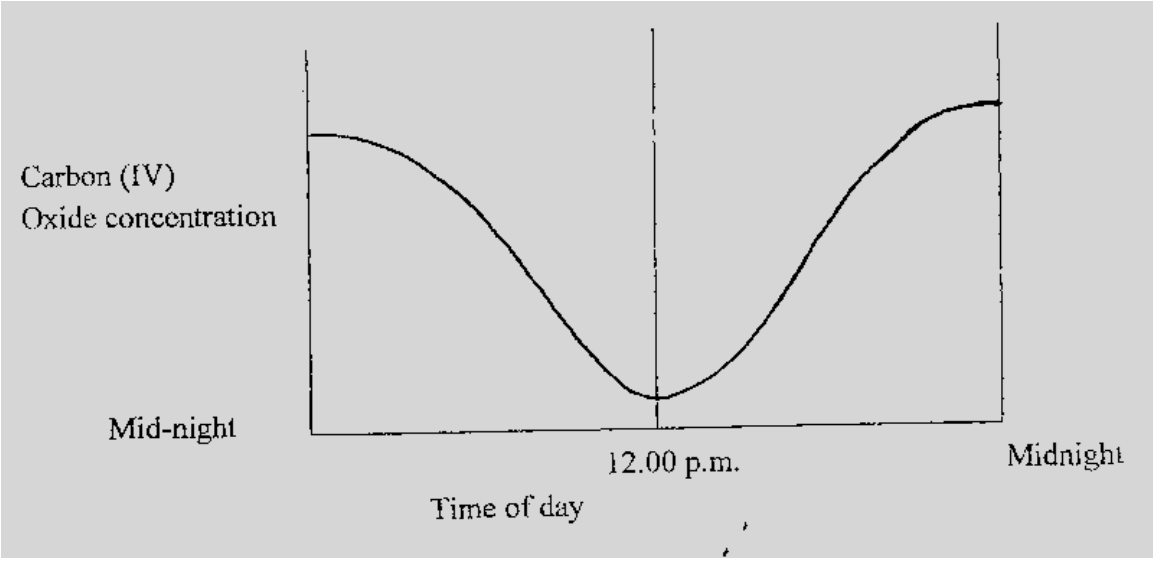
(c) State **one** adaptation of the tooth to its function. **(1mk)**

19.a) Name the part of the brain that regulates breathing **(1mk)**

b) Give two ways through which the body responds to increased concentration of carbon (IV) oxide in the blood **(2mks)**

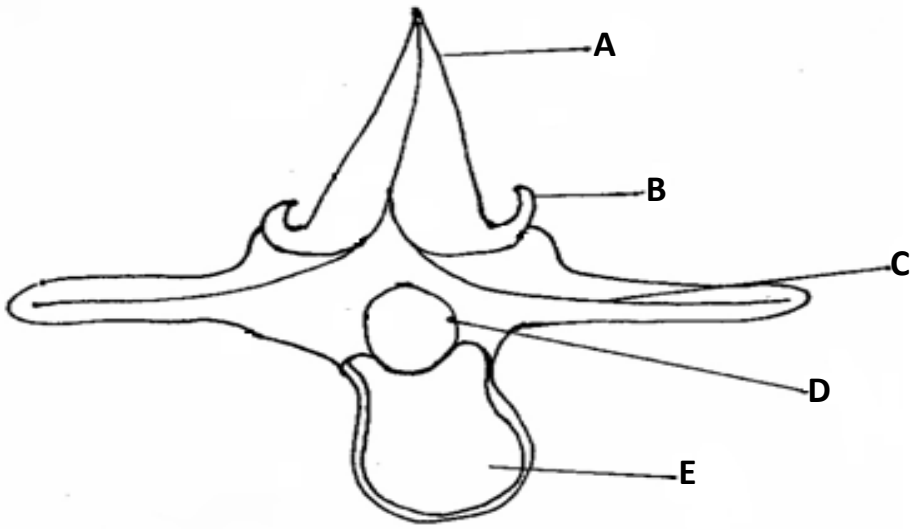
c) Name the structures in pneumatophores through which gaseous exchange occurs. **(1mk)**

20. The concentration of carbon (IV) oxide in a tropical forest was measured during the course of 24 hours period from mid-night to mid-night.



Account for the results obtained at mid day. **(2mks)**

21. The diagram **below** represents the anterior view of a certain vertebra.



(a) With a reason, identify the type of vertebra shown **above**. **(2mks)**

(b) Name the parts labeled.

(i) A _____ **(1mk)**

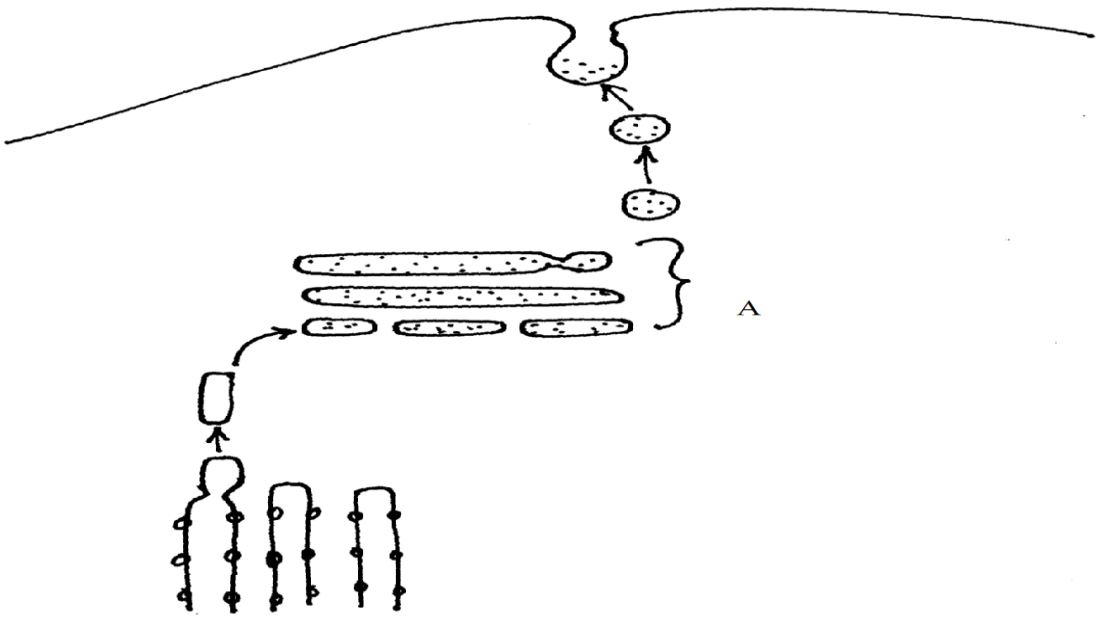
(ii) D _____ **(1mk)**

(c) State the function of part **E**. **(1mk)**

22. (a) State one similarity between diffusion and osmosis **(1mk)**

(b) State two factors that can reduce the rate of active transport **(2mks)**

23. Study the diagram below and use it to answer the questions.



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

b) Give three functions of the organelle named in (a) above **(3mks)**

24. It was found that during germination of pea seeds 9.3cm^3 of carbon (iv) oxide was produced while 9.1cm^3 of oxygen was used up.

a) Calculate the respiratory quotient (RQ) of the reaction taking place. **(2mks)**

b) Identify the type of food substance being metabolized. **(1mk)**

25. What is the biological importance of the larval stage during metamorphosis **(2mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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:-

- *Write your **name** and **adm number** in the spaces provided above.*
- *This paper consists of **two** sections; **A** and **B**.*
- *Answer **all** the questions in Section **A** in the spaces provided.*
- *In section **B**, answer question **6** (**compulsory**) and either question **7** or **8***

For Examiner's Use Only:

Section	Question	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7 or	20	
	8	20	
TOTAL SCORE		**80**	

SECTION A (40 Marks)

Answer all questions in this section in the spaces provided.

1. In human beings, a **downward pointed frontal hairline** ("windows peak") is a heritable trait. A person with windows peak always has at least one parent who has this trait; where as persons with **frontal hairline** may occur in families in which one or even both parents have windows peak. Using **W** and **w** to symbolize genes for this trait

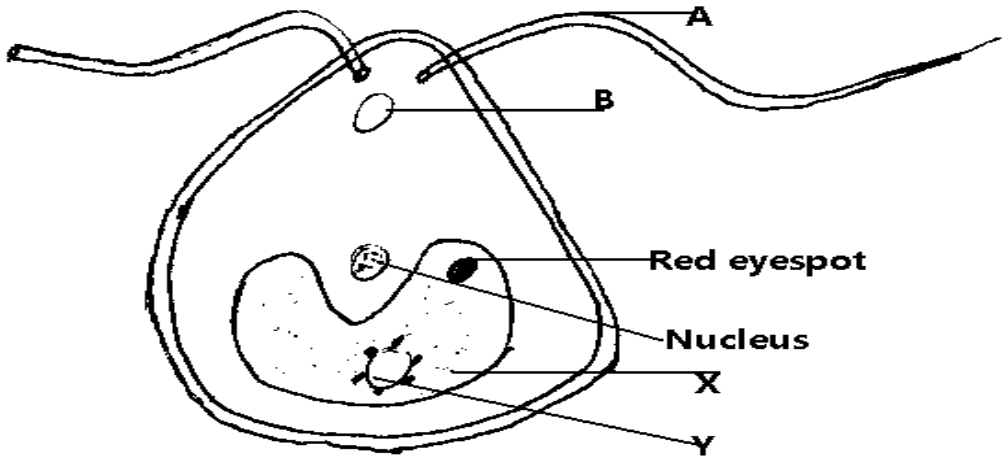
(a) Determine the F1 generation if a homozygous windows peak male parent is married to a homozygous frontal hairlined female parent **(4mks)**

(b) State two causes of variations **(1mk)**

c) Name two sex linked genetic disorders affecting human females and males **(2mks)**

(d) What is genome

2. The diagram below shows an organism obtained from an aquatic ecosystem



(a) State the kingdom in which the organism belongs. **(1mk)**

(b) Name the parts labeled **(1mk)**

B……

Y…… **(1mk)**

(c) State the functions of the following parts

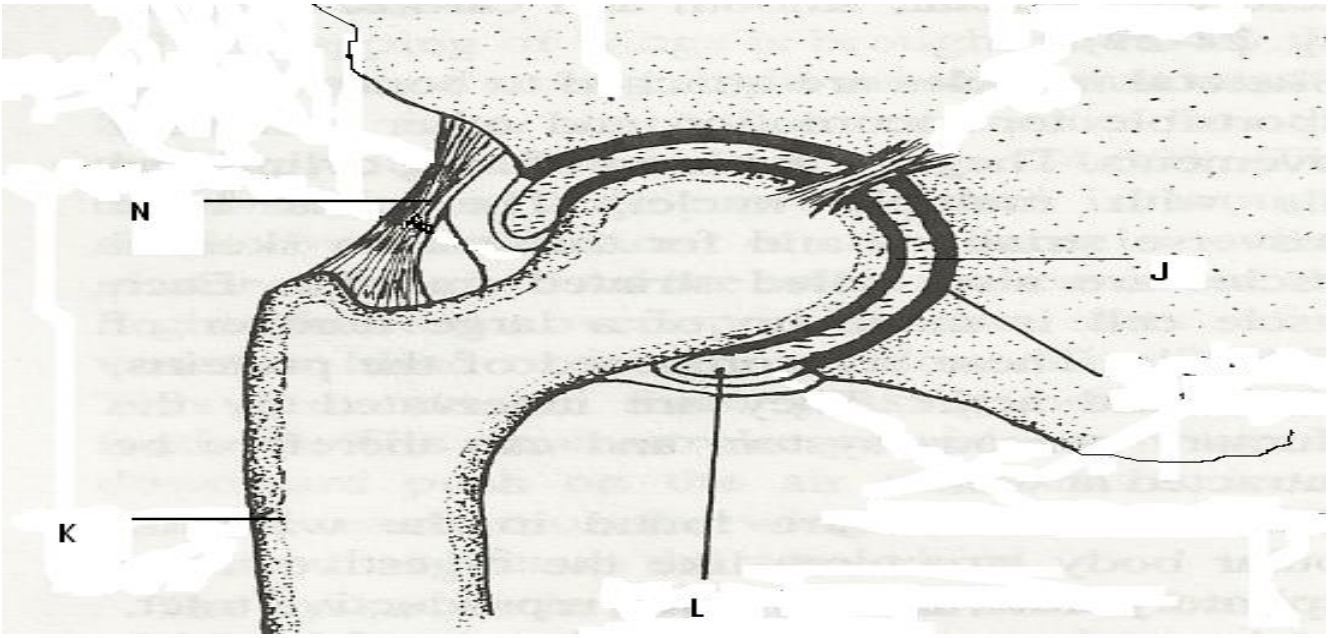
A **(1mk)**

X **(1mk)**

Z **(1mk)**

(d) Explain briefly why the organism is described as eukaryotic **(2mk)**

3a) The diagram below shows some of the features of a synovial joint. Study the diagram carefully and answer the questions that follow.



(a) Name the type of synovial joint. **(1 mark)**

(b) Name the parts labeled J, and L **(2 marks)**

(c) State **two** roles of the part labeled L**.** **(2 marks)**

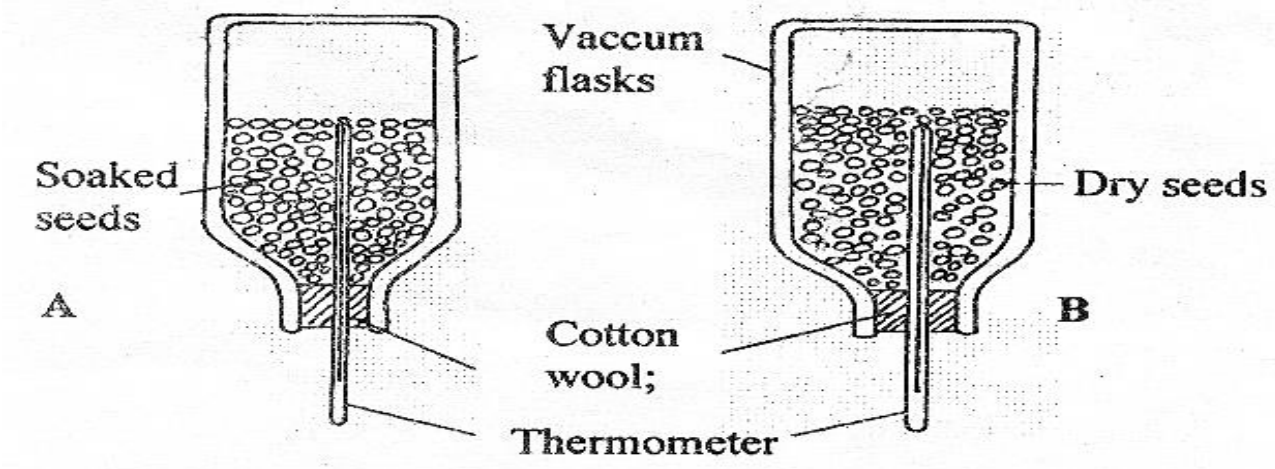
(d) Suggest **one** advantage of this type of joint. **(1 mark)**

b) State how the following tissues are adapted to provide mechanical support in plants **(2mks)**

i) Parenchyma

ii) Collenchyma

4. A student set up an experiment using soaked and dry seeds as shown below



a) State the objective of this experiment **(1mk)**

b) State the observations made in each of the flask after 24 hours **(2mks)**

c) Account for the observation made in (b) above **(2mks)**

d) Suggest why vacuum flasks were used in this experiment **(1mk)**

e) What alteration would you make in the set-up to make the results more reliable **(1mk)**

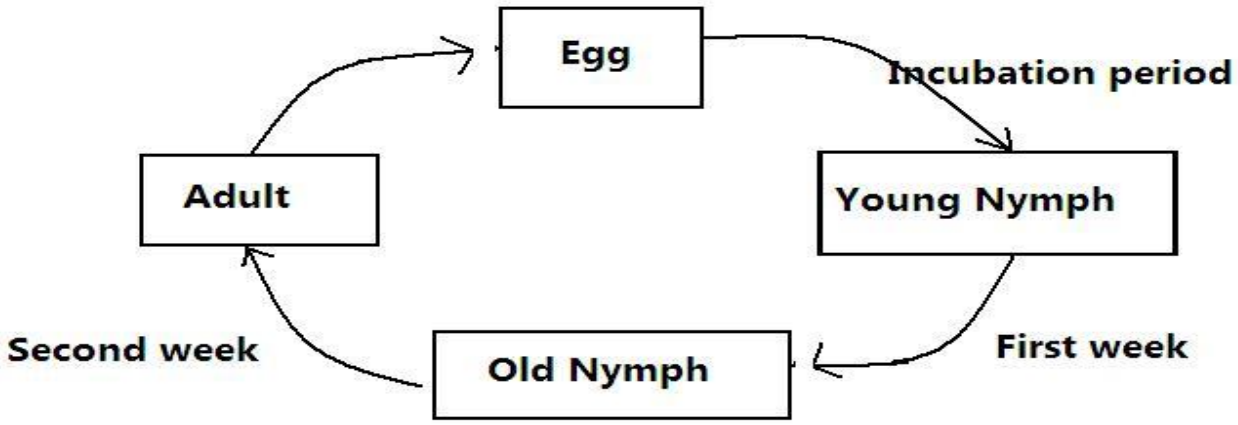
f) Why should the seeds be washed with antiseptic/10% formalin? **(1mk)**

5 a) Explain how the following meristematic tissues contribute to growth of higher plants

i) Vascular cambium **(2mks)**

ii) Cork Cambium **(2mks)**

b) The diagram below shows a life cycle of a cockroach



a) Name the hormone that would be at high concentration during.

(i) First week **(1mk)**

(ii) Second week **(1mk)**

b) Name the structure that produces hormone in a (ii) above **(1mk)**

c) Name the series of stages through which the nymph undergoes to reach adult stage **(1mks)**

SECTION B (40 Marks)

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

6. The menstrual cycle is a sequence of events repeated monthly in the female production system. The table below shows the concentration of oestrogen and progesterone hormones and body temperatures of female against time.

Time in days	Oestrogen mg/100cm of blood	Progesterone mg/100cm^3 of blood	Temperature in 0^oc
1	20	0	36.4
2	20.5	0	36.6
3	25	0	36.7
4	27.5	0	36.8
5	30	0	36.7
6	32.5	0	36.6
7	35	0	36.8
8	40	0	36.7
9	48	0	36.6
10	56	0	36.8
11	64	0	36.7
12	72	0	36.6
13	80	0	36.4
14	170	20	36.3
15	140	50	36.6
16	80	80	37.0
17	70	130	37.2
18	65	170	37.0
19	60	160	37.1
20	65	150	37.15
21	130	130	37.2
22	140	110	37.1
23	130	90	37.0
24	100	70	37.1
25	80	50	37.2
26	60	20	37.0
27	20	0	36.4

a). Using the same axis draw graphs of oestrogen and progesterone against time/days **(8mks)**

b) State the possible event taking place in the uterus during the first week? **(1 mark)**

c) State the events taking place in the ovary between day 1 and day 13. **(2 marks)**

d) Account for the sudden increase in the progesterone concentration between day 14 and day18. **(2 marks)**

e) Account for the change in temperature between day 14 and 17. **(1 mark)**

f) Account for the change of the curve of progesterone between day 19 and 27. **(2marks)**

a) State the function of the following.

(i) Ovary **(1mark)**

(ii) Progesterone **(1 mark)**

(iii) Oestrogen **(1 mark)**

7 a) Describe how the following evidences support the theory of organic evolution: geographical distribution, fossil records and comparative anatomy **(10mks)**

b) Explain tropic responses in plants and their survival values **(10mks)**

8 a) Describe the structural adaptations of mammalian heart to its Functions **(10mks)**

b) Explain the role of osmosis in organisms **(10mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 4

231/1

BIOLOGY

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- *Write your **name, Admission number and name of your school** in the spaces provided above*
- ***Sign** and write the **date** of examination in the spaces provided.*
- *Answer **all** the questions in the spaces provided.*

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-26	80	

*Answer **all** the questions in the spaces provided.*

1. a) Name the causative agents of the following diseases in humans.

i) Typhoid. **(1mk)**

ii) Amoebic dysentery. **(1mk)**

2. State the function of the following cell organelles.

i) Ribosome. **(1mk)**

ii) Lysosomes **(1mk)**

iii) Nucleolus. **(1mk)**

3.a) Name **one** defect of the circulatory system in humans. **(1mk)**

b) State **three** functions of blood other than transport. **(3mks)**

4.a) Distinguish between epigael and hypogeal germination in plants. **(2mks)**

b) Name the gland that secretes the following hormones. **(2mks)**

i) Ecdysone

ii) Juvenile

5.a) Give two sex linked genes found on the Y-chromosome. **(2mks)**

b) Below is a nucleotide strand

A	A	G	T	C

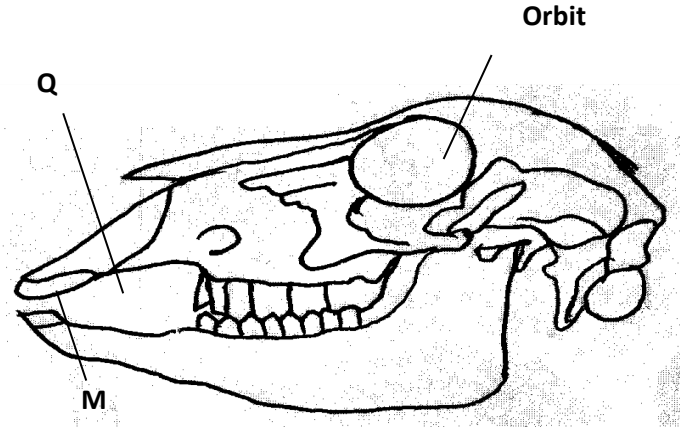
i) Identify the type of nucleic acid. **(1mk)**

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

6.a) Distinguish between homologous and analogous structures. **(2mks)**

b) Give **one** reason why organisms become resistant to drugs. **(1mk)**

7.The following specimen was extracted from a newly discovered organism.



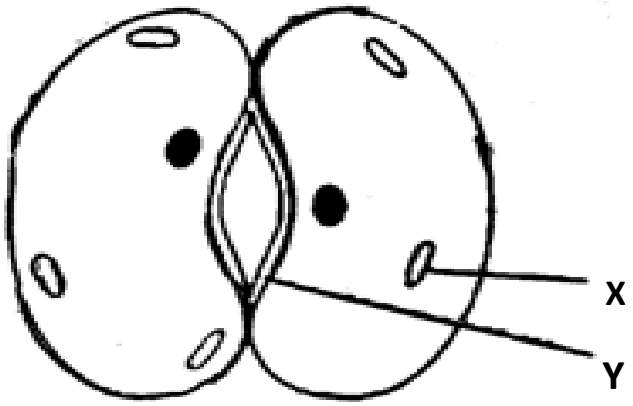
a) Name the tooth labeled **M**. **(1mk)**

b) Name the part labeled Q and state its role. **(2mks)**

Name

Role

8. The diagram below represents a cell organelle



a) Name the part labeled Y. **(1mk)**

b) State the function of the part labeled X. **(1mk)**

c) Explain how dark stage of photosynthesis is dependent on the light stage. **(2mks)**

9.a) Name **two** gaseous exchange surfaces in plants. **(2mks)**

b) What is the importance counter current flow system in fish? **(2mks)**

10. Form three students wanted to estimate the population in $5km^2$ grass field near a school compound. They captured 36 grass hoppers and marked them before returning them to the field. After a few days they made another catch of grasshoppers. They collected 45 grasshoppers out of which only 4 had marks.

a) Name the method of population estimation the students used. **(1mk)**

b) State **two** assumptions that were made by the students during the study. **(2mks)**

c) From the data, calculate the population size of grasshopper. **(2mks)**

11. State the functions of the following parts. **(2mks)**

i) a) Endometrium

b) Epididymis

ii) What mechanism facilities the movement of the ovum towards uterus. **(1mk)**

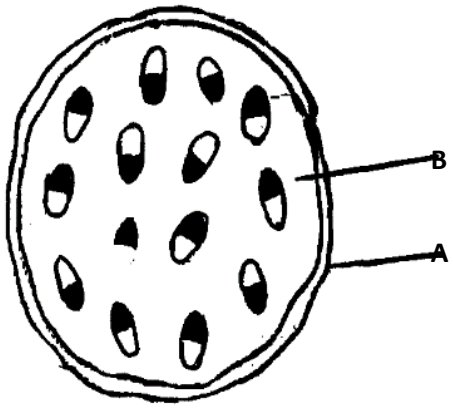
12.The diagram below represents the flow of energy in a food chain.

Sun → Grass → Antelope → Leopard → Bacteria → **P**

a) Suggest a reason why the energy labeled P does not enter food chain **(1mk)**

b) State **one** way in which energy is lost from the food chain. **(1mk)**

13. The diagram below represents the cross section of a part of a certain plant.



a) Name the class of the plant from which the section was taken. **(1mk)**

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

c) Name the parts labeled **A** and **B**. **(2mks)**

12. State **two** reasons why the study of biology is important. **(2mks)**

14. State the economic importance of the following plants excretory procedures. **(3mks)**

a) Caffeine

b) Quinine

c) Colchicine

13. Define the following terms

a) Irritability **(1mk)**

b) Stimulus **(1mk)**

14.A process that occurs in plants is replaced by the equation below

$$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + CO_2 + \text{Energy}$$

a) Name the process. **(1mk)**

b) State the importance of the process named in a) above. **(2mks)**

15. a) What is Binomial Nomenclature? **(1mk)**

b) State **two** rules that are followed when printing scientific names. **(2mks)**

16. Name **three** strengthening tissues in dicolyledonous plants. **(3mks)**

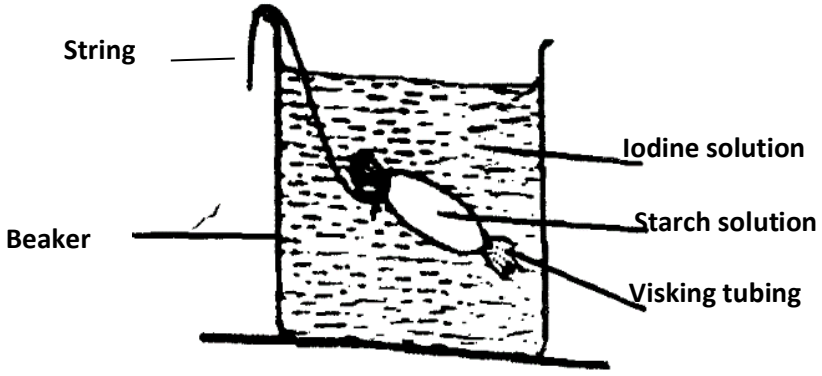
17. Name the site for gaseous exchange in insects. **(1mk)**

18. a) What is alternation of generations **(2mks)**

b) Explain why leaves of Peridophytes are referred to as Fronds. **(1mk)**

19. State **four** adaptations of red blood cells to its functions. **(4mks)**

20. The experiment illustrated below was set up to investigate a certain physiological process



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

b) State the observations that were made after at the end of the experiment

(i) Inside the Visking tubing **(1mk)**

(ii) Outside the Visking tubing **(1mk)**

c) Account for the observations in b) above. **(2mks)**

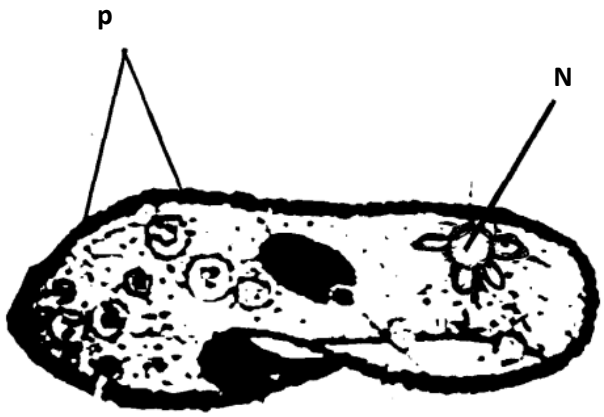
21. State the differences between the following structures in wind and insect pollinated flowers. **(3mks)**

(i) Anther

(ii) Pollen grains

(iii) Stigma

21. A student placed a drop of pond water in a cavity slide and observed it under the microscope. The student observed many fast moving organisms, one of which is represented in the diagram below.



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

b) Name the structures labeled **P** and **N** **(2mks)**

22. A person was found to pass out large volumes of dilute urine frequently. Name the;

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

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

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 4

231/2

BIOLOGY

PAPER 2 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- *Write your name and Admission Number in the spaces provided above.*
- *This paper consists of **two** sections: Section **A** and section **B**.*
- *Answer **ALL** questions in section **A** in the spaces provided.*
- *In section **B** answer question **6** (compulsory) and either question **7** or **8***

For Examiners use only.

Section	Question	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total score	80	

SECTION A (40MARKS)

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

(b) Njoki is an albino.Her husband Mwenda has normal skin colour.Two of their children have normal skin colour while the other two are albinos.If albinism is a sex linked trait;

(a) Give the genotype of

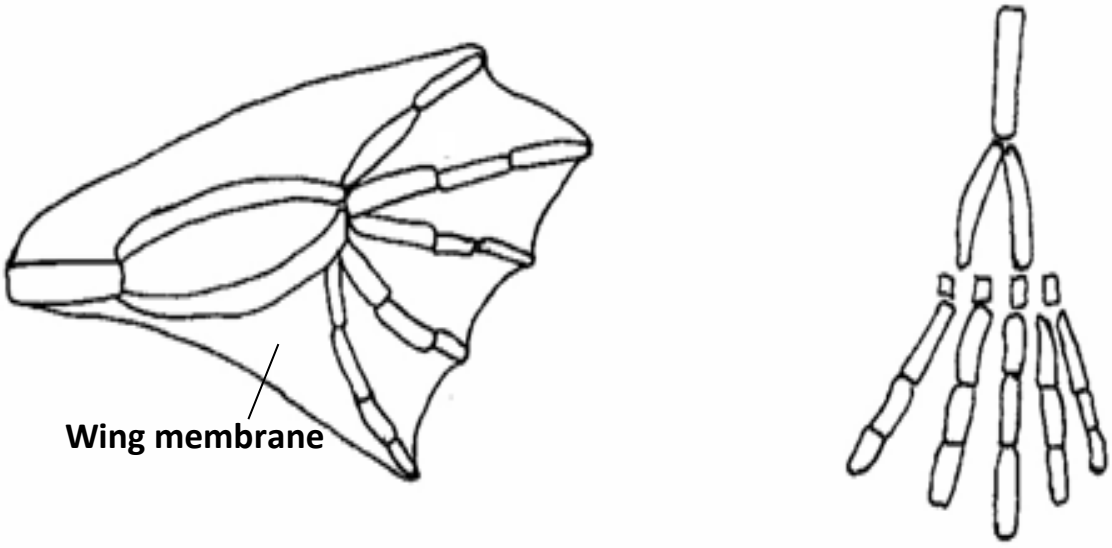
(i)Njoki **(1mk)**

(ii)Mwenda **(1mk)**

(b) Illustrate the cross between the two **parents** **(4mks)**

(c)Give genotypic ratio of the **offsprings** **(1mk)**

2 (a) The diagram below shows structures of the bat wing and human arm.



(a) These structures are thought to have same ancestral origin. State one structural similarity and one adaptational difference between the two.

(i) Structural similarity. **(1 mark)**

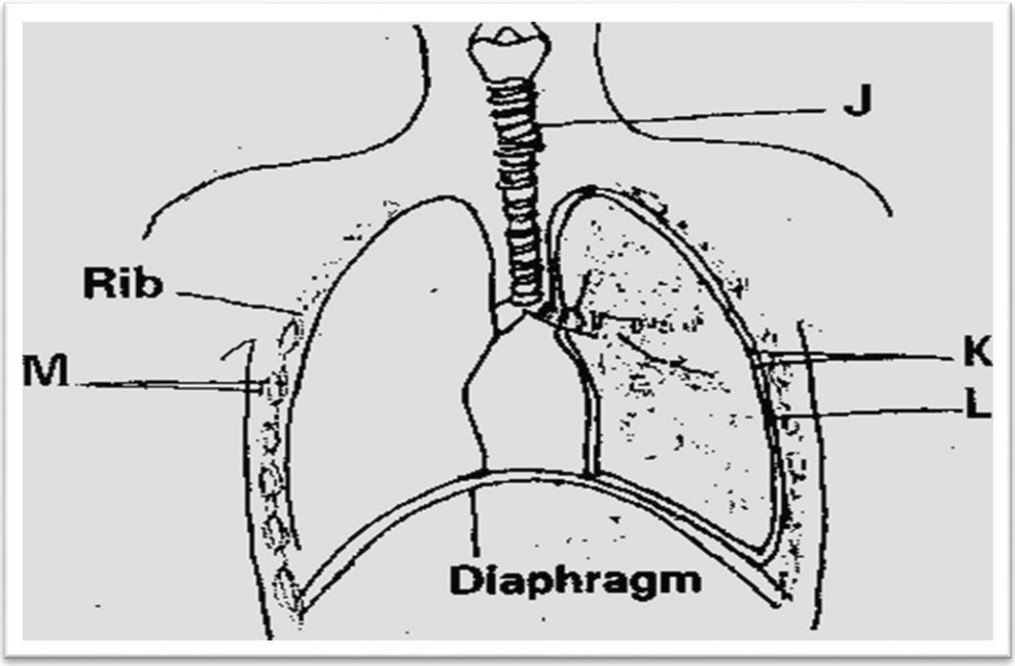
(ii) Adaptation difference. **(2 marks)**

(b) Give **two** other examples of structures in nature that show the type of evolution as in (a) above. **(2 marks)**

(c) Distinguish between the terms 'chemical evolution' and 'organic evolution'**.** **(2 marks)**

(d) What is the study of fossils called? **(1 mark)**

3.The diagram below represents some gaseous exchange structures in humans.



a) Name the structure labeled K, L and M **(3mks)**

b) How is the structure labeled J suited to its functions? **(3mks)**

c) Name the process by which inhaled air moves from the structure labeled L into blood capillaries. **(1mk)**

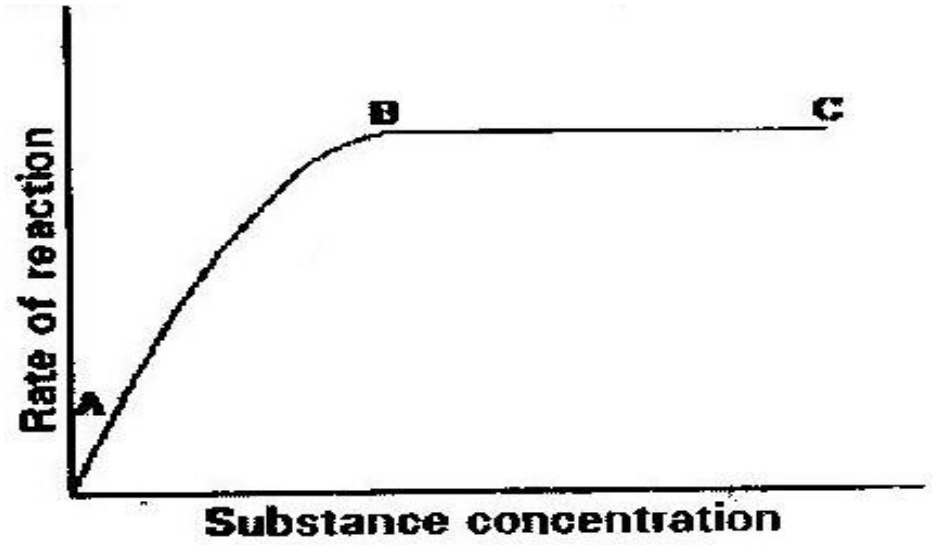
d)Give the scientific name of the organism that causes tuberculosis in humans. **(1mk)**

4. (a) (i) The action of ptyalin stops at the stomach. Explain. **(1mk)**

(ii)State a factor that denatures enzymes. **(1mk)**

(iii)Name the features that increase the surface area of small intestines**.** **(1mk)**

(b) The graph below shows the effect of substrate concentration on the rate of enzyme reaction.



(i) Account for the shape of the graph between A and B **(2mks)**

(ii) How can the rate of reaction be increased after point B? **(1mk)**

(iii) State two factors that affect the rate of enzyme reaction. **(2mks)**

5 (a) Laboratory analysis of a patient's urine revealed the following concentration of various substances:

Blood proteins	0.00%
Water	50%
Glucose	48%
Salts	0.8%
Urea	1.2%

(i) From the analysis above, which disease is the patient suffering from **(1mk)**

(ii) Explain the cause of the disease in **3(a)** above **(2mks)**

(iii) Which organ in the person may not be functioning properly**?** **(1mk)**

(b) Explain the effects of the following on the quantity and composition of urine

(i) Drinking large amount of clean water **(2mks)**

(ii) Drinking very salty **soup** **(2mks)**

SECTION B (40 Marks)

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

6. The following data are results of making daily growth measurement ion an organism over a period of 24 days during its development.

Day	Width of head (mm)	Length of hind femur (mm)
1.	3.0	7.0
2.	3.5	7.5
3.	4.0	8.0
4.	4.0	8.0
5.	4.0	8.0
6.	4.0	9.2
7.	4.0	10.5
8.	4.4	12.0
9.	4.7	12.0
10.	5.0	12.0
11.	5.0	12.0
12.	5.0	12.0
13.	5.0	12.0

14.	5.0	12.0
15.	5.0	13.3
16.	5.0	14.8
17.	5.7	16.4
18.	6.4	18.0
19.	7.0	18.0
20.	7.6	18.0
21.	7.6	18.0
22.	7.6	18.0
23.	7.6	18.0
24.	7.6	18.0

(a) Using a suitable scale draw graphs of width of head and length of femur against time. Draw the graphs on the same axis. **(8 marks)**

(b) (i) Name the growth pattern represented by the graph **(1 mark)**

(ii) With reference to your graph identify the phylum to which the organisms belong. Give a reason for your answer **(2 marks)**

(c) Account for the length of hind femur between

(i) Day 3 and day 7 **(3 marks)**

(ii) Day 7 and day 10 **(2 marks)**

(d) State two hormones involved in the growth pattern represented by the graphs **(2 marks)**

(e) State two advantages of metamorphosis in organisms **(2 marks)**

7 (a) Describe how the mammalian small intestine is adapted to its function**.** **(12mks)**

(b) For each of the following nutrients give one example of its role in the body and the deficiency disease it may cause **?** **(8mks)**

Nutrient	Role in the body	Deficiency disorder it causes
Vitamin A		
Iron		
Iodine		
Vitamin D		

8. a) Describe the process of fertilization in flowering plant**.** **(15mks)**

b) State the changes that take place in a flower after fertilization. **(5mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL TRIAL 5

231/1

BIOLOGY

PAPER 1 (THEORY)

TIME: 2 HOURS

NAME……

SCHOOL…… **SIGN**……

INDEX NO…… **ADM NO**……

Kenya Certificate of Secondary Education.

INSTRUCTIONS

a) *Write your name, class and admission number in the space provided above.*

b) *Write the date of the examination and sign in the space provided above.*

c) *Answer **all** the questions in the spaces provided.*

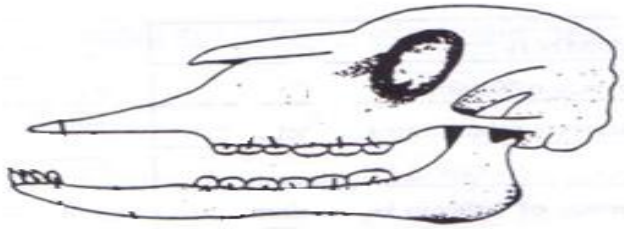
d) *You may be penalized for wrong spelling especially technical terms.*

FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidate's Score
1-31	80	

*Answer **all** the questions in the spaces provided*

1. The figure below is a diagram of a skull. Use the diagram to answer questions.



(a) Identify the type of food utilized by an organism with such a skull**.** **(1 mark)**

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

2. (a) Explain why specimens are important in studying biology**.** **(1 mark)**

(b) Identify an apparatus that is effective in capturing:

(i) A scorpion. **(1 mark)**

(ii) Butterfly **(1 mark)**

3. (a) Identify an organelle that is most abundant in the proximal convoluted tubule. **(1 mark)**

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

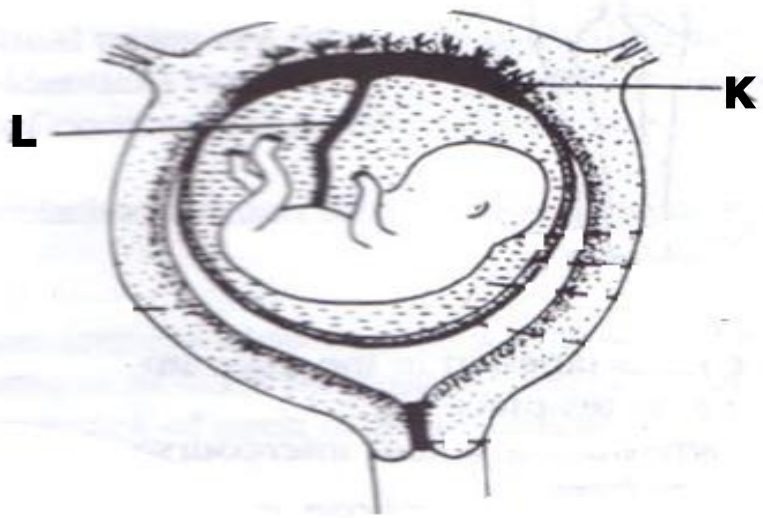
4. A student enclosed a leafy shoot using a transparent polythene bag, after 45 minutes clear droplets were observed on the walls of the polythene bag. Anhydrous cobalt (II) chloride paper was used to determine the identity of the clear droplets.

(a) Identify the process under investigation. **(1 mark)**

(b) State the expected colour changes of anhydrous cobalt (II) chloride paper. **(1 mark)**

(c) Explain why the clear droplets cannot be observed when the leafy shoot is not enclosed in a polythene paper. **(1 mark)**

5. The figure below illustrates the relationship between a developing foetus and maternal tissues



(a) Give two roles of part labeled K. **(2 marks)**

(b) Name a vessel in L that supplies nutrients and oxygen to the foetus. **(1 mark)**

6. Explain why deficiency of vitamin K leads to excessive bleeding even in small cuts**.** **(2 marks)**

7. Identify the parts of the mammalian heart that plays the following roles

(a) Prevents oxygenated blood from mixing with oxygenated blood. **(1 mark)**

(b) Secretes pericardial fluid**.** **(1 mark)**

(c) Prevents valves from turning inside out. **(1 mark)**

8. A flower was observed to be scented.

(a) Identify the phylum of living organisms that transfer pollen grains within the species of plants having the flower. **(1 mark)**

(b) Name a physiological process that aids the organisms in (a) above effect the transfer of pollen grains while giving a reason. **(2 marks)**

9. Explain why maize stalks do not undergo secondary growth yet they increase in girth**.(3 marks)**

10. A food sample was made into suspension and a few drops of iodine was added into it. A blue black colour was obtained. A Benedict's test on the sample gave a clear blue colour. Another sample of the same food was made into suspension. Some millet seeds which had been soaked for 48 hours were crushed and mixed with suspension. The mixture was incubated in warm water bath for six hours at 35^0c. After incubation, the sample gave a negative test with iodine and positive test with Benedict's solution.

(a) Explain why the iodine test was negative after incubation. **(2 marks)**

(b) Explain why it is necessary to incubate the mixture in warm water bath**.** **(1 mark)**

11. Explain why rate of absorption of mineral salts reduce with less oxygen concentration. **(2 marks)**

12. Name the:

(i) Material that strengthens xylem tissue **(1 mark)**

(ii) Tissue that is removed when the bark of a dicotyledonous plant is ringed**.** **(1 mark)**

13. State two functions of a cell sap. **(2 marks)**

14. Below is an apparatus used estimate the population of organisms especially plants

(a) What is the name of the apparatus? **(1 mark)**

(b) Explain why the apparatus is not suitable for estimation of animal population. **(1 mark)**

(c) State a one feature that can be used to identify the plants under enumeration above. **(1 mark)**

15. Below are photographs of plant taken at different times of the day.

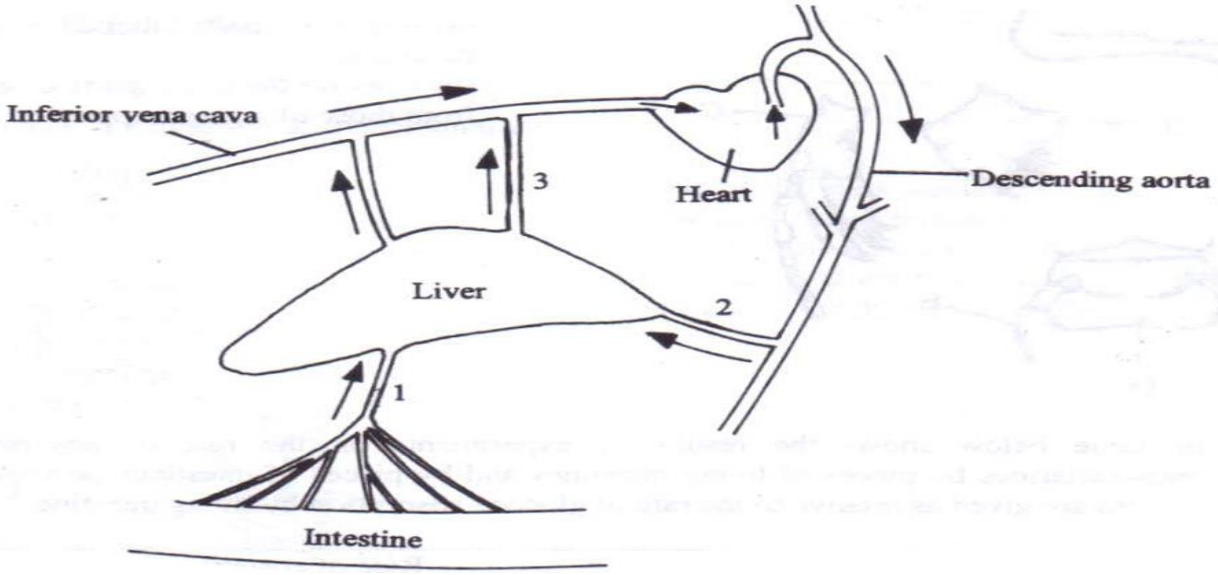
(a) Give a term for used to describe the nature of cells obtained from the plant at;

(i) 6:00 am……..…….(1 mark)

(ii) 12:00 pm…….……(1 mark)

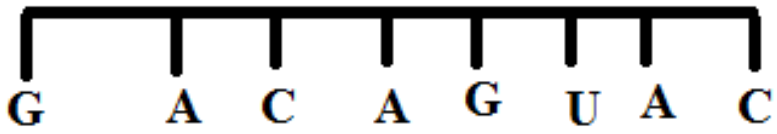
(b) What is the significance of this phenomenon to herbaceous plants? **(1 mark)**

16. The figure below illustrates the blood supply and drainage of the liver



(a) In which of the vessels labeled 1, 2 and 3 would you expect the highest concentration of glucose after an overnight of fast? Give a reason. **(3 marks)**

17. The illustration below represents the base sequence of a segment of a nucleic acid.



(a) Which nucleic acid does the above segment represent? **(1 mark)**

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

(c) Name the part of the cell where the segment of nucleic acid is used**.** **(1 mark)**

18. Describe how the following structures lower the rate of transpiration;

(a) Sunken stomata. **(2 marks)**

(ii) Hairy leaf. **(1 mark)**

19. Explain the following observation made by Gregory Mendel in his experiments, A cross between a pure breed tall plant and a pure breed dwarf plant had all the first filial generation being tall. **(2 marks)**

20. During an ecology field trip, students came across a pond with several bird species, upon closer look the students noted that the beaks of the birds were different in length, shape and size.

(a) Identify the type of evolution responsible for the beaks length, shape and size. **(1 mark)**

(b) What is the significance of the phenomenon to the birds**?** **(2 marks)**

21. (a) Explain why excessive use of pesticides in the soil lowers the concentration of nitrates **(2 marks)**

(b) Explain why a total of 1000 animals that include; giraffes, elephants and zebras can occupy 10 acres of land without depletion of food and yet 1000 cattle will deplete resources in the same piece of land. **(1 mark)**

22. Name two end products of anaerobic respiration in animals. **(2 marks)**

23. Explain why the presence of air bubble in a xylem vessel would cause drying up of a plant **(2 marks)**

24. (a) Identify a useful excretory plant product obtained from raw paw paw fruits. **(1 mark)**

(b) Give the use of the plant excretory product named in (a) above. **(1 mark)**

25. Name the method by which the following excretory products are removed from plants.

(i) Excess water**.** **(1 mark)**

(ii) Carbon (IV) oxide from cellular respiration. **(1 mark)**

26. In view of modern genetics, explain why the Lamarckian theory of evolution is not accepted. **(2 marks)**

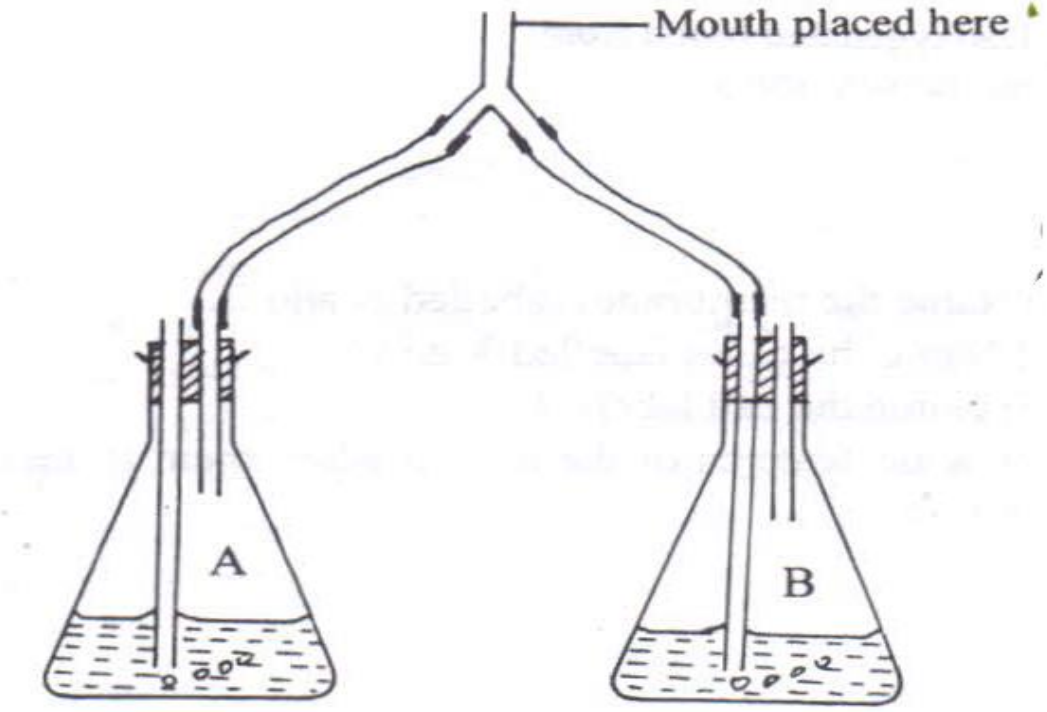
27. Below is a photograph on cell division.

Identify the stages labeled;

(a) A…….. (1 mark)

(ii) B…….. (1 mark)

28. The diagram below illustrates an experiment to show that there is much more carbon (IV) oxide in exhaled air than inhaled air. Calcium hydroxide is used in both flask A and B.



(a) Explain why it is necessary to use calcium hydroxide solution and not water. **(2 marks)**

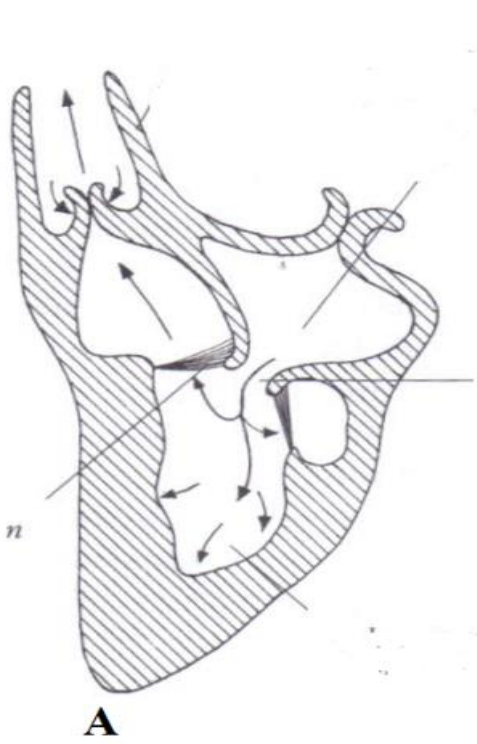
(b) Identify the flask that shows higher presence of carbon (IV) oxide after five minutes. **(1 mark)**

29. Explain why fertilization in flowering plants is termed double fertilization. **(2 marks)**

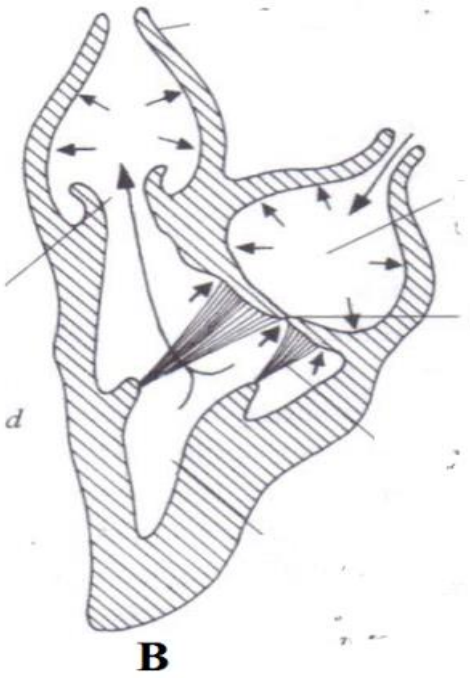
30. (a) What are the roles of testes in the mammalian reproductive system? **(2 marks)**

(b) Explain why female frogs produce large number of eggs. **(2 marks)**

31. The diagrams below represent a process of the heart that constitutes a heartbeat. Observe and answer questions that follow.



A



B

(a) Identify each of the process labeled;

(i) A…… (1 mark)

(ii) B…… (1 mark)

(b) Give a reason for answers in (a)(i) above **(1 mark)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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

- *Write your name and Index Number in the spaces provided above.*
- *This paper consists of two sections. Section A and section 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.*

FOR EXAMINERS USE ONLY.

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL SCORE	**80**	

SECTION A (40 MARKS)

1. (a) Explain how dichogamy prevents self-fertilization in flowering plants. **(2 marks)**

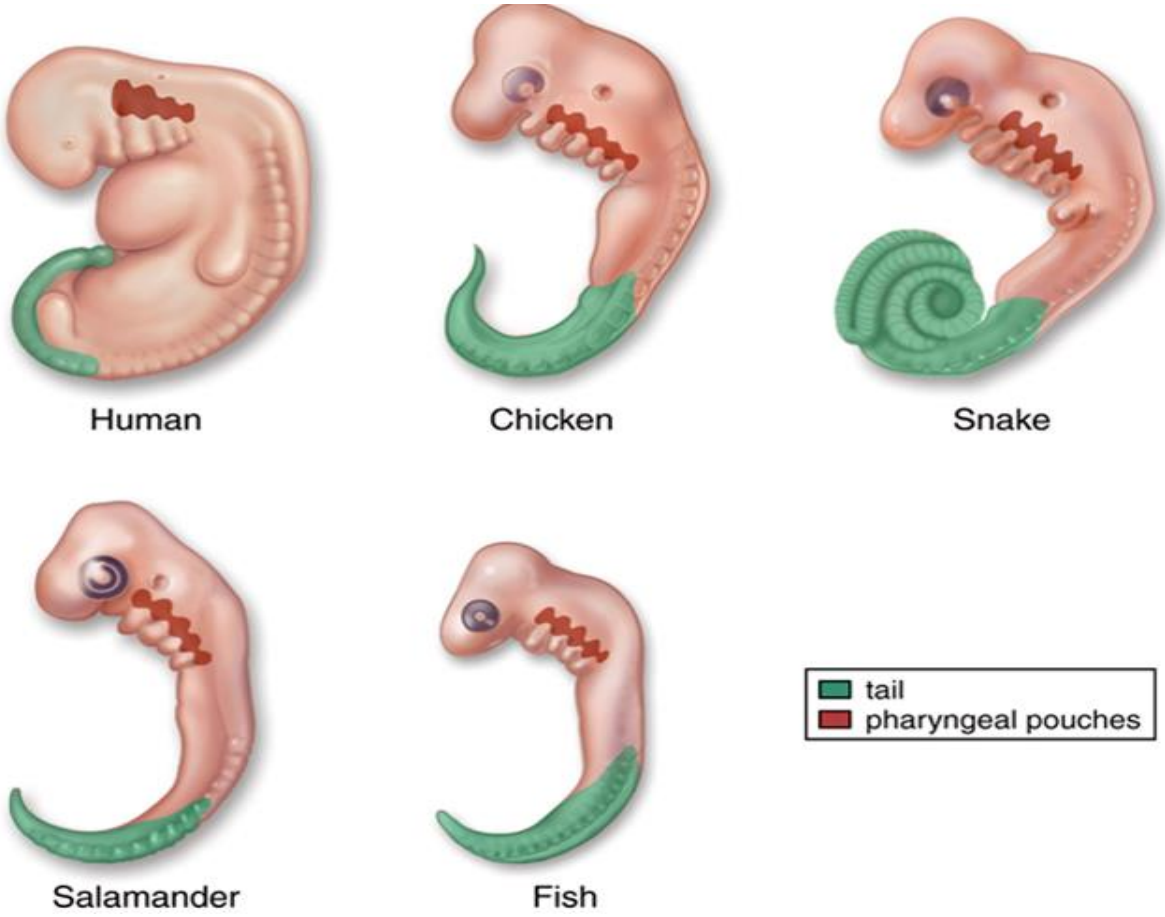
(**b) State** the changes that take place in a flower after fertilization. **(3 marks)**

(c) Describe the adaptations of the male parts of a wind pollinated flower to their function**?**

(3 Mks)

2. (a) Explain how convergent evolution may occur. **(3 marks)**

(b) The diagrams below show some organism structures that have been used as evidence of the process of evolution.

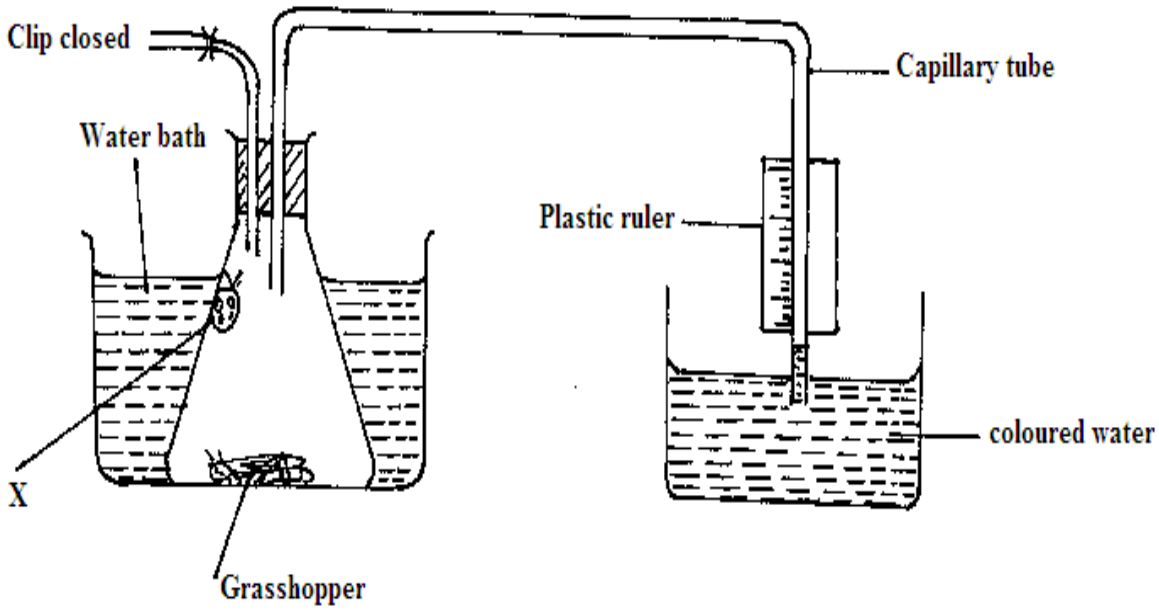


Name the type of evidence and explain it provides evidence to proof that the process of evolution may be taking place. **(3 marks)**

(c) Outline two evolutionary characteristics that adapt man to his environment. **(2 marks)**

3. (a) Name the end products of glycolysis. **(1 mark)**

(b) The diagram below illustrates an experiment to determine the rate of respiration in a small insect.



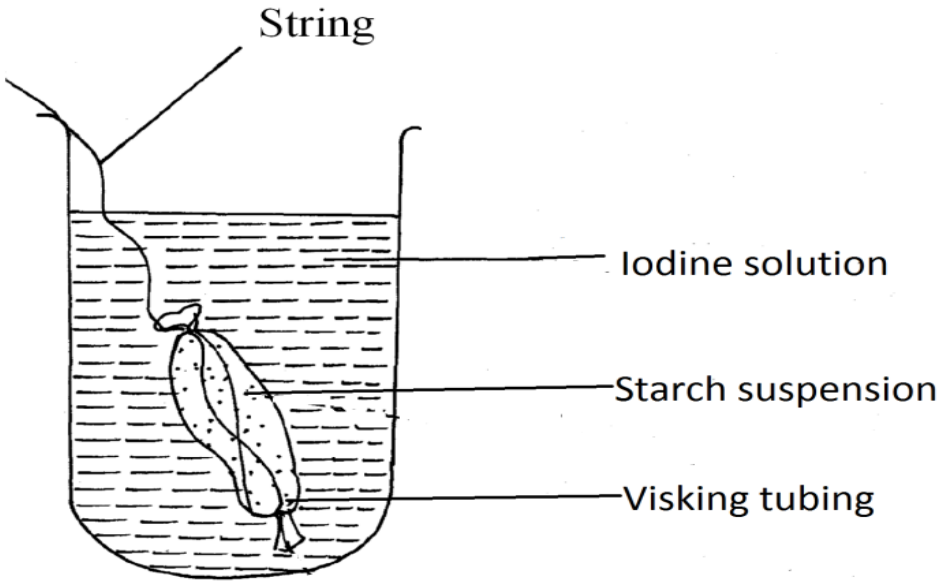
(i) Name the chemical compound labelled X and state its function. **(2 marks)**

(ii) What changes would you expect to observe in the level of the coloured water in the capillary tube after the experiment has run for 10 minutes? **(1 mark)**

(iii) Explain the changes you have stated in (b) (ii) above. **(3 marks)**

(c) Why was it necessary to place the flask in a water bath? **(1 mark)**

4. An investigation was performed by a group of students as shown in the set up below.



After 30 minutes, the starch suspension had turned blue-black while iodine solution retained its colour.

(a) Name the physiological process that was being investigated in the experiment. **(1 mark)**

(b) Account for the results observed after 30 minutes. **(3 marks)**

(c) Explain what would happen to a red blood cell when placed in distilled water and left to stand for the same duration as for the experiment above. **(3 marks)**

(d) Define cell physiology. **(1 mark)**

5. In a plant breeding research, a certain plant species was developed and found to be normally green in colour. A recessive gene for colour (g) causes these plants to be white in the homozygous state. In this state, the gene is lethal causing white plants to die at an early age soon after germination. In the heterozygous state, these plants are pale green in colour and grow to maturity.

(a) Suggest a reason for the early death of the plants with homozygous recessive genes.**(1 marks)**

(b) A normal green plant was crossed with a pale green plant; work out the genotypes of the F1 generation. Show your working. **(4 marks)**

(c) Seeds from the heterozygous plants were planted. The plant breeders allowed the resulting plants to self-pollinate. Work out the phenotypic ratio of the plants that would grow to become mature. **(2 marks)**

(d) Give an explanation for the occurrence of the pale green colour in heterozygous plants. **(1 mark)**

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

6. A group of students carried out a study to estimate the population of grasshoppers in their school compound. The table below shows the number of grasshoppers that were collected from eight sites within the school compound.

Site	1	2	3	4	5	6	7	8
Number of grasshoppers	280	50	190	220	85	300	175	30

(a)(i) Construct a bar graph to represent the number of grasshoppers collected from each site. **(6 mks)**

(ii) In a related exercise, students caught 240 grasshoppers, marked them with ink and then released them. After five days, they caught 160 grasshoppers and found that 40 were marked. Work out the estimated population of grasshoppers in the school compound. **(3 marks)**

(b) (i) Identify the method described in (a)(ii) above. **(1 mark)**

(ii) Identify the instrument the students might have used to get the grasshoppers. **(1 mark)**

(iii) State three factors that would influence the results in the method above. **(3 marks)**

(c) Outline the adaptable observations the students would make on the grasshopper regarding;

(i) Locomotion. **(2 marks)**

(ii) Protection. **(2 marks)**

(iii) Feeding. **(2 marks)**

7. (a) Name the tissues in flowering plants responsible for secondary thickening **(2 marks).**

(b) Describe an experiment you would carry out to demonstrate the region of growth in the root of a bean seedling. **(8 marks).**

(**c) Explain** the role of growth hormones in metamorphosis of a housefly **(10 marks).**

8. Describe the role of the liver in;

(a) Blood sugar regulation. **(10 marks)**

(b) Thermoregulation. **(5 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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 CANDIDATES:

1) *Write your **name** and **index number** and **school** in the spaces provided above.*
2) *Sign and write **date** of the examination in the spaces provided above*
3) *Answer **all** the questions in section **A** and **B***

FOR EXAMINER'S USE ONLY:

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1-29	80	

SECTION A (40MARKS)

Answer all the questions in this section in the spaces provided.

1. State the functions of each of the following structures in a cell.

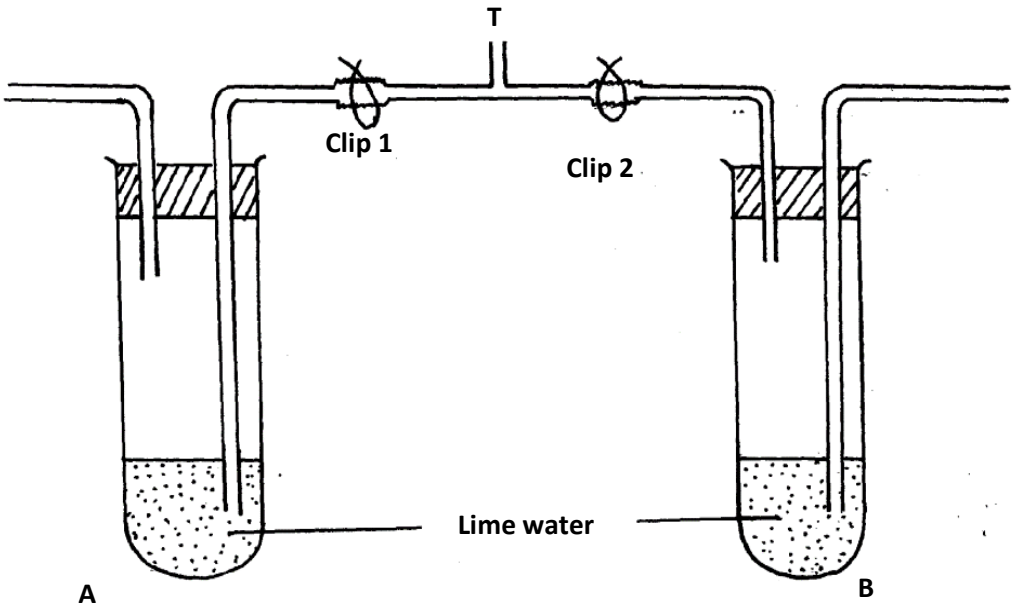
Golgi apparatus **(2mks)**

Cell sap **(2mks)**

2. Give **two** distinguishing characteristics of cervical vertebrae. **(2mks)**

3. (a) Name the carbon compound responsible for raising of the dough during baking of bread**.** **(1mk)**

(b) The diagram below represents an experiment set-up to determine a certain physiological aspect of man. Air was breathed in and out several times at tube labelled **T**.



(i) What was the aim of the experiment? **(1mk)**

(ii) State the observations made on lime water in tubes **A** and **B.** **(2mks)**

4. A child of blood group O is born to a woman of blood group A and a man of blood group B. What are the genotypes of the parents? **(2mks)**

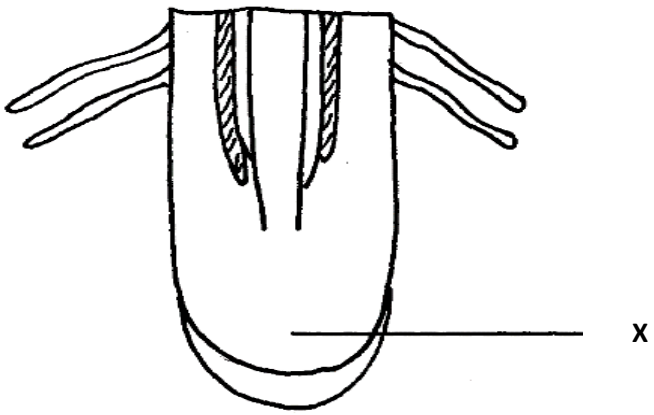
Mother

Father

5. Name **three** parts of the nephron found in the cortex. **(3mks)**

6. State **two** symptoms of diabetes mellitus. **(2mks)**

7. The diagram below represents a longitudinal section of a plant.



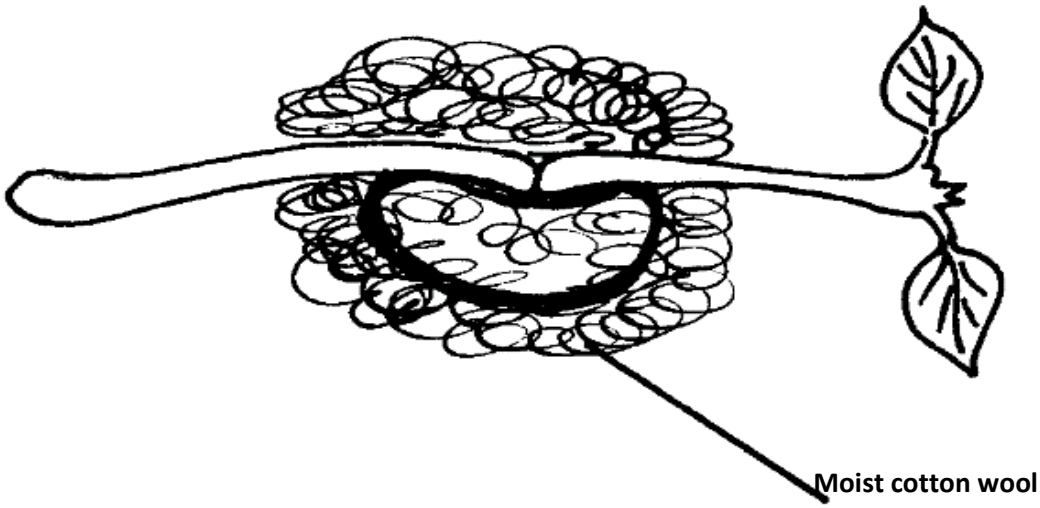
State **three** characteristics of cells found at the part labelled **X.** **(3mks)**

8. Name **three** classes of phylum chordate characterized by presence of scales. **(1mk)**

9. What is natural selection? **(2mks)**

10. Name the structure on the bodies of arthropods responsible for the intermittent growth curve pattern. **(1mk)**

11. The diagram below represents a seedling growing horizontally in a moist cotton wool.



Account for the results that would be observed on the radicle after 5 days of growth. **(3mks)**

12. Give a reason for each of the following on a mammalian Red blood cell.

(a) Absence of the nucleus **(1mk)**

(b) Biconcave shape **(1mk)**

13. How is the pulp cavity adapted to its functions? **(2mks)**

14. **(a)** Name the tissue in higher plants responsible for transport of manufactured foods.**(1mk)**

……

(b) Give **two** importance of transpiration in plants. **(2mks)**

15. Distinguish between;

(a) Biomass and carrying capacity. **(2mks)**

(b) Interspecific and intraspecific competitions. **(2mks)**

16. Name **two** bacterial diseases controlled by boiling drinking water. **(2mks)**

17. State the function of nectarines in an insect pollinated flower. **(2mks)**

18. State **two** factors in a seed that causes seed dormancy. **(2mks)**

19. The equation below summarizes a reaction that occurs in a plant organ.

$$6CO_2 + 6H_20 \xrightarrow[\text{Pigment A}]{\text{Sunlight}} C_6H_{12}0_6 + X$$

(a) Name the pigment A and product **X**. **(2mks)**

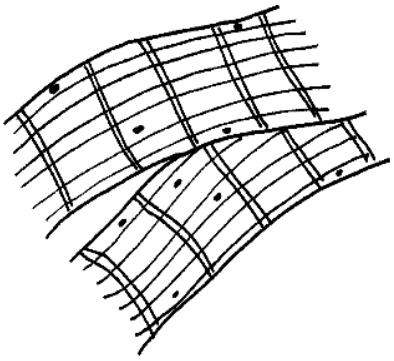
Pigment **A**

Product **X**

(b) Name the organelle in plants where the above reaction occurs. **(1mk)**

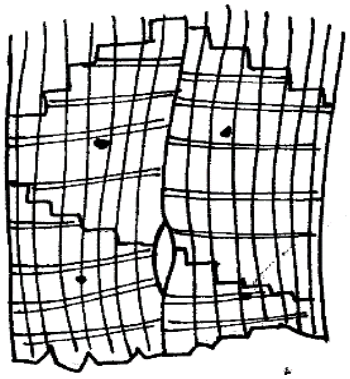
20. The diagrams below represent three types of muscles found on a mammalian body.

A



B

C



Name the location of each of the three types of muscles on the body. **(3mks)**

A……

B……

C……

21. Give a reason why herbaceous plants remain upright. **(2mks)**

22. **(a)** State the significance of emulsification of fats in the bodies of human beings. **(2mks)**

(b) Name the structure in the body of a mammal that stores bile. **(1mk)**

23. State **two** functions of a pollen tube. **(2mks)**

24. The table below shows relative rates of transpiration in three different trees growing under similar conditions.

Tree	Relative rate of transpiration
A	**195**
B	**20**
C	**70**

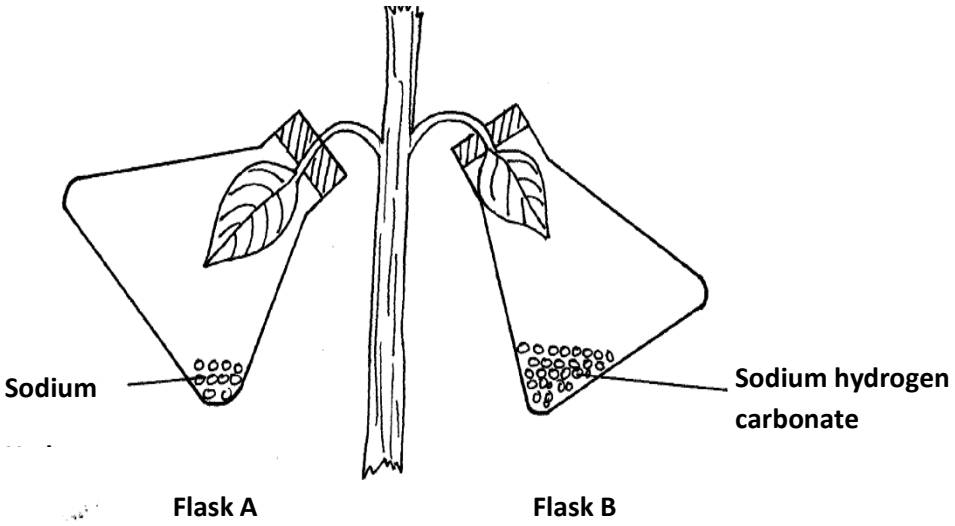
(a) State the most likely habitat for plant **B**. **(1mk)**

(b) State the structural adaptations of the stomata on the leaves of plant **B**. **(2mks)**

25. Name **two** hormones responsible for regulation of blood sugar. **(2mks)**

26. Account for the decrease in dry weight of endosperm of a cereal during germination. **(2mks)**

27. A healthy plant was kept in dark for 24 hours. Two of its leaves were enclosed in glass jars as shown in the diagram below. The plants were then exposed to light for shows.



(i) Leaves in flask A and B were tested for a food substance. Name the food substance tested for in each of the flasks. **(1mk)**

(ii) What were the results of the test started in (i) above. **(2mks)**

Flask **A**……

Flask **B**……

28. Name **two** main support tissues in woody plants. **(2mks)**

29. **(a)** State **two** functions of a synovial fluid at a movable joint. **(2mks)**

(b) Name the structure at a movable joint responsible for secretion of synovial fluid. **(1mk)**

30. State **two** advantages of hybrid vigour. **(2mks)**

31. How is ascaris lumbricoides adapted to its parasitic mode of life? **(2mks)**

32. **(a)** At what stage of meiosis does crossing over take place. **(1mk)**

(b) What is the importance of crossing-over? **(1mk)**

33. Explain the functions of the ear drum. **(2mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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:

1) *Write **your name** and **index number** in the spaces provided.*
2) *Answer **all** the questions in Section **A** in the spaces provided.*
3) *In section **B** answer questions **6** (**compulsory**) and either question **7** or **8** in the spaces provided*

FOR EXAMINER'S USE ONLY:

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	**80**	

SECTION A (40MARKS)

Answer all the questions in this section in the spaces provided.

1. In human beings the phenotypes and genotypes with respect to the condition of sickle anaemia are as follows

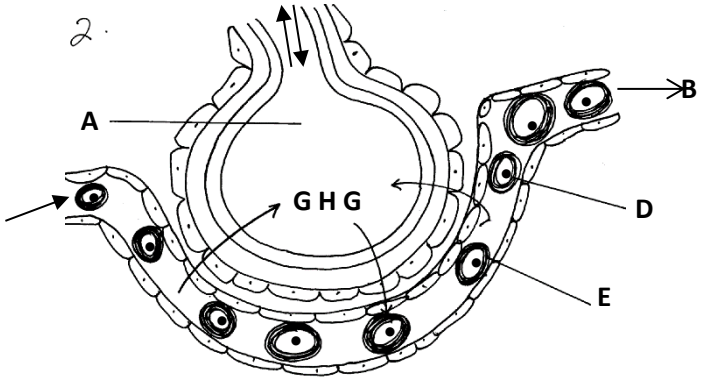
Phenotype	Genotype
Unaffected	SS
Sickle cell trait	Ss
Sickle cell anaemia	ss

a) Carry out a genetic cross to predict the outcome of a man and a woman with the sickle cell trait. **(4mks)**

b) What are the phenotypic and genotypic ratios. **(2mks)**

c) Name the **two** possible sets of chromosomes that can be found in a normal cell. **(2mks)**

2. The diagram below represents a unit of gaseous exchange in man. Study it carefully and answer the questions that follow.



a) Name the blood vessel that brings blood to the lungs and the vessel which takes blood away from the lungs. **(2mks)**

b) Name the structure above. **(1mk)**

c) Label **A** and **E.** **(2mks)**

d) In what form is carbon (IV) oxide transported in structure labeled **E**. **(1mk)**

e) Name the gas **G**. **(1mk)**

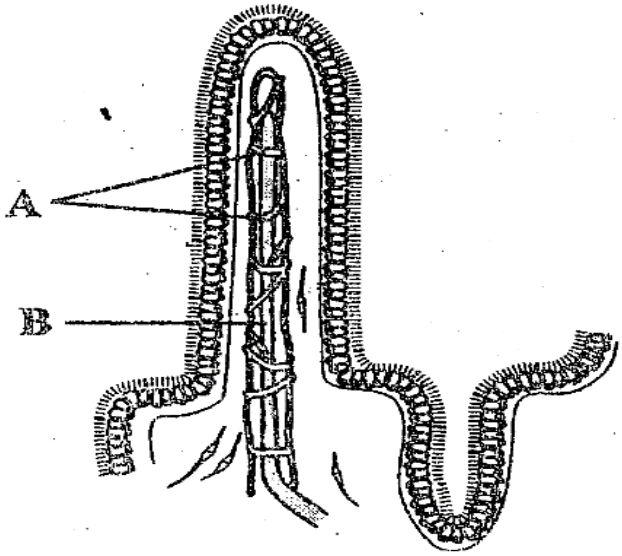
3. Gastrin is a hormone produced by mammals.

(a) (i) Where is the hormone produced? **(1mk)**

(ii) What is the function of gastrin? **(1mk)**

(b) What stimulates the production of gastrin. **(1mk)**

(c) The diagram below shows part of the human intestine.

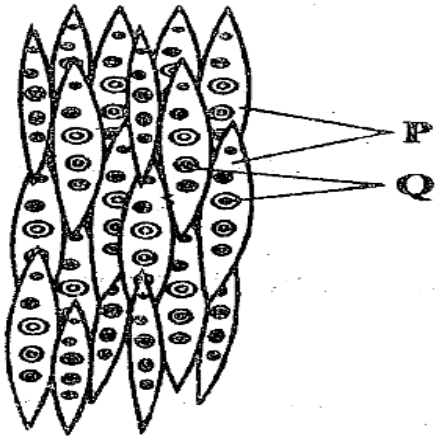


(i) Identify the parts labeled **A** and **B** **(1mk)**

(ii) To which circulatory system does the part labeled **B** belong. **(1mk)**

d) State any **two** adaptations of the human large intestine to its function. **(2mks)**

4 The diagram below represents part of a xylem tissue.



a) (i) Name the parts labeled **P** and **Q** **(2mks)**

(ii) Give the function of the part labeled **P**. **(1mks)**

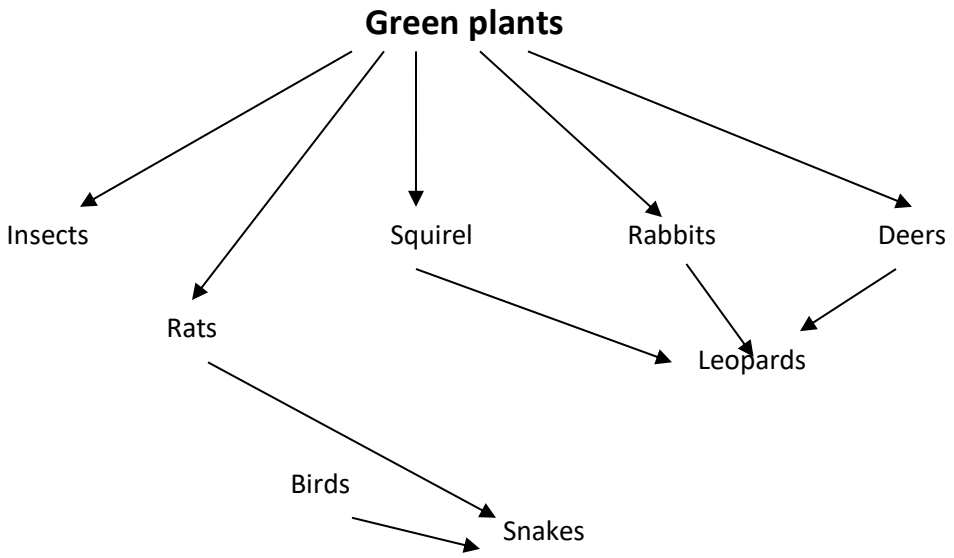
b) State the function of the phloem tissue. **(1mk)**

c) (i) State how the functioning of the phloem tissue is affected if the companion cell is destroyed**.** **(1mk)**

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

d) State any **two** structural differences between phloem and xylem tissues. **(2mks)**

5 The diagram below represents a food web from Lake Nakuru national park.



a) With a reason, identify the organism with the largest biomass. **(2mks)**

b) From the food web isolate a food chain ending with snakes as tertiary consumer. **(1mk)**

c) (i) Name any **two** organisms not shown in the food web but would be present in the ecosystem. **(1mk)**

(ii) What is the role of the organisms stated in (i) above in the ecosystem. **(2mks)**

d) From the food web, snakes and leopards feed on rabbits. What name is given to this kind of competition. **(1mk)**

e) Name an organisms that may be both secondary and tertiary consumer. **(1mk)**

SECTION B (40MARKS)

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

6. In an experiment to determine the effect of exercise on the concentration of lactic acid in blood, the following data was obtained. Study the data and use it to answer the questions that follow.

The lactic acid concentration was measured before, during and after the exercise.

Time minutes	**0**	**10**	**20**	**25**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Lactic acid conc. (arbituary units)	**0.5**	**0.5**	**5**	**13**	**12**	**8**	**6**	**4**	**3**	**2**	**1**	**0.9**

a) Using a suitable scale, plot a graph of the concentration of lactic acid against time. **(6mks)**

b) From the graph you have drawn determine

(i) The period of exercise . Explain. **(2mks)**

(ii) The time when oxygen debt occurred Explain. **(2mks)**

(iii) The duration it took to pay back the oxygen debt. Explain **(2mk)**

c) On the same set of axes plot a hypothetical curve for oxygen intake during the experiment period of 90 minutes. **(2mks)**

d) Why does lactic acid level usually continue to rise in the blood after exercise ceases. **(2mks)**

e) Suggest the **two** importance of anaerobic respiration to animals. **(2mks)**

d) What is oxygen debt? **(2mks)**

7. What is the role of the liver in the maintenance of a constant level of materials in the body. **(20mks)**

8 (a) What is organic evolution? **(2mks)**

(b) Distinguish between homologous and analogous structure. **(2mks)**

(c) How does natural selection bring about adaptation of species to its environment? **(16mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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 CANDIDATES

- *Write your name and Index Number in the spaces provided above.*
- *Sign and write date of examination in the spaces provided above.*
- *Answer **ALL** questions in the spaces provided.*

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-30	80	

*Answer **ALL** questions in the spaces provided.*

1. Name the branch of Biology that involves the study of: **(2marks)**

a) Organisms for the sake of classifying them.

b) Microscopic organisms.

2. The diagram below represents a plant

a) Name the division to which the plant belongs. **(1mark)**

b) Give **three** reasons for your answer in (a) above. **(3marks)**

3. State **three** parameters that can be used to estimate growth in seedlings. **(3marks)**

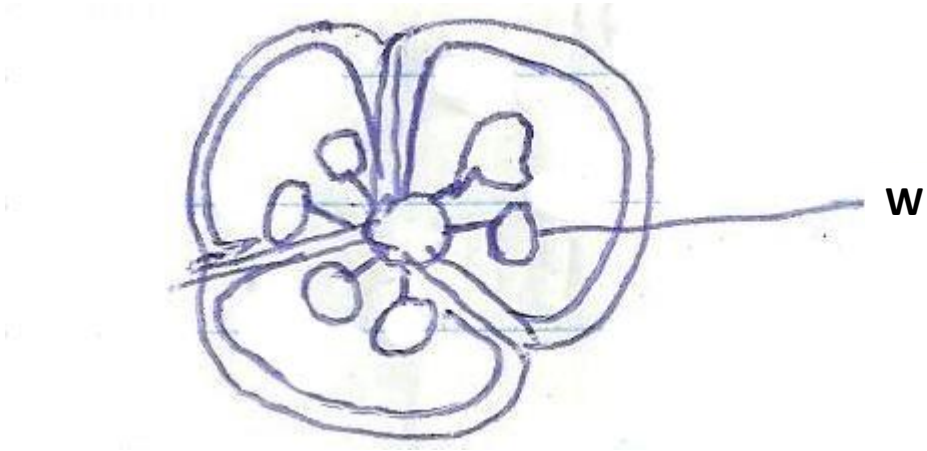
4. Equal amounts of crushed Irish potato were placed in equal volumes of hydrogen peroxide solution at indicated pH. The volume of the gas produced was measured and recorded as shown in the table below.

pH	4.0	7.0	9.0
Volume of gas (cm^3)	2.7	5.7	7.7

(a) Name the gas that was produced. **(1mark)**

(b) Account for the difference in the volume of the gas produced in pH 4.0 and pH 9.0 **(2marks)**

5. The diagram below represents a transverse section of an ovary from a certain flower.



(i) Name the structure labeled W. **(1mk)**

(ii) Name the type of placentation illustrated in this diagram. **(1mk)**

6. What are the names of modified leaves enclosing bougainvillea flowers whose function is to attract insect pollinators? **(1mark)**

7. **(a)** A dog weighing 15.2kg requires 216kJ while a mouse weighing 50g requires 2736 kJ per day. Explain. **(2marks)**

(b) Under what condition is lactic acid formed in human muscles? **(1mark)**

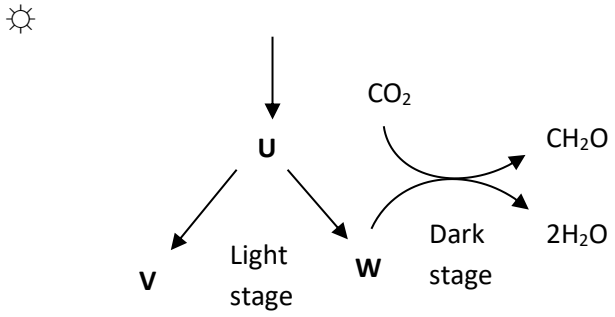
8. In a certain experiment, the following observation was made:

When red blood cell was placed in a certain solution, the solution exerted more osmotic pressure leading to the cell losing water molecules to become crenated/ shrunk.

(a) What type of solution was the cell placed in respect to the cell's cytoplasm**?** **(1 mark)**

(b) By which physiological process did the cell lose water molecules? **(1 mark)**

9. Study the flow diagram below.



Name the substance **U**, **V** and **W**. **(3 mks)**

U:……

V:……

W:……..

10 a) State the deficiency diseases of each of the following vitamins. **(3 marks)**

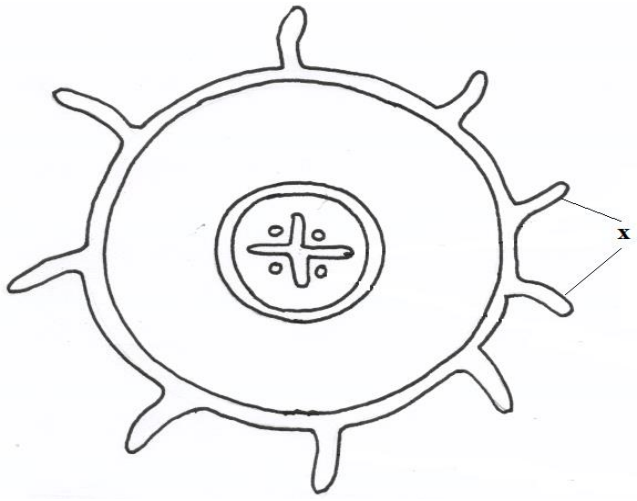
(i) **B_1** **…….**

(ii) **B_2** **…….**

(iii) **B_6** **……**

(b) What is the role of roughage in a diet? **(1 mark)**

11. The diagram below represents a transverse section of a plant part. Study it and answer the questions that follow.

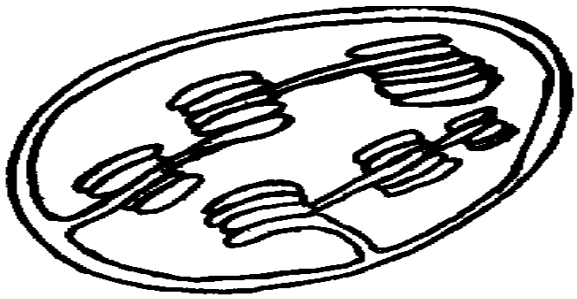


a) Name the class in which the plant belongs. **(1mark)**

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

c) State **one** adaptation for the structures labeled X to their functions. **(1mark)**

12. Below is a diagram of an organelle.



(a) State the function of the organelle drawn above. **(1mark)**

(b) Name the parts of the organelle where :

(i) Oxygen gas is produced as a byproduct. **(1mark)**

(ii) Carbon (IV) oxide is utilized. **(1mark)**

13. The equation below represents a metabolic process that occurs in the mammalian liver.

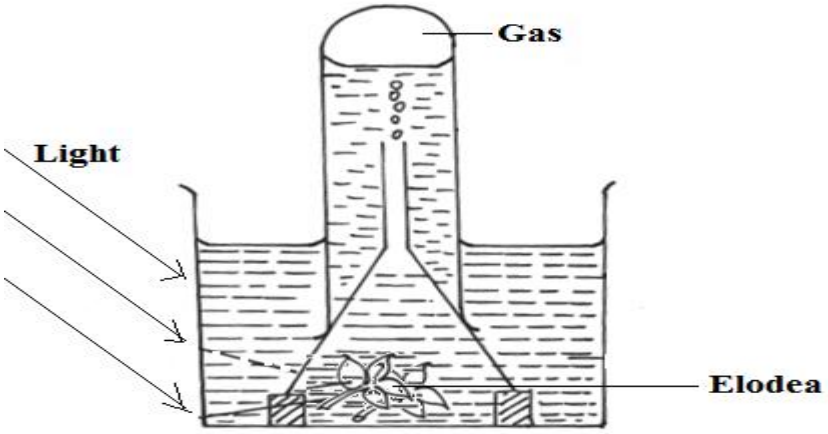
Amino Acids ⟶ Organic + Urea

Compounds

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

(b) What is the importance of the process to the mammal? **(2mrks)**

14. The diagram below represents a set up that was used to investigate a certain process in a plant.



(a) State the process that was being investigated. **(1 mark)**

(b) Other than the factors shown, state two factors that would affect the process named in (a) above. **(2 marks)**

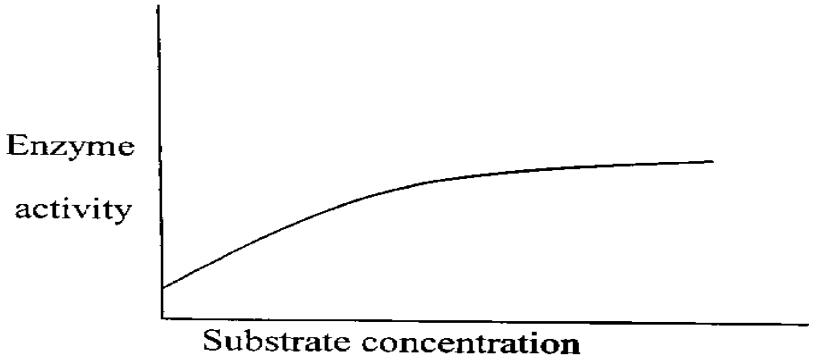
15. a) Name the causal organism for amoebic dysentery. **(1 mark)**

b) State three preventive measures of schistosomiasis in human beings **(3 mrks)**

16. (a) Why is the wall of the left ventricle thicker than that of the right ventricle. **(1mark)**

(b) State **three** adaptations of xylem to water transportation **(3mrks)**

17. Use the graph below to answer the following questions.



(a) Why does the activity of the enzyme become constant after a while? **(1mark)**

(b) State how the activity of the enzyme may be increased in (a) above. **(1mark)**

18. Describe capture - recapture method of estimating population. **(3mrks)**

19. What is meant by self sterility with reference to flowers? **(1mark)**

20. Why do plants lack complex excretory system? **(3mrks)**

21. State **three** advantages of asexual reproduction in plants. **(3 mrks)**

22. How does sunken stomata help in lowering transpiration? **(3mrks)**

23. State the importance of active transport in living organisms. **(3maks)**

24. Why does carboxyhaemoglobin lead to death? **(2mrks)**

25. Name **two** gaseous exchange sites in higher plants. **(2marks)**

26. What causes apical dominance? **(1mrk)**

27a) What type of circulatory system is found in members of class insecta? **(1 mark)**

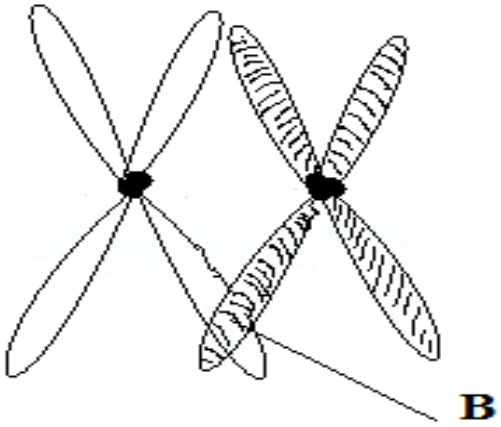
b) Name the blood vessel that transports blood from:

(i) Small intestine to liver. **(1 mark)**

ii) Lungs to heart **(1 mark)**

28. Distinguish between natural and acquired immunity. **(2 mrks)**

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



a) Identify the stage of cell division in which this phenomenon occurs. **(1 mark)**

b) State the importance of the phenomenon taking place in the part labeled B. **(2 mrks)**

30. State **two** functions of ovaries in humans. **(2mrks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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.

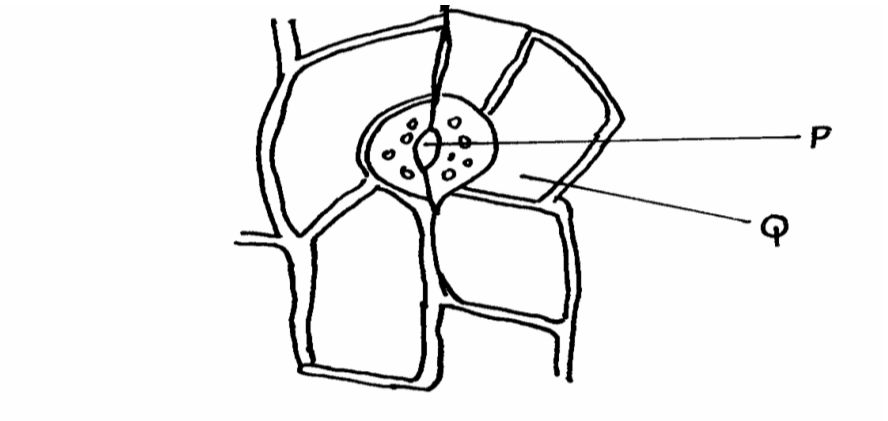
1) *Write **your name** and **index number** in the spaces provided above.*
2) *Sign and write the date of examination in the spaces provided above.*
3) *This paper consists of section **A** and **B**.*
4) *Answer **ALL** questions in section A in the spaces provided above.*
5) *In section **B** answer questions **6 (compulsory)** and either question **7** or **8***

FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	80	

Answer All the Questions

1. The diagram below shows a portion of a lower epidermis of a sukuma wiki leaf.



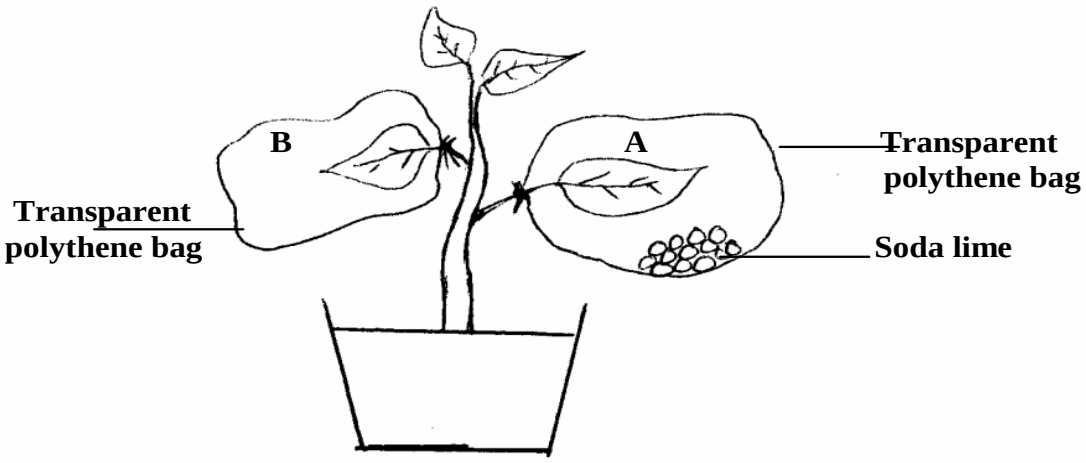
a) Name the parts labeled P and Q. **(2mks)**

b) Briefly describe the photosynthetic theory of stomata opening. **(5mks)**

c) State one modification in the stomata of xerophyte plant other than being sunken and hairy.

(1mk)

2. The diagram below represents an experimental set-up to investigate an aspect of photosynthesis.



The set up was placed in darkness for 24 hrs and then exposed to light for 5 hrs.

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

(b) Leaves **A** and **B** were tested for starch.

(i) What would be the expected results? **(2marks)**

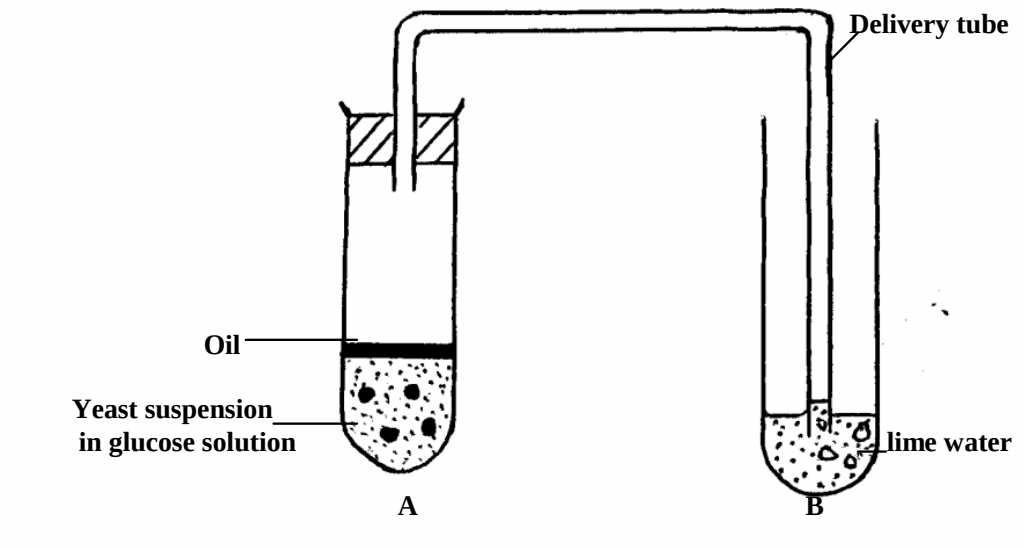
(ii) Give reasons for your answer in **(b) (i)** above. **(2marks)**

(c) What was the role of leaf **B** in the experiment **(1mark)**

(d) Why was the set – up placed in darkness for 24 hours? **(1mark)**

(e) Name the organelle in a plant where photosynthesis takes place **(1mark)**

3. The diagram below illustrates an experiment to demonstrate a certain biological process.



Before adding yeast suspension in tube **A**, the glucose solution was first boiled and cooled.

a. What biological process was being demonstrated? **(1mark)**

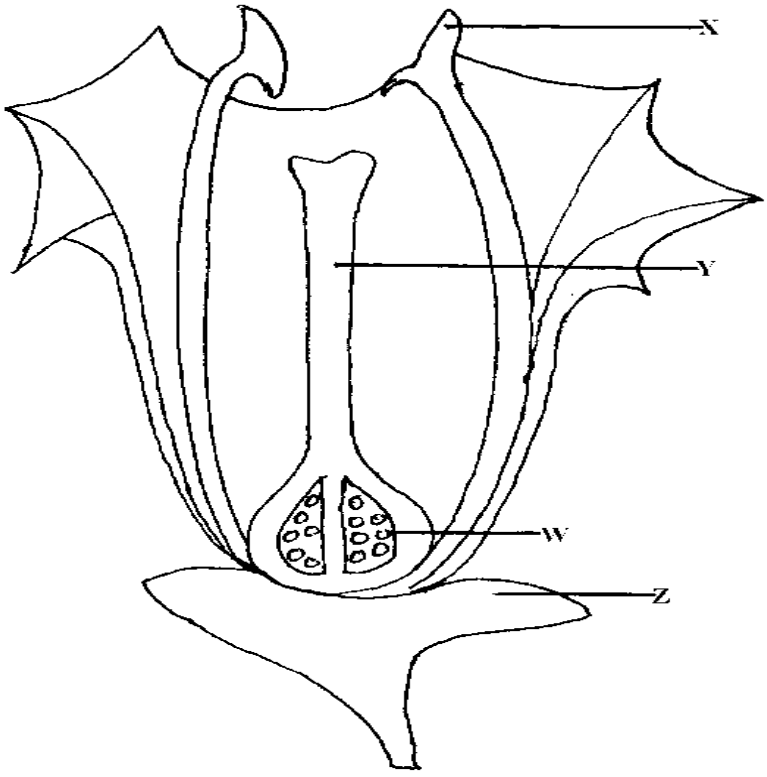
(b) (i) What observation would be made in tube **B** after 20 minutes of the experiment?**(2marks)**

(ii) Account for the observations made in **(b) (i)** above **(2marks)**

(c) Write down an equation to summarize the reaction taking place in tube **A**. **(1mark)**

(d) State two industrial applications of the chemical reaction taking place in tube **A**. **(2marks)**

4. The diagram below represents a flower.



(a) Name the parts labeled X and Y. **(2mks)**

(b) Describe the ovary position. **(1mk)**

(c) (i) **Suggest** an agent of pollination of the flower above **(1mk)**

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

(d) On the diagram above, which part do you expect to find haploid nucleus after meiosis? **(1mk)**

(e) In the flower above its sepals cell was found to have 20 chromosomes. **What** would be the number of chromosomes found in the endosperm cell of the flower embryo sac after fertilization? **(1mk)**

(f) State one way in which flowers prevent self – pollination. **(1mk)**

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 mks)**

(ii) F_1 Generation **(1 mk)**

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

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

SECTION B (40 marks)

Answer question 6 (compulsory) in the space provided and either question 7 or 8

6. In an experiment to investigate the effect of temperature on the activity of salivary amylase enzyme, test tubes containing 5 cm^3 of starch solution were placed in water baths maintained at different temperatures. After 30 minutes, 0.1cm^3 amylase solution was added into each of the tubes.

At one minute intervals, a drop of the mixture in each tube was tested for presence of starch. The time taken for all the starch to be digested was taken and recorded. The results were as shown in the table below.

Temperature (^{0}c)	5	10	15	20	25	30	35	40	45
Time taken to digest all starch (mins)	80	60	48	26	18	9	3	14	75

(a) On the grid provided **plot** a graph of time taken to digest all the starch against temperature.

(6 marks

(b) What was the optimum temperature range for this enzyme? **(1mark)**

(c) Account for the results obtained at

(i) 5^0C **(2marks)**

(ii) 45^0C **(2marks)**

(d) Apart from temperature **name three** other factors that would affect the above reaction. **(3marks)**

(e) Name two regions in a human body where digestion of starch occurs. **(2marks)**

(f) (i) Give three metallic ions that act as enzyme co- factors in a human body. **(2marks)**

(ii) What is the role played by enzyme co- factors in the physiology of human body? **(1mark)**

(g) Name the major respiratory substrate in a mammalian body during severe starvation.**(1mark)**

7. How are leaves of mesophytes suited to their function? **(20mks)**

8. Describe the adaptations of the mammalian skin to its functions. **(20mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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 KCSE CANDIDATES

a) *Write your name, class and admission number in the space provided above.*

b) *Write the date of the examination and sign in the space provided above.*

c) *Answer **all** the questions in the spaces provided.*

d) *You may be penalized for wrong spelling especially technical terms.*

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-26	80	

*Attempt **All** the Questions*

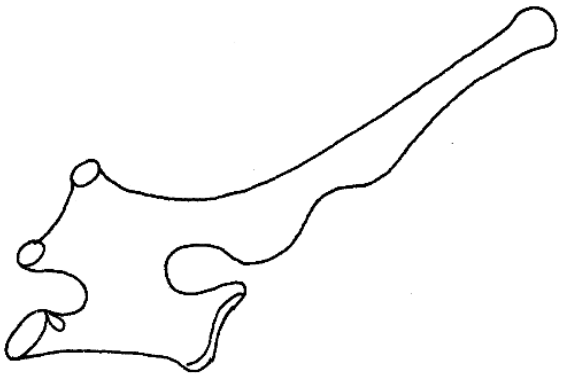
1. Some **KCSE 2025** candidates wanted to collect the following animals for study in the laboratory. State the suitable apparatus they should use.

i) Housefly **(1 mark)**

ii) Scorpion **(1 mark)**

iii) Ants **(1 mark)**

2. The diagram below represents a mammalian vertebra.



(a) Identify the vertebra represented above. **(1mk)**

(b) Give a reason for your answer. **(1mk)**

3. (a) Explain the role of oxygen in Active transport **(1mk)**

(b) Name two processes that depend on Active transport in animals **(2mks)**

4. Explain how sunken stomata lower the rate of transpiration **(2mks)**

5. State how xylem vessel is adapted to its function **(3mks)**

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

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

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

7. (a) State two adaptations of the alveolus to its functions. **(2mks)**

(b) Why may an asthmatic patient produce a wheezing sound during breathing? **(1mk)**

(c) What is the significance of the cartilage found in the human trachea being incomplete (c-shaped rings) **(1mk)**

8. Define the following terms;

(i) Inter specific competition. **(1mk)**

(ii) Carrying capacity **(1mk)**

9. Suggest two methods that can be used to determine the type of food eaten by animals. **(2mks)**

10. (a) State one significance of genetics counseling **(1mk)**

(b) Part of a strand of DNA molecules was found to have the following sequence A-T-C-G-G-G-A-T-C-T. What is the sequence?

(i) Of the complementary strand? **(1mk)**

(ii) On a m- RNA strand copied **(1mk)**

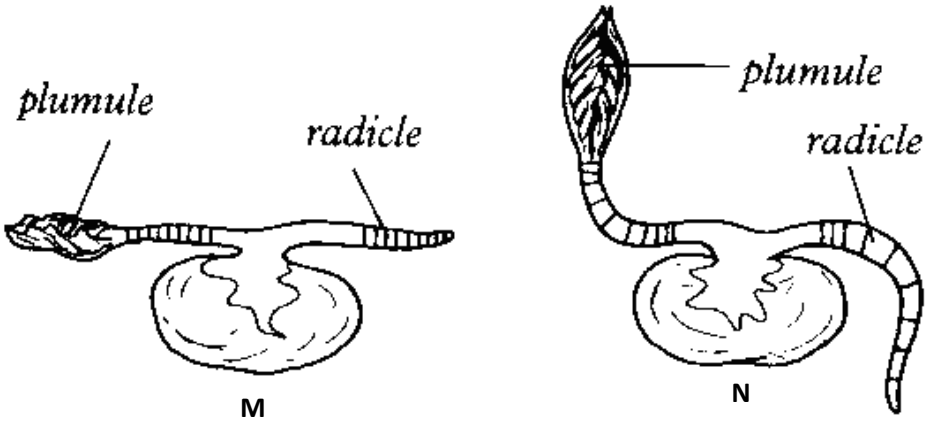
11). The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

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

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

c) Give two examples of vestigial organs in man. **(2mk)**

12). 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)**

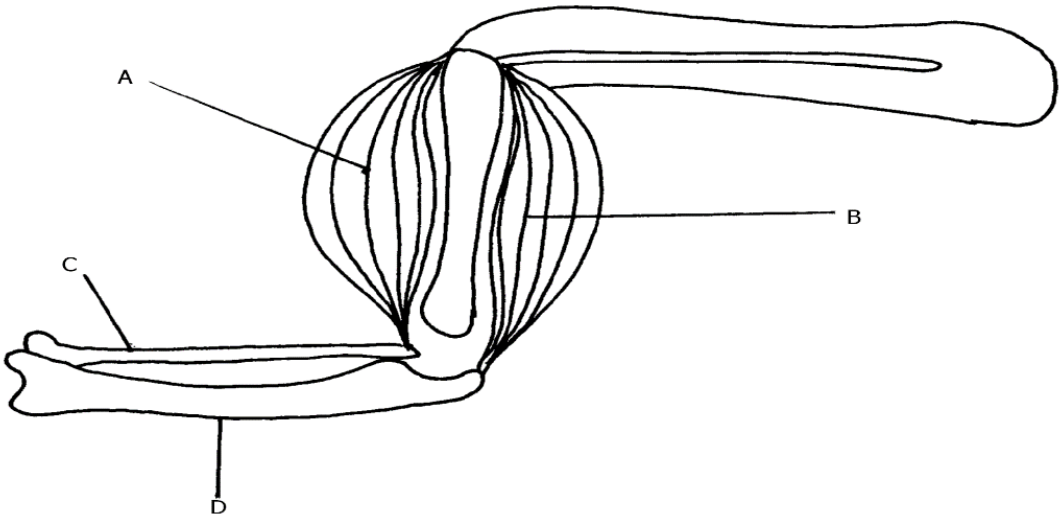
13. The following is an equation representing a type of respiration

$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + Energy$

a) Identify the type of respiration. **(1mk)**

b) Suggest industrial applications of the process shown in the equation above **(2mks)**

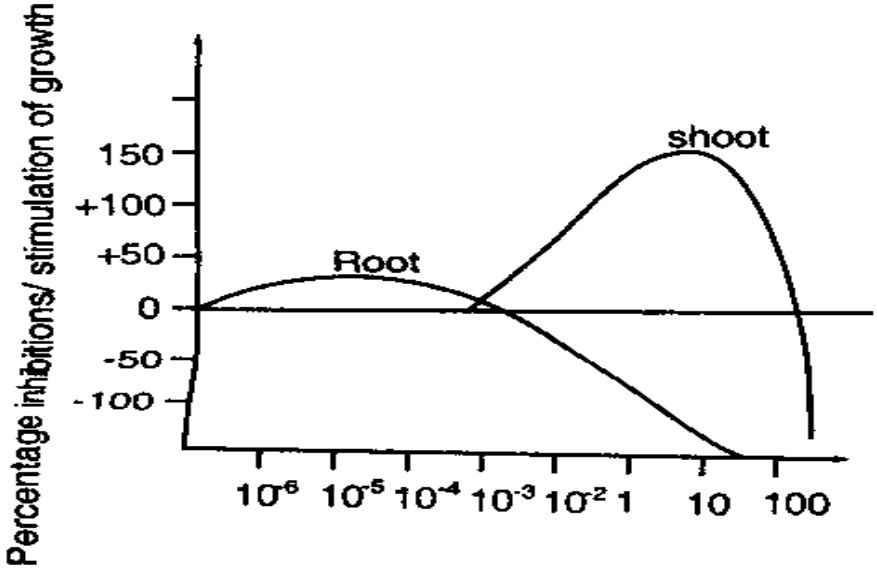
14.



a) Name the bones labeled C and D. **(2 mark)**

b) What happens to structure A and B as the arm is straightened **(1 mark)**

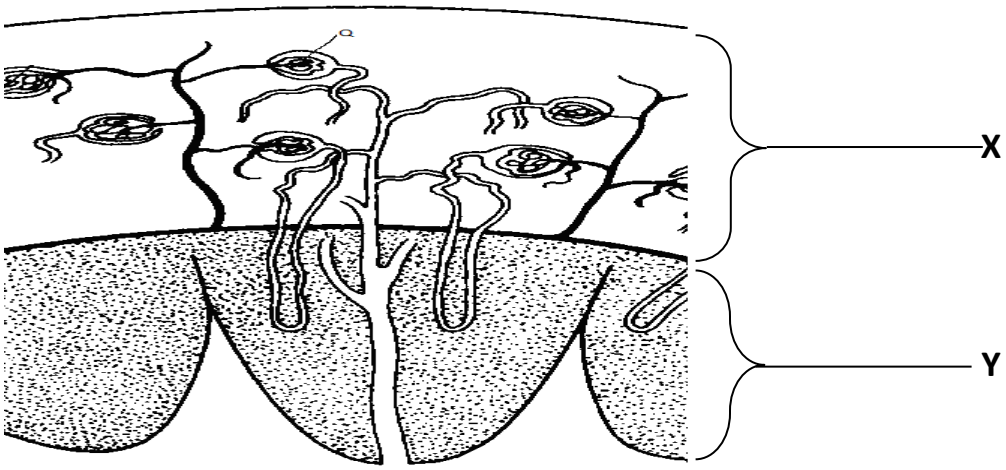
15. Below is a graphical representation of the effects of different concentration of auxins on shoot and root growth. Study it carefully and then answer the questions that follow.



Auxin concentration (ppm)

(a)Identify conclusions that can be drawn from the graph**.** **(3mks)**

16. The illustration below shows a transverse section through a mammalian kidney.



(a) Name the structures labelled **X** and **Y**. (**2mk)**

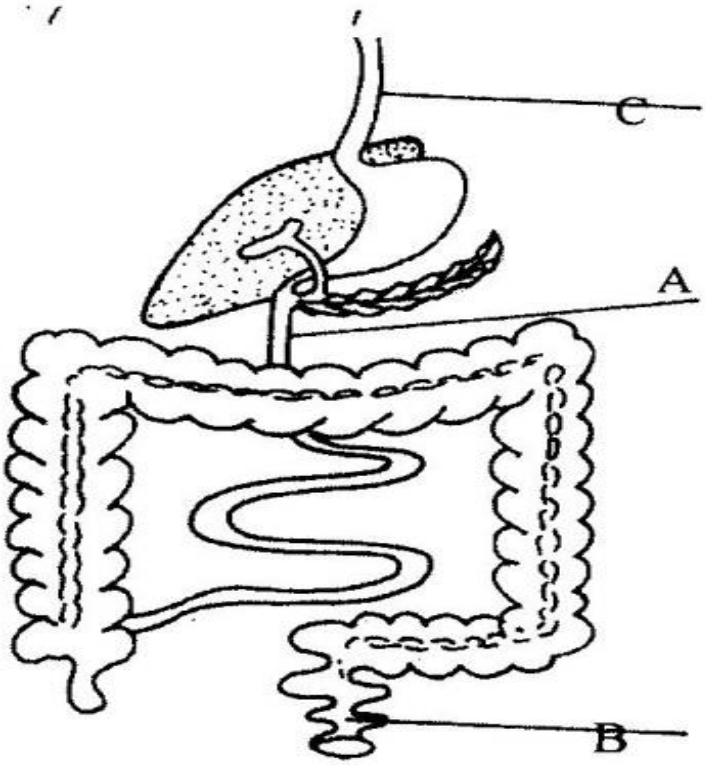
(b) State the process in **Q** that leads to the formation of glomerular filtrate. **(1mk)**

17. State **three** differences in composition between umbilical artery and umbilical vein. **(3 marks)**

18. (a) What is meant by the term taxonomy? **(1mk)**

(b) When are two organisms considered to belong to the same species. **(2mks)**

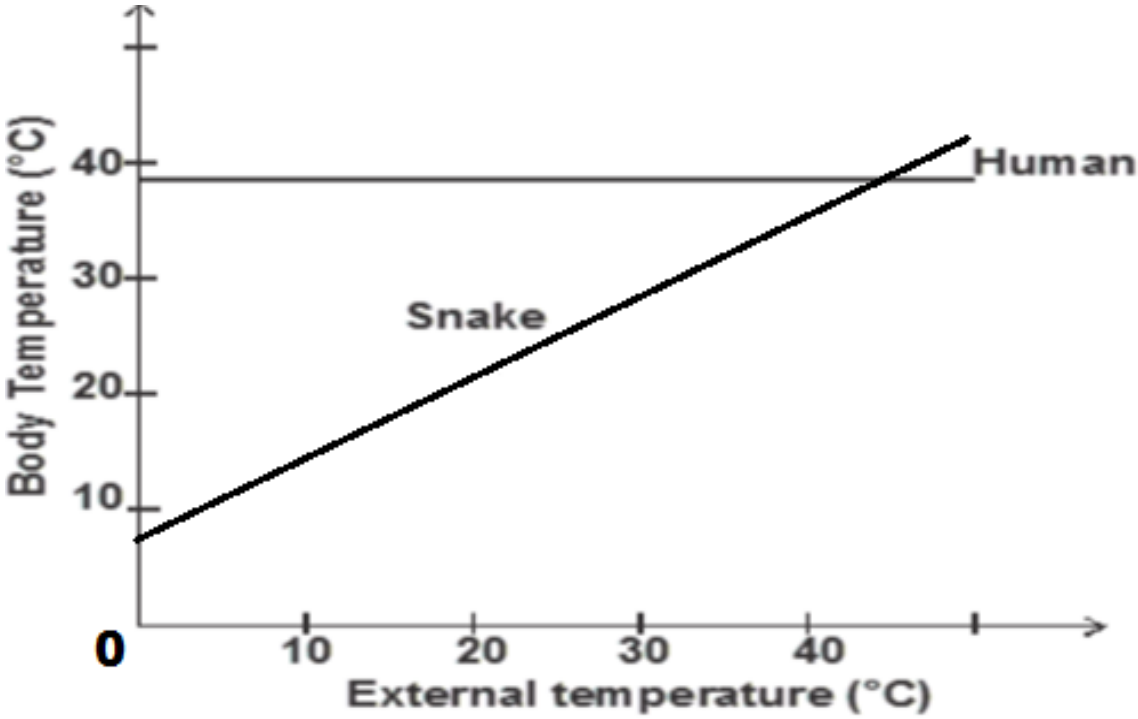
19). The diagram below shows part of alimentary canal of a mammal



(i) Name the parts labeled A and C **(2mks)**

(ii) State the function of the part labeled B **(1mk)**

20). The graph below shows the relationship between body temperatures and external temperatures in a human being and a snake. Study it and answer questions that follow.



a) What happens to the temperature of each organism as the external temperature increases. **(2 mrks)**

Human –

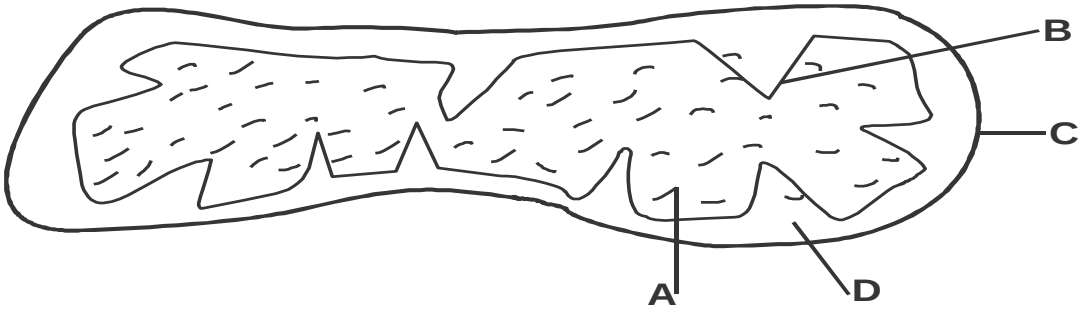
Snake –

b) Humans are described as homoithermic. State the advantage of this condition. **(2marks)**

21. a) Name two products of light stage during photosynthesis. **(2 marks)**

b) State three differences between light stage and dark stage of photosynthesis. **(3 marks)**

22. The diagram below represents a cell organelle.

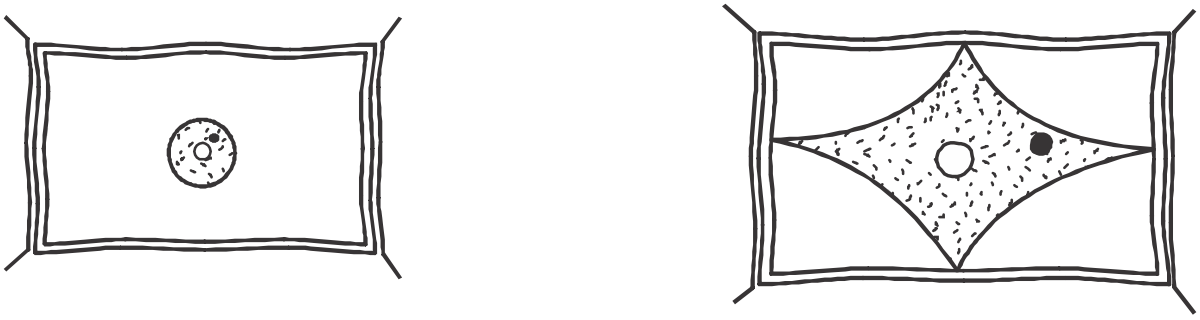


a) Identify the organelle. **(1 mark)**

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

c) State the functions of the part labelled A **(1 mark)**

23 . The diagram below represents a plant cell that was subjected to a certain treatment.



At the start **At the end of the experiment**

a) Account for the shape of the cell at the end of the experiment. **(2 marks)**

b) Draw a diagram to illustrate how an animal cell would appear if subjected to the same treatment**.** **(1 marks)**

24.a)Give a reason why each of the following steps are followed when preparing cross sections of a leaf for examination under a microscope.

i) Cutting thin sections. **(1 mark)**

ii) Placing the sections in water. **(1 mark)**

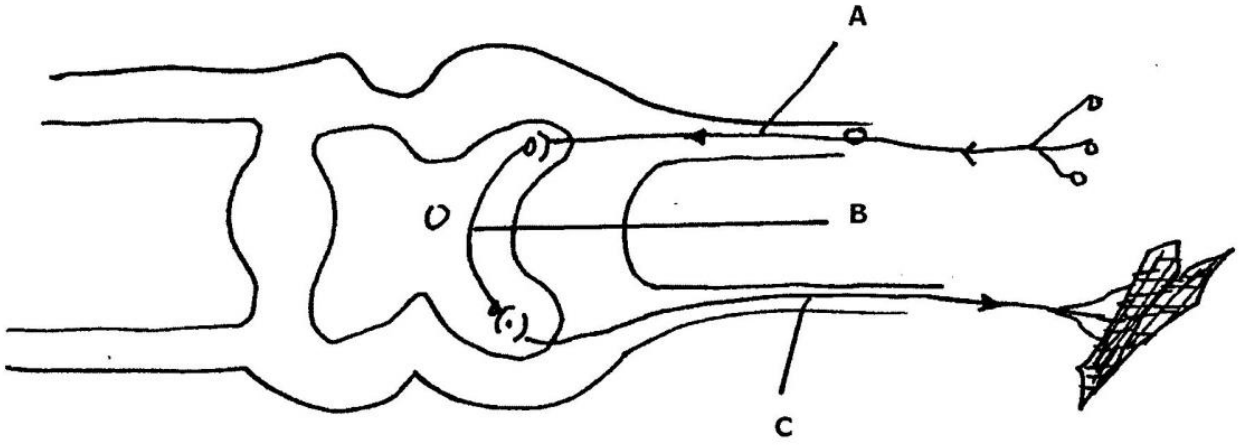
25.a) Name two tissues in plants that provide mechanical support. **(2 marks)**

b. Name the types of joints formed by each of the following pairs of bones:

i) Axis and atlas. **(1 mark)**

ii) Humerus with clavicle and scapula. **(1mk)**

26.) The diagram below represents a simple reflex arc



(a) Name the parts labeled A, B and C **(3mks)**

(b) What is the role of part **A** **(1mk)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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:

1) *Write **your name** and **index number** in the spaces provided.*
2) *Answer **all** the questions in Section **A** in the spaces provided.*
3) *In section **B** answer questions **6** (compulsory) and either question **7** or **8** in the spaces provided*

FOR EXAMINER'S USE ONLY:

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	**80**	

SECTION A (40 MARKS)

Answer all questions in this section in the spaces provided.

1. **(a)** Name **two** disorders in human caused by gene mutation. **(2 marks)**

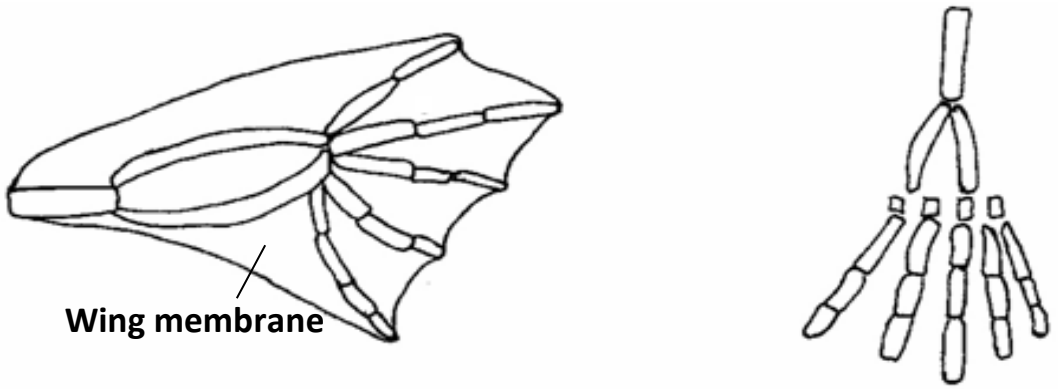
(b) Describe the following chromosomal mutations:

(i) Inversion **(1 marks)**

(ii) Translocation **(1 marks)**

(c) In mice the allele for **black fur** is **dominant** to the allele for **brown fur**. What Percentage of offspring would have brown fur from a cross between heterozygous black mice? Show working. Use letter **B** to represent the allele for **black colour**. **(4 marks)**

2. The diagram **below** shows structures of the bat wing and human arm.



(a) **These** structures are thought to have same ancestral origin. State **one** structural similarity and **one** adaptational difference between the two.

(i) Structural similarity. **(1mk)**

(ii) Adaptation difference. **(2mks)**

(b) Give **two** other examples of structures in nature that show the type of evolution as in (a) above. **(2mks)**

(c) Distinguish between the terms 'chemical evolution' and 'organic evolution'. **(2mks)**

(d) What is the study of fossils called? **(1mk)**

3 a) Name the causative agents for the following respiratory diseases.

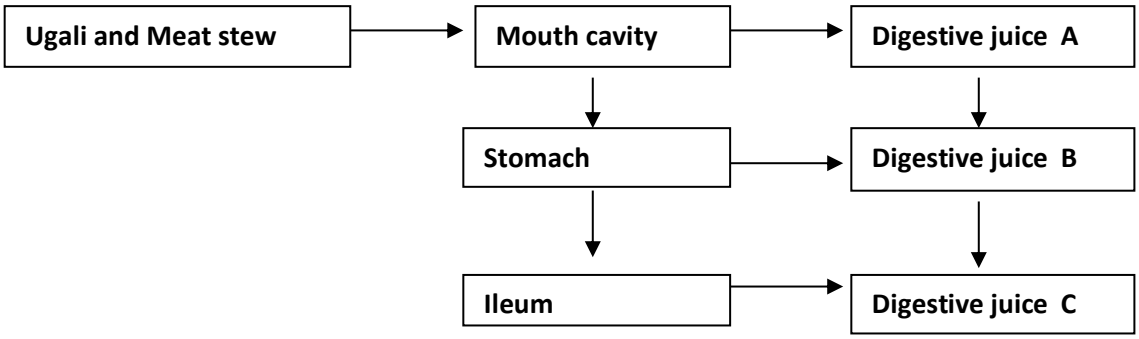
i) Whooping cough**……** **(1 mark)**

ii) Pneumonia**……** **(1 mark)**

b) Describe how carbon (IV) oxide in the tissues reaches the lungs **(4 marks)**

c) How are guard cells adapted to their functions**?** **2mks**

4. The flow diagram below represents passage of a meal through the human digestive system. Study the diagram and answer the questions that follow.



(a) Name the physical process that will occur in mouth cavity **(1mark)**

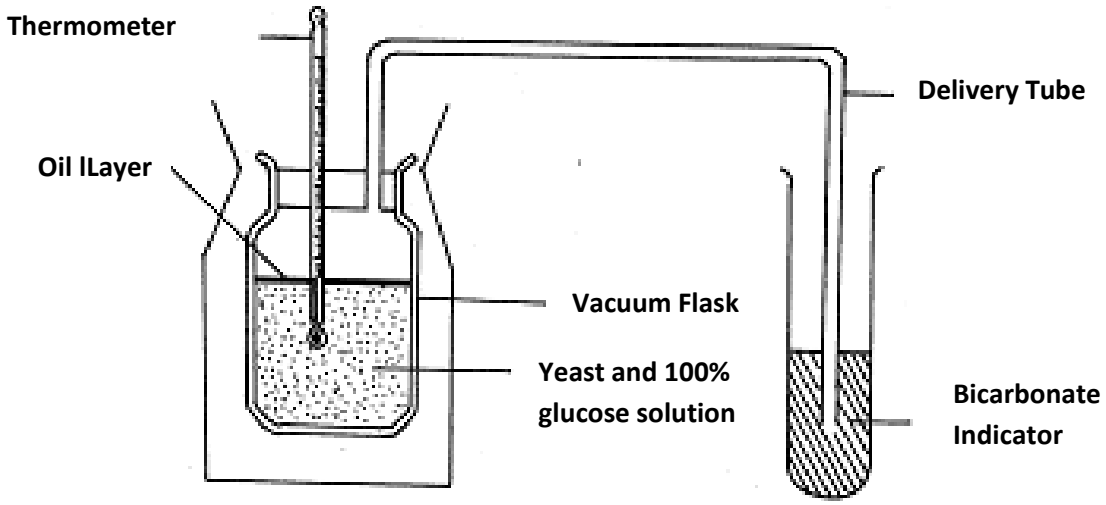
(b) Name the digestive juices **B** and **C** **(2 mrks)**

(c) Explain **two** ways in which the digestive system is protected from corrosive effects of digestive juices. **(2 marks)**

(d) Name the hormone that stimulate secretion of juice **B**. **(1mark)**

(e) Identify **two** contents of digestive juice **A** **(2 marks)**

5. The experiment below was set-up to investigate some physiological processes. The glucose solution was first boiled then cooled. The set-up was left for 24hrs.



(a) Suggest two aims of the experiment. **(2mks)**

(b)(i) State the expected observations after 24 hours. **(2mks)**

(ii) Explain your observations in a (i) above. **(2mk)**

(iii) Why was glucose solution boiled then cooled? **(1mk)**

(iii) Suggest a control for the above experiment **(1mk)**

SECTION B (40 MARKS)

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

6. In an experiment, a man drank one litre of water and the volume of urine produced was measured and recorded at an interval of one hour after drinking the water. On the second day, the man repeated the experiment but this time he drank one litre of 1.2% sodium chloride solution. The results are as shown in the table below:

Time (hours)	Volume of urine produced (cm^3) on drinking	
	Water	1.2 % sodium chloride solution
0	80	30
1	50	30
2	350	40
3	540	35
4	30	60
5	100	40
6	50	80
7	70	100

(a) On the same axes, plot graphs of urine produced on drinking water and 1.2%sodium chloride solution against time. **(8 marks)**

(b) From the graph, determine the volume of urine produced by the man two and a half hours after drinking water. **(1 mark)**

(c) Account for the production of urine produced by the man when he drank the litre of

(i) 1.2% sodium chloride solution. **(3 marks)**

(ii) Water **(3marks)**

(d) What is diabetes insipidus? **(2 marks)**

(e) Explain why treatment of diabetes mellitus is via injection and not through taking insulin tablets orally. **(2 marks)**

7. Explain how abiotic factors affect plants in their habitat. **(20 marks)**

8.Describe the structure and function of various parts of the heart **(20 marks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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 CANDIDATES:

1) *Write your **name** and **index number** and **school** in the spaces provided above.*
2) *Sign and write **date** of the examination in the spaces provided above*
3) *Answer **all** the questions in section **A** and **B***

FOR EXAMINER'S USE ONLY:

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1-29	80	

SECTION A

1. A young scientist observed a bird laying her eggs in a nest and later the eggs hatched into chicks. Name three characteristics shown by the chicks that show a chick is a living thing but an egg is not **(3mks)**

2. Which organelles should be abundant in;

i) Skeletal muscle **(1mk)**

ii) Palisade tissue **(1mk)**

3. A form 1 student was preparing temporary slides in the laboratory, in the course of preparation he carried out the following processes;

i) Sectioning

ii) Fixation

iii) Staining

State the importance of the above processes **(3mks)**

4. Why are lysosomes many in phagocytic cells **(2mks)**

5. Differentiate between guttation and transpiration **(2mks)**

6. a) Give a reason why xylem vessel should be dead **(1mk)**

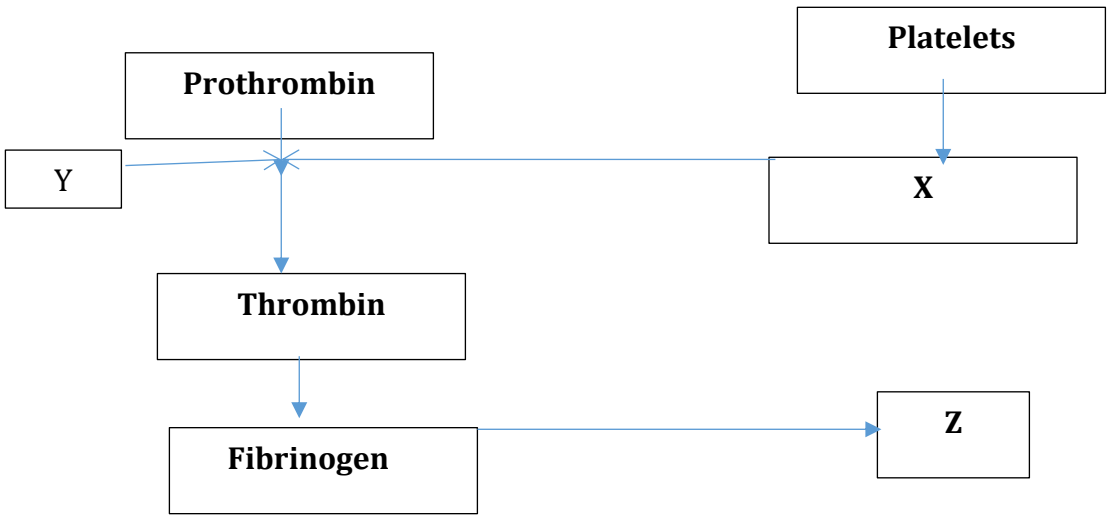
b) What is the role of lignin in the wall of the xylem vessel **(1mk)**

7. Name the disease of the blood characterized by,

a) Abnormally large number of white blood cells **(1mk)**

b) Cresent –shaped haemoglobin **(1mk)**

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

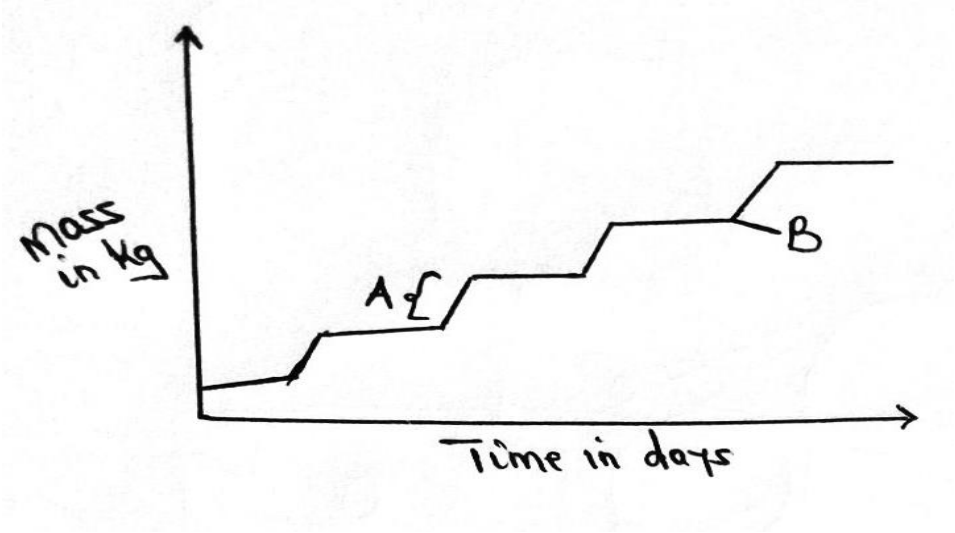


Name;

i) The metal ion represented by Y **(1mk)**

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

9. The graph below represents the growth of animals in a certain phylum. Study it and answer the questions that follow.



a) Name the type of growth pattern shown on the graph **(1mk)**

b) Identify the process represented by letter B **(1mk)**

c) Name the hormone responsible for the process in (b) above **(1mk)**

10. Explain why a mule is infertile **(1mk)**

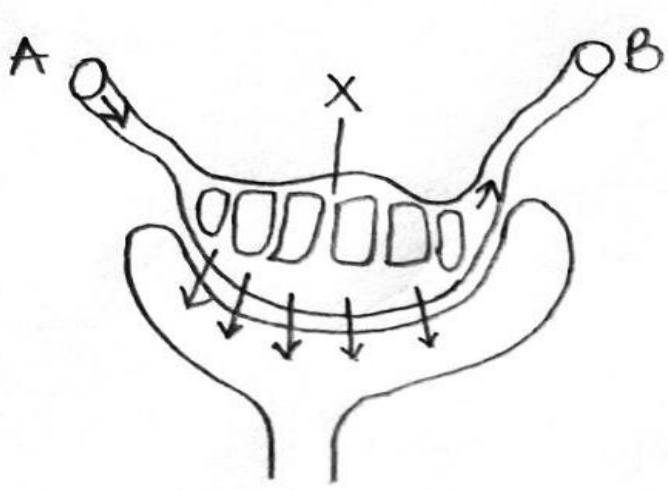
11. Phylum Arthropoda is the most successful of invertebrates. Explain two characteristics that make them most successful **(2mks)**

12. Name phylum whose members possess a notochord **(1mk)**

13. a) Define evolution and homologous structures **(2mks)**

b) **State** three limitations of using fossil records as an evidence that supports organic evolution **(3mks)**

14. The following is part of a kidney nephron



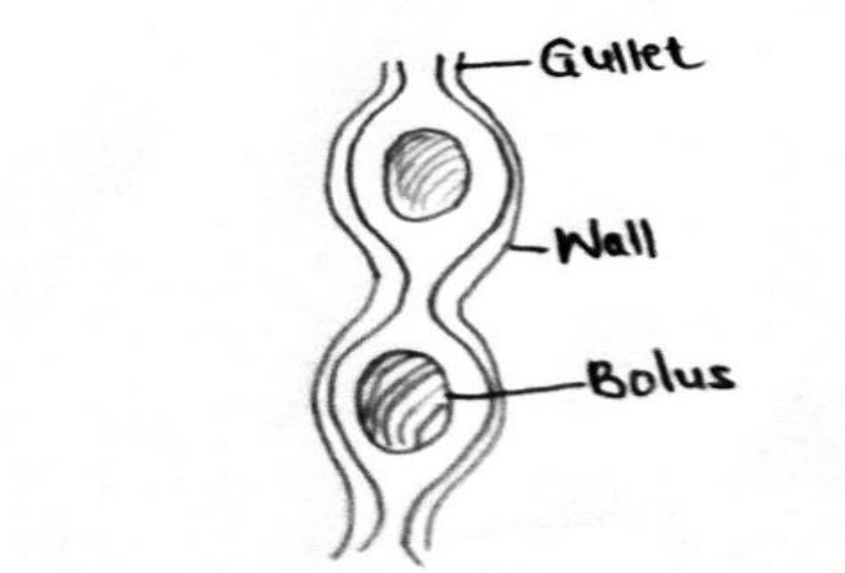
a) i)Name the process represented by the arrows **(1mk)**

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

b) Identify with a reason vessel A **(1mk)**

c) Name any two blood components that are present in vessel (A) but are absent in vess**el B (2mks)**

15. The diagrammatic representation below illustrates one of the process that occurs in mammals during feeding. Carefully study it and answer the following questions



i) Identify the process **(1mk)**

ii) State two structural adaptations of gullet to its functions **(2mks)**

iii) Name one enzyme already present in the food bolus within the gullet in man **(1mk)**

b) State two functions of mucus secreted by the intestines **(2mks)**

16. Explain each of the following;

a) Variegated plants accumulates less food than non-variegated plants under similar conditions. **(2mks)**

b) Most leaves are thin with broad leaf surface **(2mks)**

17. State the economic importance of the following plant excretory products **(3mks)**

a) Papain

b) Caffein

c) Colchicine

18. a) State two processes which occurs during anaphase of mitosis **(2mks)**

b)What is the significance of first meiotic division **(1mk)**

c)State two ways in which HIV/AIDS is transmitted from mother to child **(2mks)**

19. State the function of the following during pregnancy **(3mks)**

a) Amnion
b) Amniotic fluid
c) Umblical cord

20. Name the process by which;

i) Producers convert sunlight energy into chemical energy **(1mk)**

ii) Chemical energy is converted into heat energy by consumers **(1mk)**

21. Students from Mpesa foundation academy wanted to investigate the population of crabs in their school pond. They caught 50 crabs, marked them with white paint on the cephalothorax and then released them back into the pond. After three days, they came back and caught 50 crabs of which 3 had the white mark.

a) Using the data above, calculate the population of crabs in the pond **(2mks)**

b) Suggest three assumptions the students made during this study **(3mks)**

22. State any two methods that can be used at home to properly manage domestic effluents **(2mks)**

23. a) Explain how the following factors increase the rate of diffusion **(3mks)**

i) Temperature

ii) Diffusion gradient

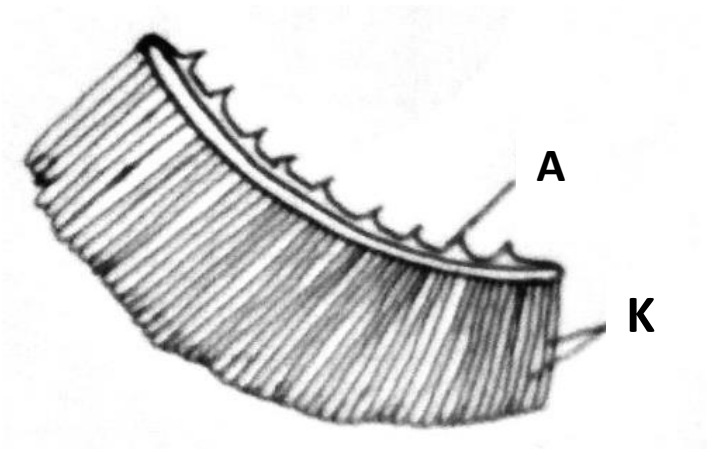
iii) Size of diffusing particles

b) Diffusion is a passive process while active transport is an active **process. Explain** **(2mks)**

24. a) Waterlogging in terrestrial plants inhibit uptake of certain mineral ions from the soil by the plants. Explain **(3mks)**

b) State two illustrations of Osmosis in plants **(2mks)**

25. The diagram below represents a gill of a fish



i) State two ways in which a large surface area is created in structures labelled K **(2mks)**

ii) Name the type of flow system that occurs between water and blood in the capillaries present on structures K **(1mk)**

iii) Name an organ in human beings that also display the flow system named in (ii) above **(1mk)**

26. Identical twins were separated after birth and were then raised in different environments. One in Kenya and the other in U.S.A. They rejoined after 18 years and they looked slightly different.

i) Name the type of variation the twins exhibited **(1mk)**

ii) Give two observable differences likely to be noted between the twins **(2mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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:

1) *Write **your name** and **index number** in the spaces provided.*
2) *Answer **all** the questions in Section **A** in the spaces provided.*
3) *In section **B** answer questions **6** (**compulsory**) and either question **7** or **8** in the spaces provided*

FOR EXAMINER'S USE ONLY:

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	**80**	

SECTION A (40MKS)

Answer all the questions in these section

1. Haemophilia is a sex linked characteristic caused by a recessive gene located on one of the sex chromosomes.

a) Name the chromosome onto which the gene for haemophilia is linked to **(1mk)**

b) A normal man for the condition marries a normal woman for the condition but sadly one of their sons develop this condition from birth.

i) What are the likely genotypes of this couple? **(2mks)**

Man

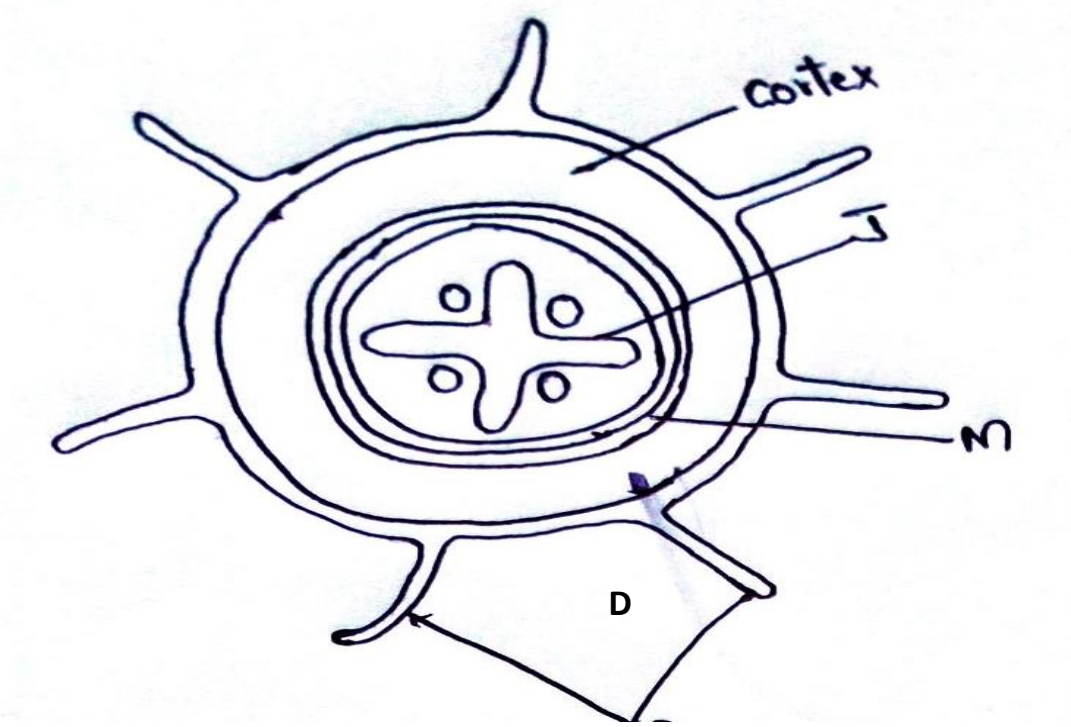
Woman

ii) Using a punnet square, carry out a cross to show why the couple gave birth to haemophiliac son **(4mks)**

Use (H),to represent the gene for normal condition and (h) to represent the gene for haemophilia

iii) Why is this haemophiliac condition very common in males than in **female** **(1mk)**

2. The figure below represents an organ obtained from a section of a plant. Use it to answer questions that follow.



a) **i)** Name the organ from which the above section was obtained. Give a reason for your answer **(2mks)**

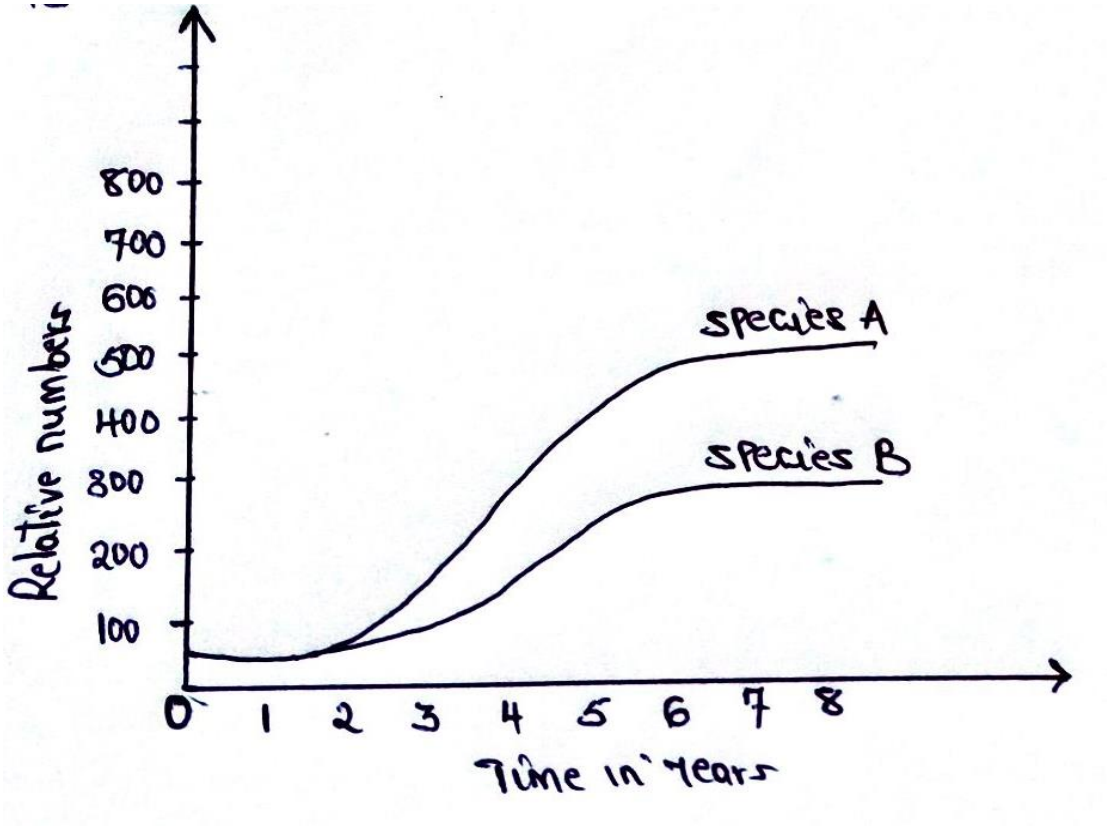
ii) Structure labelled J is described as a mechanical tissue. Explain **(1mk)**

b) i) Name the process by which water passes across structure M **(1mk)**

ii) Explain two ways by which cells with structures Dare adapted to their functions **(2mks)**

c) Name two strengthening materials that strengthen the collenchyma tissue **(2mks)**

3. The herbivorous mammalian species were introduced into an ecosystem at the same time and in equal numbers. The graph below represents their populations during the first seven years. Study the graph and answer the questions that follow.



a) i) Which species has a better competitive ability **(1mk)**

ii) Give reason for your answer **(1mk)**

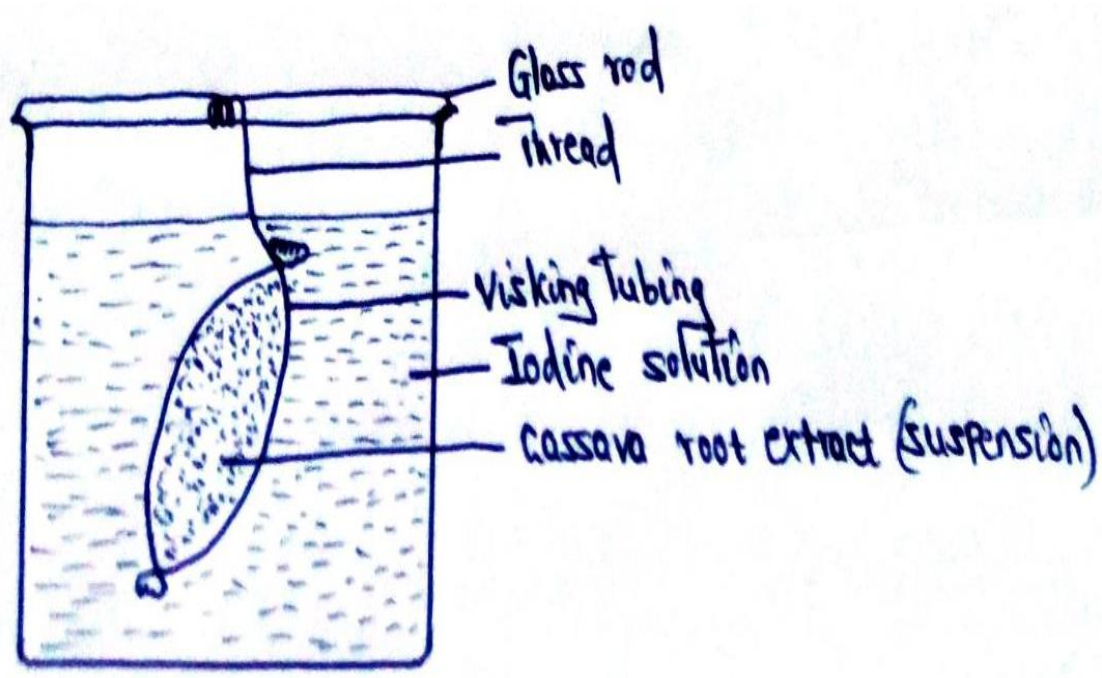
b) Account for the shape of the curve of species A between

i) One year and three years **(2mks)**

ii) Three years and seven years **(2mks)**

c) A natural predator for species A was introduced into the ecosystem. With a reason state how the population of each species would be affected **(2mks)**

4. A student from Abogeta secondary set up an experiment as illustrated below.



The visking tubing was left in iodine solution for 4 hours.

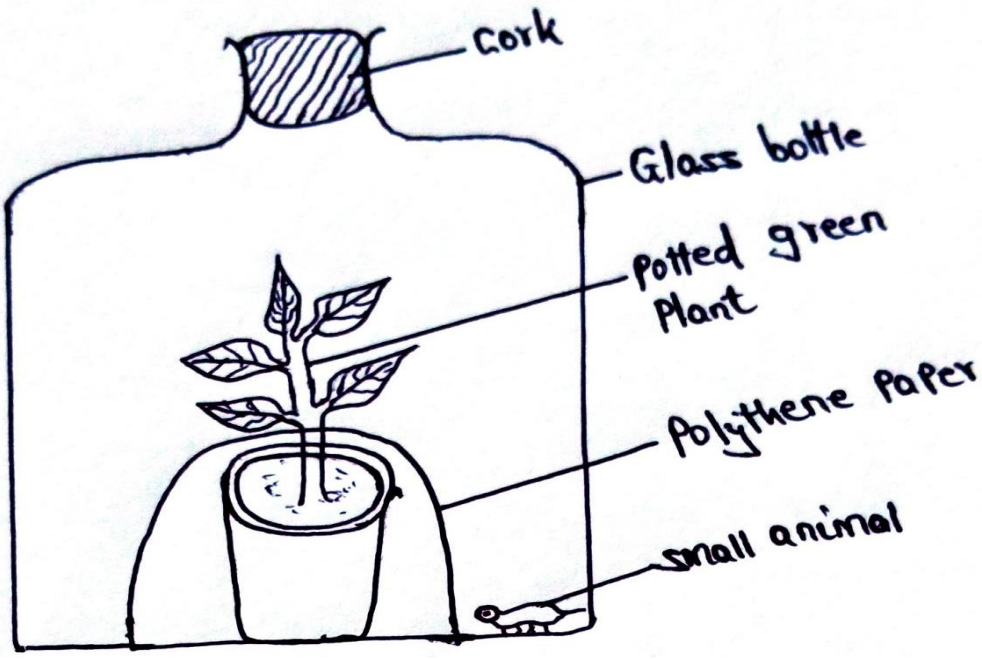
a) State the physiological process being investigated **(1mk)**

b) i) What were the expected results in the visking tubing and in the beaker **(2mks)**

ii) Account for your expected result in visking tubing **(2mks)**

c) Mention three factors that influences the rate of active transport **(3mks)**

5. An experiment was set up to investigate a factor in autotrophism in green plants.



Vaseline was applied at joint between the cork and the mouth of glass bottle and set up was left under sunlight for 6 hours.

a) Why was it necessary;

i) To apply Vaseline **(1mk)**

ii) To cover the pot with polythene paper **(1mk)**

iii) What was the purpose of including the small animals? Give two reasons. **(2mks)**

b) i) What would happen to the small animal if the set up was left over night in darkness **(1mk)**

ii) Account for the answer in b (i) above **(1mk)**

c) State the respiratory surface of the following organism **(2mks)**

i) Amoeba

ii) Fish

SECTION B (40MKS)

Answer question 6 (Compulsory) and choose either question 7 or 8

6. A hungry person had a meal, after which the concentration of glucose and amino acids in the blood were determined. This was measured hourly as the blood passed through the hepatic portal vein and the iliac vein in the leg. The results were as shown in the table below.

Time (Hrs)	Concentration of contents in Hepatic portal vein (Mg/100ml)		Concentration of contents in the iliac vein of the leg (Mg/100ml)	
	Glucose	Amino acids	Glucose	Amino acids
0	85	1.0	85	1.0
1	85	1.0	85	1.0
2	140	1.0	125	1.0
3	130	1.5	110	1.5
4	110	1.5	90	3.0
5	90	3.0	90	2.0
6	90	2.0	90	1.0
7	90	1.0	90	1.0

a) Using the same axes draw graphs of concentration of glucose in the hepatic portal vein and the iliac vein in the leg against time **(7mks)**

b) Account for the concentration of glucose in the hepatic portal vein from;

i) 0-1 hour **(2mks)**

ii) 1-2 hours **(3mks)**

iii) 2-4 hours **(3mks)**

iv) 5-7 hours **(2mks)**

c) Account for the difference in the concentration of glucose in hepatic portal vein and the iliac vein between 2 and 4 hours **(2mks)**

d) Using the data provided in the table explain why the concertation of amino acids in the hepatic portal vein took longer to increase **(1mk)**

7. a) Describe the opening and closing of the stomata using the photosynthetic theory **(10mks)**

b) Describe blood sugar regulations in mammals **(10mks)**

8. a) Describe the adaptation of the following plants to their habitat;

i) Xerophytes **(15mks)**

ii) Hydrophytes **(5mks)**

KCSE 2025 TOP SCHOOLS MOCKS

NATIONAL 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 CANDIDATES

1. *Write your name, admission number, school and stream in the spaces provided above.*
2. *Answer all the questions in the spaces provided.*

FOR EXAMINERS USE ONLY

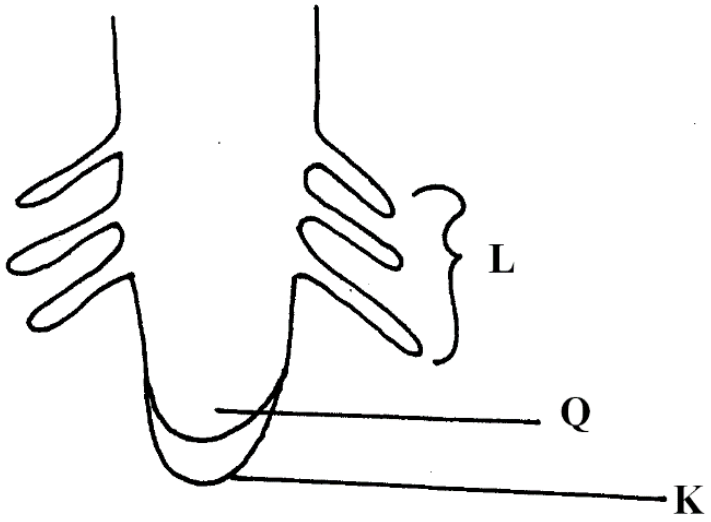
QUESTIONS	MAXIMUM SCORES	CANDIDATE'S SCORE
1 – 31	80	

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

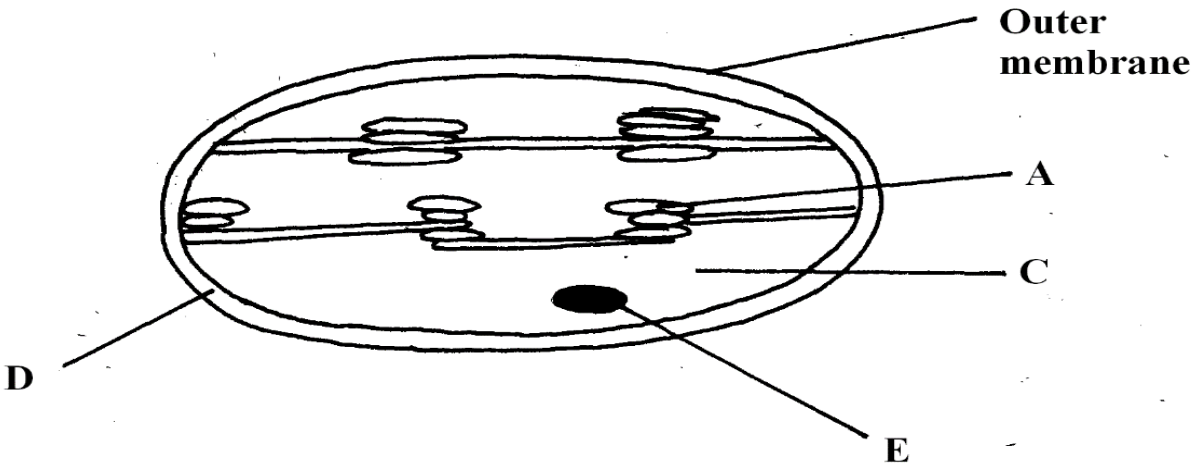


a) What is the function of the part labeled K**.** **(1mk)**

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)**

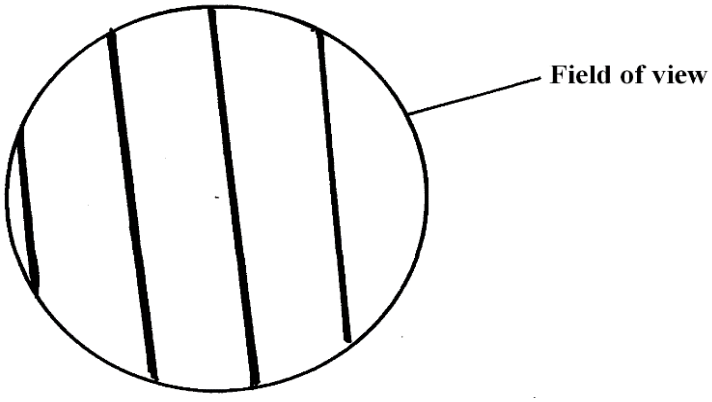
5. A Rhinocerous in a game park was found to be infested with ticks. State the trophic level occupied by **Ticks** **(2mks)**

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.



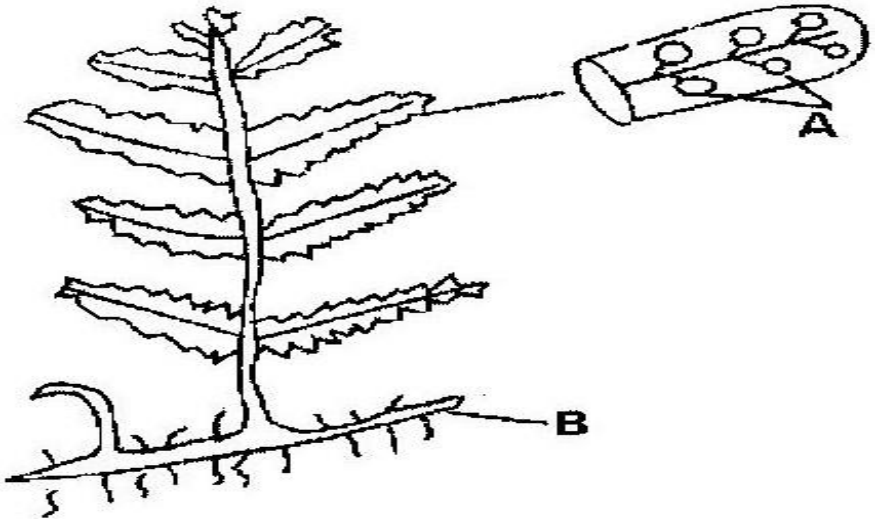
The student identified 20 cells across the field of view. Calculate the size of the cell in Micrometers (show your working) **(3mks)**

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:

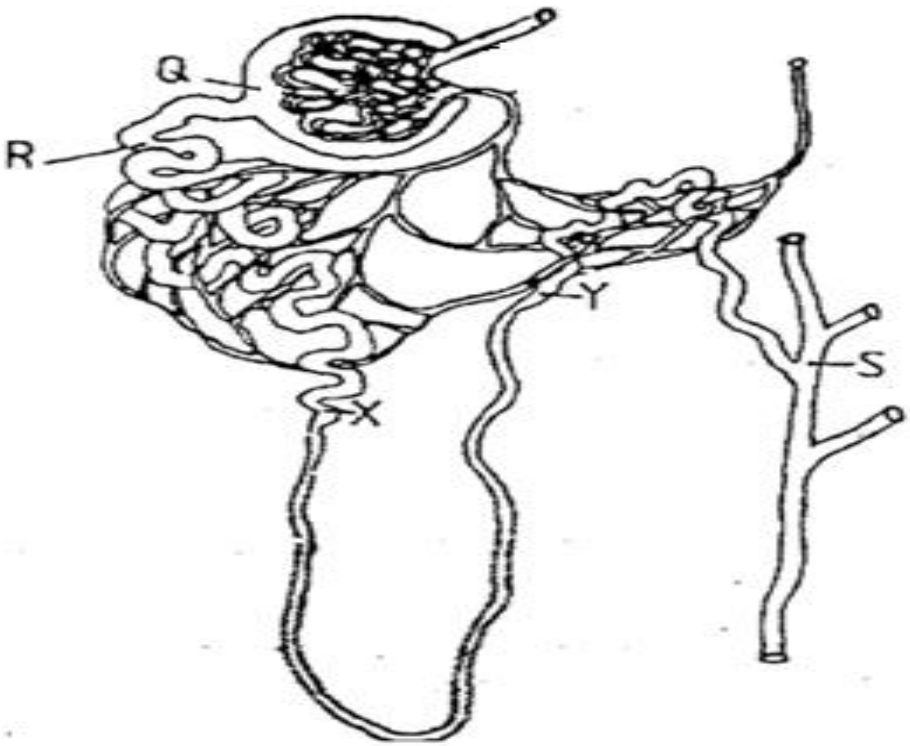
(i) Protogyny **(1mk)**

(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)**

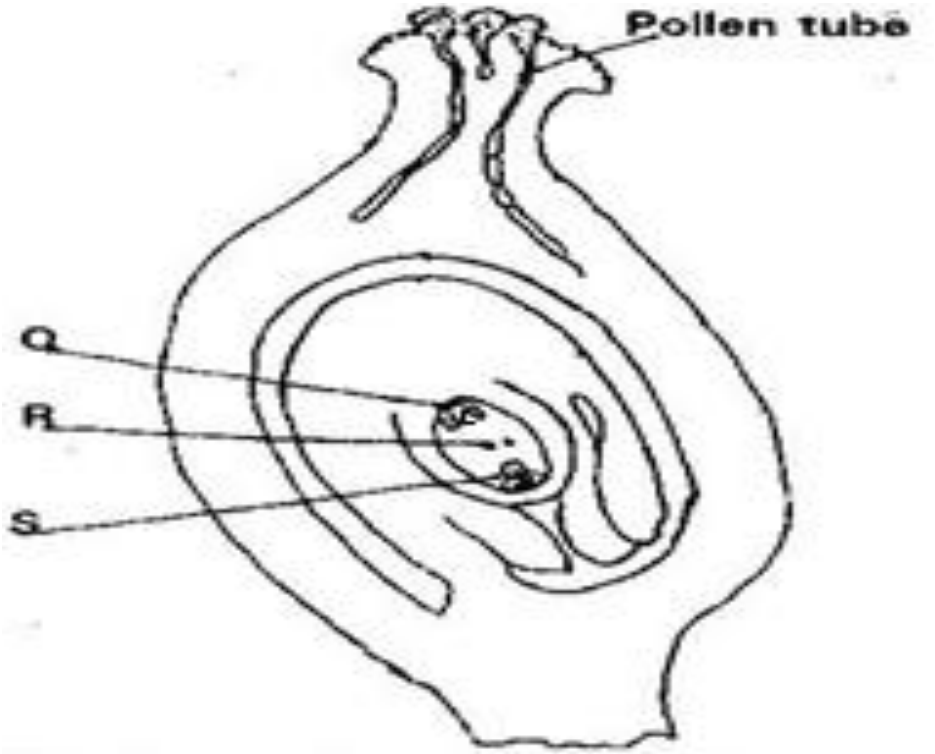
14. State TWO characteristics of members of kingdom Monera that are not found in other kingdoms. **(2mk)**

15. What is meant by the following biological terms?

i) Crenation **(1mk)**

ii) Haemolysis **(1mk)**

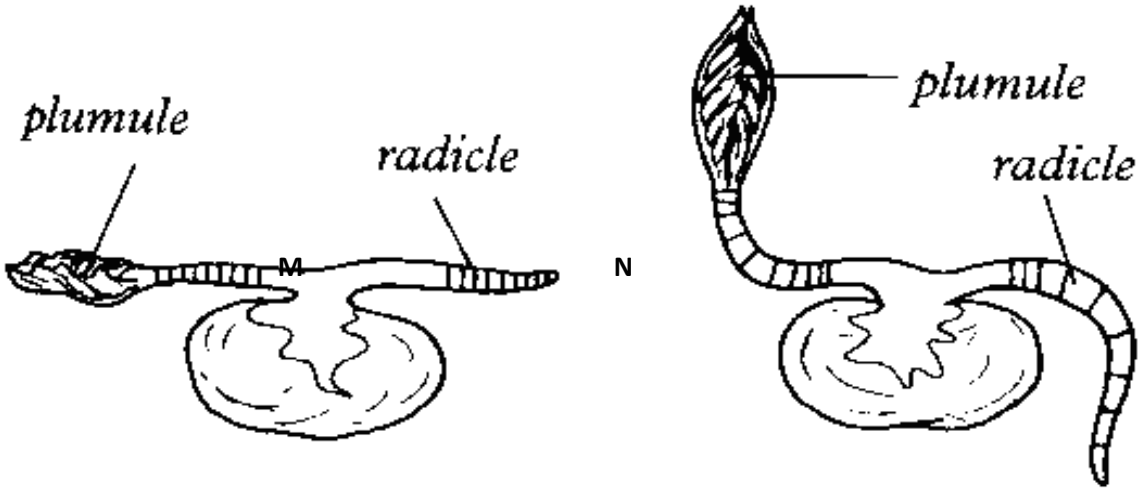
16. The diagram below shows a stage during fertilization in flowering plant.



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**

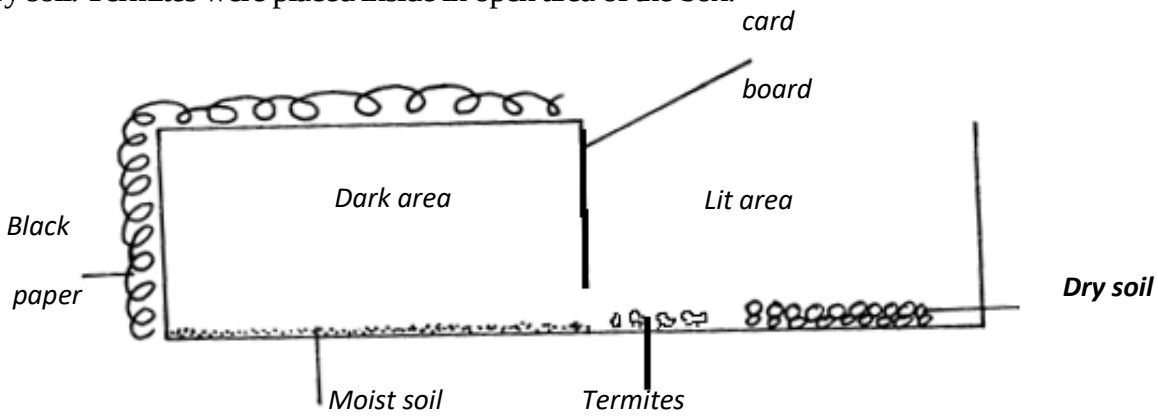
18. The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

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 example 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.

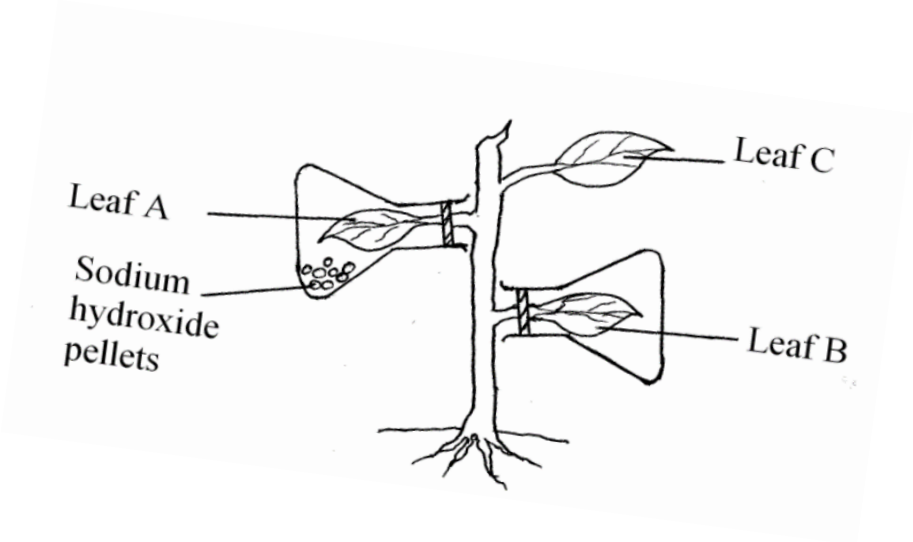


a) Predict what happened to the termites after 30 minutes**.** **(1mk)**

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 **Drosophila melanogaster** (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)**

X _____

Z _____

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

Y _____

KCSE 2025 TOP SCHOOLS MOCKS

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231/2

BIOLOGY

PAPER 2 (THEORY)

TIME: 2 HOURS

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Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES.

1) *Write **your name** and **index number** in the spaces provided above.*
2) *Sign and write the date of examination in the spaces provided above.*
3) *This paper consists of section **A** and **B**.*
4) *Answer **ALL** questions in section A in the spaces provided.*
5) *In section **B** answer questions 6 (compulsory) and either question **7** or **8***

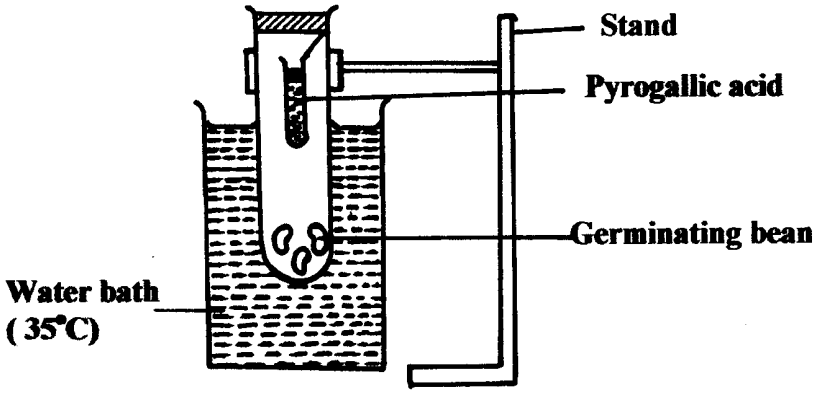
FOR EXAMINERS' USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	80	

SECTION A (40MARKS)

Answer all questions in this section in the spaces provided.

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**

(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 mrks)**

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

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)**

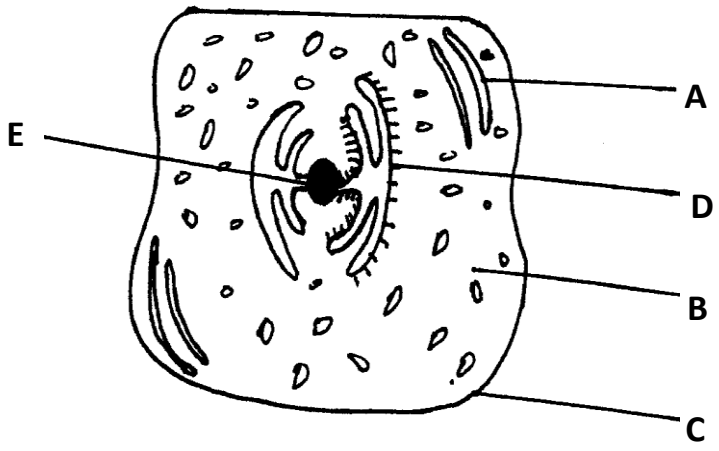
d) Mention one role played by each of the following hormones in human menstrual cycle. **(3mks)**

i) Oestrogen

ii) Luteinizing hormone

iii) Follicle stimulating hormone

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)**

D:……

E:……

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 e**qual?** **(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)**

THE END

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