KCSE 2024 REGIONAL MOCKS

BIOLOGY

The PDF Comprises of A Compilation of 4 Top Joint National Mocks Administered across the 47 Counties for KCSE Class of November 2024

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

NAME:……ADM:……CLASS:……

231/1
BIOLOGY
PAPER 1
CLASS OF KCSE 2024
TIME: 2HRS

THE NAIROBI & CENTRAL REGIONS KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTION: Answer all questions in the spaces provided after the question.

1. (a) Explain why a person discharges urine more frequency when environmental temperatures are lower than when they are high. (2mks)

(b) Name the nitrogenous waste product excreted by a fresh water fish. (1mk)

---

2. Explain how the xylem vessels are adapted to their functions. (3mks)

---

3. State three evidences of organic evolution (3mks)

---

4. In an experiment, it was found that when maggots are exposed to light, they move to the dark areas.
   a) Name the type of response exhibited by the maggots. (1mk)

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b) State the survival value of the response in (a) above. (1mk)

---

5. (a) What is meant by oxygen debt. (2mks)

(b) State one factor that affects basal metabolic rate. (1mk)

---

6. Explain what would happen to red blood cells when they are placed in hypotonic solution. (3mks)

---

7. State the organelle that perform the following functions. (3mks)
(i) Synthesis of ribosomes

(ii) Transport of lipids

(iii) Package and transport of glyoco-proteins

---

8. What are structural units of lipids. (2mks)

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9. (a) State the major factor in the 'Global warming" experienced in the world today. (1mk)

(b) Suggest the ways of reducing the global warming (2mks)

---

10. State the role of the following in Homeostasis. (2mks)

i) ADH:……

ii) Aldosterone…….

11. Explain why cells of an endosperm are triploid and not haploid. (2mks)

---

12. State four ways in which respiratory surfaces are suited to their functions. (4mks)

---

13. State three structural modifications of nephrons found in desert mammals. (3mks)

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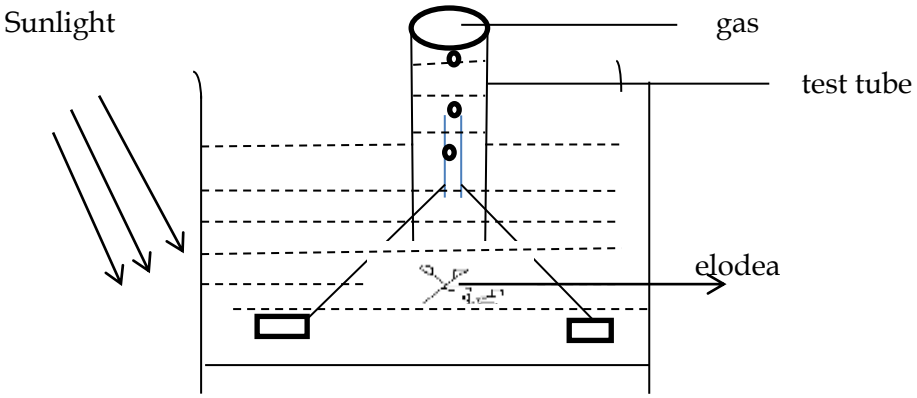
14. How would you find out from a sample of urine whether a person is suffering from diabetes mellitus. (3mks)

---

15. What are the advantages of fruit and seed disposal (2mks)

---

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



a) What was the aim of the experiment? (1mk)

---

b) Name the gas collected in the gas jar. (1mk)

---

c) What is the confirmation test for the gas in (b) above? (1mk)

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d) State two factors that would affect the process. (2mks)

---

17. Name the antigens that determine human blood group. (2mks)

---

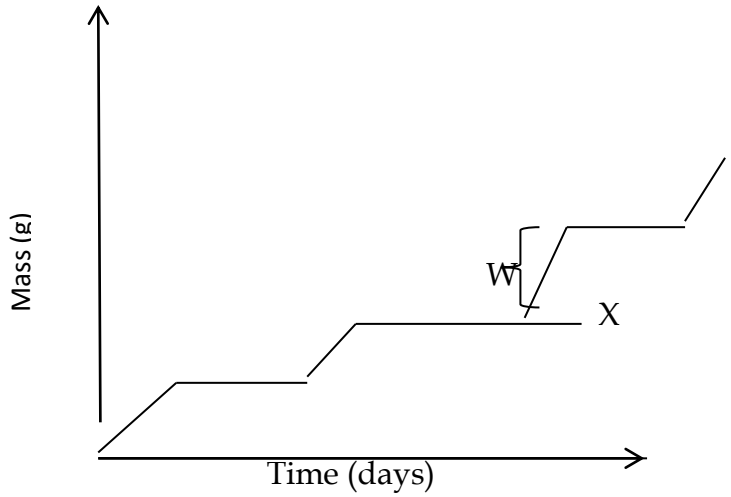
18. a) Explain why pepsin in stomach of man is secreted in inactive form (1mk)

---

b) Which gland secretes pepsinogen? (1mk)

---

19. The graph below represents its growth of animals in a certain phylum.



a) Name the type of growth pattern shown on the graph. (1mk)

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b) Identify the process represented by x. (1mk)

---

c) Name the hormone responsible for the process in (b) above. (1mk)

---

20. A student smeared Vaseline jelly on the lower epidermis of a leaf of a potted green plant which had been kept in the dark for 24hrs. She then transferred the plant to the light for six hours starch test on the leaf of the plant were negative. Account for the observation. (3mks)

---

21. State the three different types of blood cells. (3mks)

---

22. The following cell are found in living organisms.
a) Identify the parts labeled V and U. (2mks)

---

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

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c) State one cell organelle which is most abundant in the structure and explain its role. (2mks)

---

23. a)) Explain briefly Lamarck's theory of evolution. (2mks)

---

b)State a reason why Lamarck's theory of evolution has been disapproved by scientists. (1mk)

---

24. Below is an equation showing the aerobic breakdown of fat.
$2C_{51}H_{98}O_6 + 145O_2 \xrightarrow{Energy} 102CO_2 + 98H_2O$.

Calculate the respiratory quotient of the breakdown above. (2mks)

25. (a) What are vestigial structures? (1mk)

---

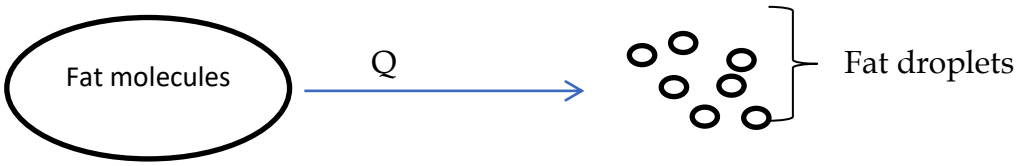
b) Give two examples of vestigial structures found in man. (2mks)

---

26. Give two limitations of fossil records as evidence of evolution. (2mks)

---

27. The diagram below illustrates a physiological process that occurs in the alimentary canal of man.



a) Name the process Q above. (1mk)

---

b) Explain the biological importance of the above process. (1mk)

---

c) Name the substance that helps the process name in (a) above (1mk)

---

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

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

NAME:……ADM:……CLASS:……

231/2
BIOLOGY
PAPER 2
CLASS OF KCSE 2024
TIME: 2HRS

THE NAIROBI & CENTRAL REGIONS KCSE JOINT NATIONAL MOCK 2024

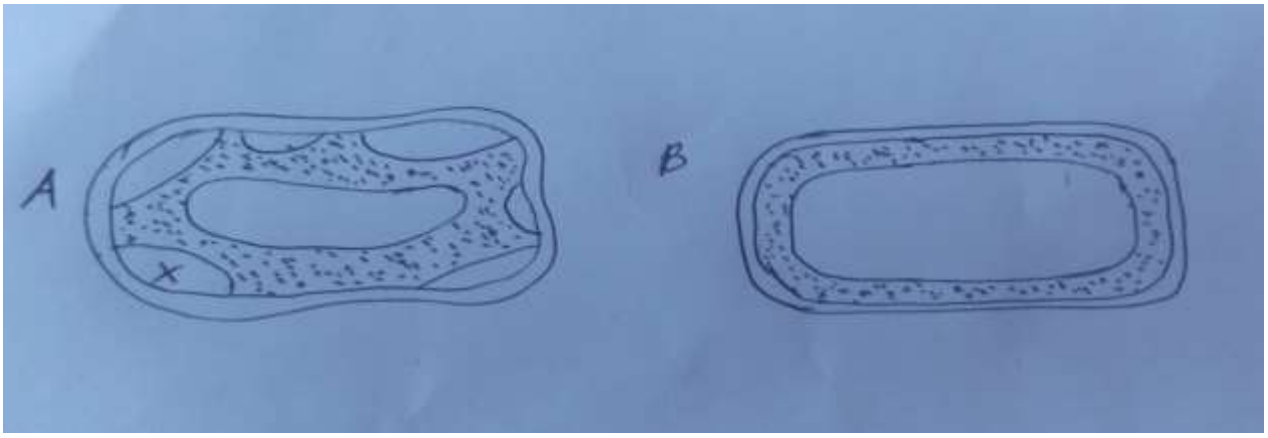
Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES

a) **This paper consists of two sections A and B.**
b) **Answer All the questions in Section A in the spaces provided**
c) **In section B answer question 6. (compulsory) and either question 7 or 8 in the spaces provided after question &.**
d) **Candidates should answer the questions in English.**

SECTION A(40 MARKS)

1. The diagrams below represents two plants cell A and B placed in two different solutions. Study the diagrams and answer questions that follow.



a) Identify the nature of solution into which each cell was placed. (2mks)
A----------

B----------

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b) Name the physiological process responsible for the observed results. (1mk)

---

c) Give the correct biological term used to describe cell A. (1mk)

---

d) Describe what would happen if a red blood cell was placed in the solution in which cell B was placed. (2mks)

---

e) Explain why freshwater amoeba do not burst when placed in distilled water. (2mks)

---

f) Explain the fate of glucose after assimilation. (2mks)

---

2. (a) Distinguish between the terms homodont and heterodont. (2mks)

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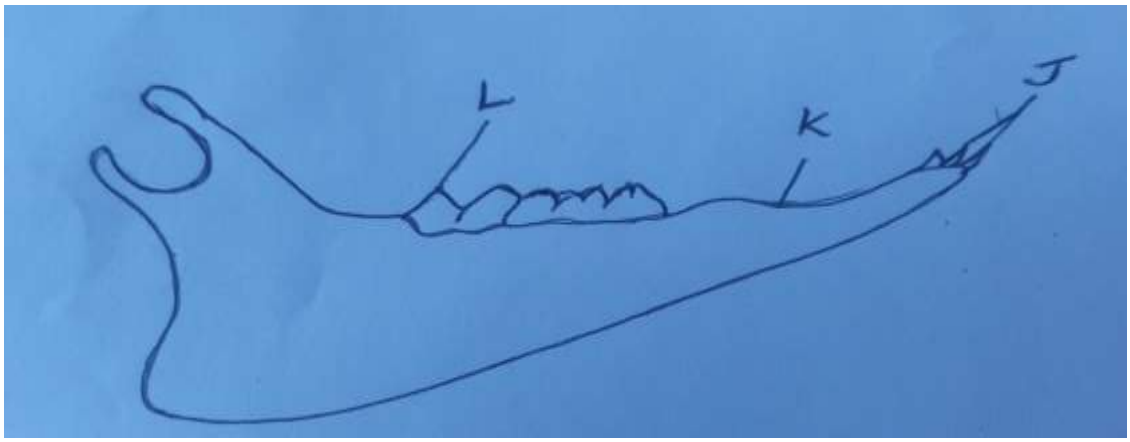
(b) What is the function of carnassial teeth? (1mk)

(c) The diagram below represents the lower jaw of a mammal.



(i) Name the mode of nutrition of the mammal whose jaw is shown above. (1mk)

(ii) State one structural and one functional differences between the teeth labeled J and L. (2mks)

(iii) Name the toothless gap labeled K. (1mk)

(iv) State the function of the gap. (1mk)

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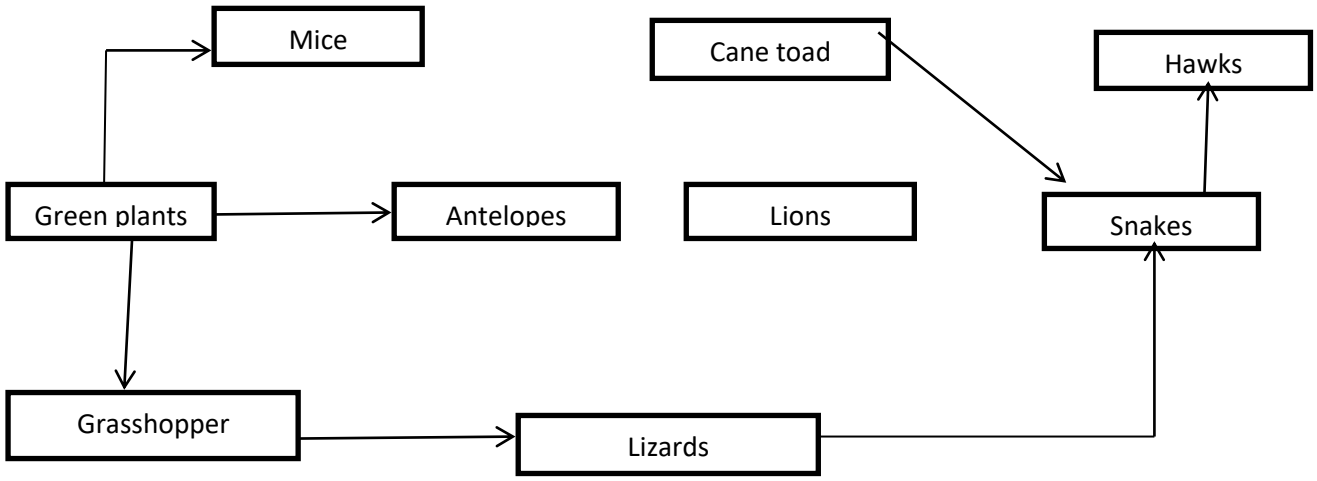
(v) Name the substance that is responsible for hardening of teeth. (1mk)

(v) What do you understand by the term 'dental formula'. (1mk)

---

3. The diagram below represents a food web in a terrestrial ecosystem.



a) Which organism has the highest number of preys? (1mk)

---

b) Construct food chains with snakes as tertiary consumers. (2mks)

---

c) State the trophic level occupied by hawks in the food chains constructed in (b) above (1mk)

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d) Describe how capture-recapture method can be used in estimating the population of fishes in a lake. (4mks)

---

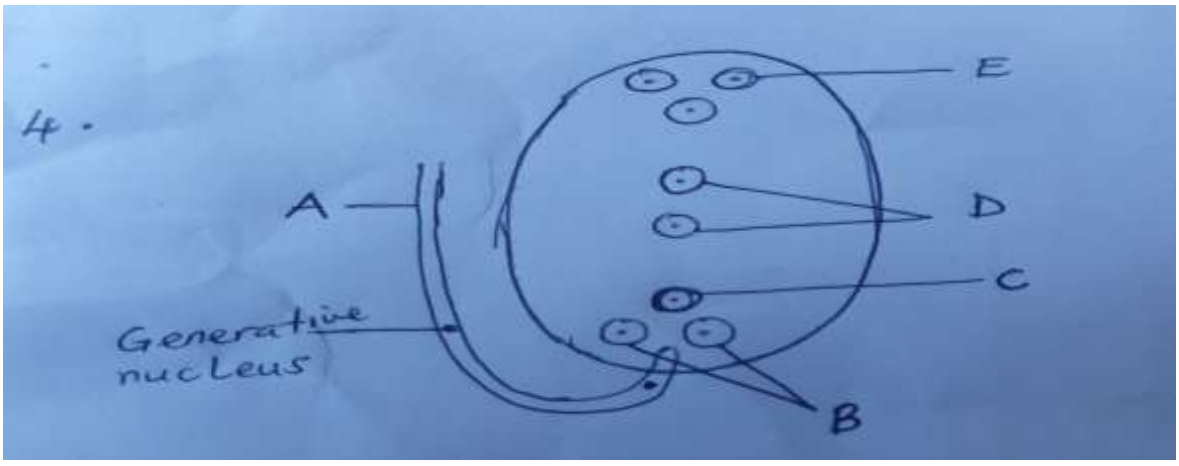
e) Name the process through which:

(i) Producers convert chemical energy into heat energy lost to the environment. (1mk)

(ii) Living organisms convert chemical energy into heat energy lost to the environments. (1mk)

---

4. The figure below shows the embryo sac before fertilization.



a) Identify the structures labeled A and B (2MKS)

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b) Identify the structures labeled in the diagram that will develop into the following after fertilization.

(i) Embryo (1mks)

(ii) Endosperm (1mk)

---

c) State the ploidy of each of the following nuclei after fertilization

i) C ---------- (1mk)

ii) D ---------- (1mk)

d) Briefly outline the process of 'double fertilization' in flowering plants. (2mks)

---

e) Name two substances which are found in the intercellular air spaces in a green leaf during a hot sunny day. (2mks)

---

5. In an investigation, snapdragon plants with broad leaves (B) were crossed with narrow leaves (N). The F1 progeny had intermediate leaf breadth.

(i) Give a reason for intermediate leaf breadth in F1 generation (1mk)

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(ii) If the plants in the F1 Generation were selfed, state the genotypic and phonotypic ratio of the F2 generation. (show your working) (5mks)

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

(iv) Explain why an under dose insecticide spraying of mosquitoes may cause a serious problem on this mode of killing mosquitoes using the same spray in future. (2mks)

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SECTION B(40 MARKS)

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

6. Two sets of a pea seeds were germinated, set A was placed in normal day light conditions in the laboratory which set B was placed in a dark cupboard. Starting a few days later the shoots lengths were measured twice daily and their mean length recorded as shown in the table below.

Time in hours	0	12	24	36	48	60	72	84
Set A (length (mm)	12	14	20	23	28	31	47	54
Set B length (mm)	17	23	28	35	48	62	80	94

(a) Using suitable scale draw the graphs of the mean lengths in set A and B against time (7mks)

(b) From the graph, state the man shoot length of each set of seedling at the 66th hour. (2mks)

---

c) Account for the difference of curve B and A. (3mks)

(d) Explain what would happen to set up B if it were allowed to continue to grow under conditions of darkness. (4mks)

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(e) State 3 external conditions which should be constant for both set ups. (3mks)

(f) Why is oxygen important in the process of active transport? (1mk)

---

7. (a) state five difference between aerobic and anaerobic respiration. (5mks)

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(b) Discuss the application of anaerobic respiration in industry and at home. (15mks)

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8 (a) state two functions of the mammalian skin. (2mks)

(b) Describe the structure and function of the mammalian skin. (8mks)

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BIOLOGY

PAPER 3.

CLASS OF KCSE 2024

Paper 231/3.(Practical).

THE NAIROBI & CENTRAL REGIONS KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

CONFIDENTIAL INSTRUCTIONS:

NB/Requirement instruments:

1. **About 10ml of substance L.**
2. **4 clean test tubes on arack.**
3. **A means of heating**
4. **Test tube holder.**
5. **A scalpel.**
6. **A house fly labeled specimen M.**
7. **A dry bean seed labeled S_1.**
8. **A bean seedling labeled S_2.**
9. **A maize seedling labeled S_3.**
10. **1% copper (II)sulphate solution.**
11. **10% sodium hydroxide solution.**
12. **Benedicts solution.**
13. **Iodine solution.**

Note:

i. **To make substance L,mix egg albumen and starch.**

ii. **Specimen S_2 and S_3 should be ready 1 week before the exams and must have the seeds intact.**

NAME: .....ADM NO: ..... CLASS: .....
231/3
BIOLOGY
PRACTICAL
CLASS OF KCSE 2024
TIME: 1 3/4 HOURS
MAX 40 MKS.

THE NAIROBI & CENTRAL REGIONS KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

ANSWER ALLTHE QUESTION IN THE SPACES PROVIDED.

Answer all the questions in the spaces provided.

1. You are provided with substance L. Carry out food tests on the substance using the reagents provided Record your procedure, observations and conclusions in the table below.(9mks)

Food substance	Procedure	Observation	Conclusions

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2. During a visit to a museum, students were shown ten specimens of organisms on display.The teacher provided a dichotomous key (shown in a separate page) to enable them to place each species on display into its taxonomic group. Five of the specimens that were on display are shown in the diagrams provided.

Dichotomous Key.

1.(a) Animal with a flattened body….. ……go to 9.
(b)Animal without a flattened body……..go to 2.
2.(a)Animal with body in a shell …….Mollusca.
(b)Animal with body in shell……. go to 3.
3.(a)Animal with segmented body….. ……...go to 4.
(b)Animal with body not segmented……..Nematoda.
4.(a)Animal with jointed appendages…… go to 6.
(b) Animal without jointed appendages……..go to 5.
5.(a)Animal with long and cyndrical body…… annelida.
(b)Animal with short stout body…… Trenada.
6.(a) Animal with antennae…… go to7.
(b) Animal without antennae ….. ……go to 8.
7.(a)Animal with one pair of antennae……Insecta.
(b) Animal with more than one pair of antennae……...crustacean.
8.(a)Animal with pincer –like mouthparts……Arachida.
(b) Animal with sucking mouth parts……Acarina.
9.(a)Animal with long ribbon-like body ……..…cestoda.
(b) Animal with circular body…….rinoidea).

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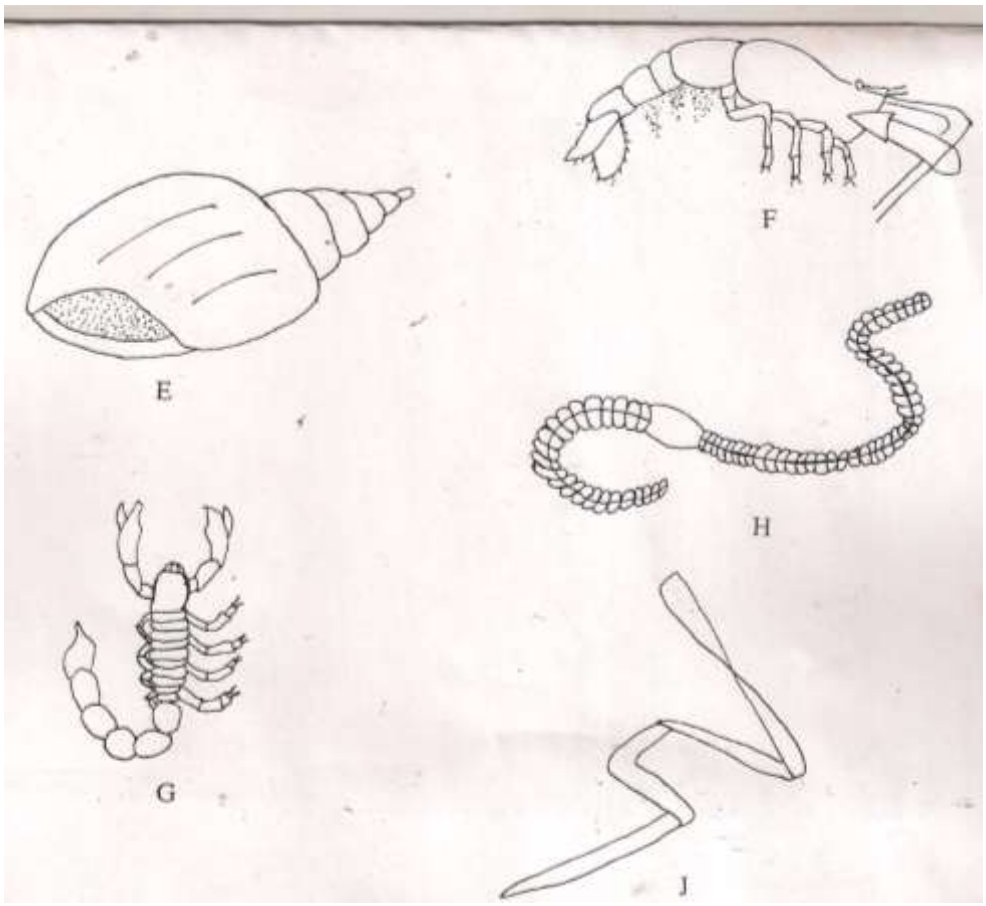
Use the dichotomous key to identify the taxonomic group of each of the five specimens shown in the drawings.



a. In each case, show in sequence the steps (ef 1a,2a,5a, 7b) in the key that you followed to arrive at the identify of each specimen.(5mks)

Animal	Steps followed	Identity
E		
F		
G		
H		
J		

b)i)Nam the phylum and the class to which specimen M belongs(2mks)

Phylum:----------

Class:----------

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ii) Name the observation features that enabled you to place it in the class above.(3mks)

(c)With the help of a hand lens, examine the body of specimen M.

i)State with a reason in each case he observable features that enable the specimen to be a disease vector.(2mks)

(ii) Name one disease transmitted by specimen M.(1mk)

---

iii) State two methods that can be used to prevent specimen M from spreading diseases.(2mks)

---

2. You are provided with specimens labeled S_1S_2 and S_3
   a. Using a scarpel blade split S_1longitudinally and draw a well labeled diagram to show the internal structures.
   State your magnification (4mks)

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b. With a reason ,state the class to which the plant from specimen S_1 belongs to.
Class(1mk)

Reason(1mk)

---

c. Specimen S_2 is a germinated seedling of S_1.In the table below, name three structures and say which structure in S_1developed into the structure in S_2.

Structure in S_1	**Structure in S_2**

d.(i) Using specimens S_1 and S_3 ,name the type of germination in :-
S_1

S_3 (1mk)

---

ii. Give the difference between the this type of germination in (d) (i) above (2mks)

---

iii.Account for the type of germination in :-
S_1 2mks

S_3(2mks)

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name……Adm No……

Signature……Date……

231/1

BIOLOGY

PAPER 1

CLASS OF KCSE 2024

2 HOURS

THE NYANZA & WESTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate of Secondary Education (KCSE)

Instructions to candidates.

a) *Write your name and adm number in the spaces provided above.*
b) *Sign and write the date of examination in the spaces provided above.*
c) *Answer all the questions in the spaces provided.*
d) ***This paper consists of 8 printed pages.***
e) ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
f) ***Candidates should answer all the questions in English.***

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1-28	80	
	Total Score		

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1. A student was viewing a slide preparation of an onion cell under high power of a light microscope and observed that the features of the cell were blurred.
   a) Name the part of the microscope the student would use to obtain sharper focus of the features. (1mk)

   _____

   _____

   b) State the function of mirror in a light microscope. (1mk)

   _____

   _____

2. (a) Guard cells are specialized epidermal cells. State **two** structural features which suit them to their function. (2mks)

   _____

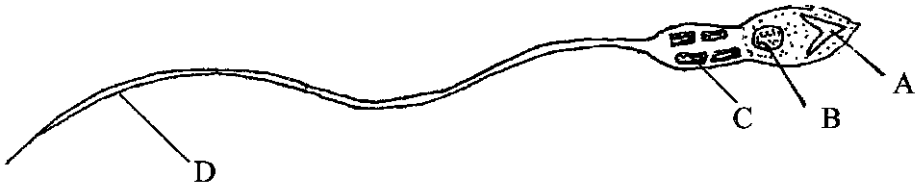
   _____

   (b) Apart from gaseous exchange, give one other function of stomata. (1mk)

   _____

   _____

3. The diagram below is a specialized mammalian cell.



   a) Name the parts labeled B and D (2mks)

   B_____

   D_____

   b) State the function of the following
      i. Part labeled A (1mk)

      _____

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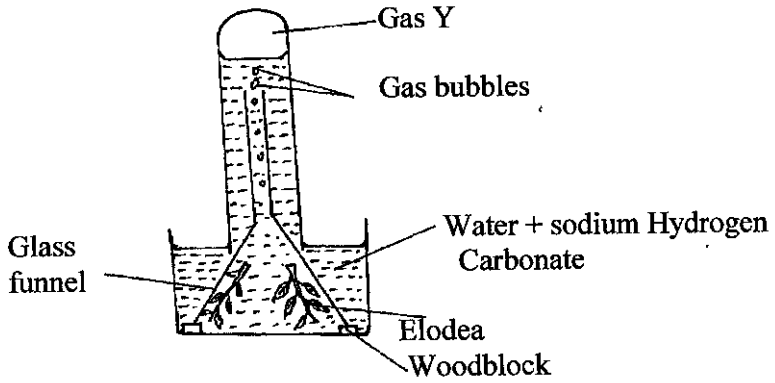
ii. The portion marked C (1mk)

_____

4. In an experiment to investigate a product of photosynthesis, the set up was as shown in the diagram below. The apparatus was placed in the sun.



a) State the confirmatory test for gas Y. (1mk)

_____

b) Explain why Elodea is the most suitable plant for this experiment. (2mks)

_____

_____

_____

c) State the function of the sodium hydrogen carbonate in the experiment.

(1mk)

_____

_____

5. (a) Name **one** hormone involved in insect metamorphosis. (1mk)

_____

(b) State the importance of metamorphosis to the life of insects. (2mks)

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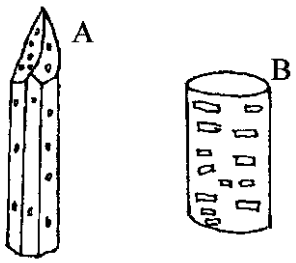
_____

_____

6. A student measured the diameter of a mitochondrion on a photomicrograph whose magnification was
X50, 000 to be 1mm. What was the actual size of the mitochondrion in micrometers? (2mks)

7. The diagrams below are of two conducting elements of the xylem tissue.



a) Identify each of them (2mks)

A_____

B_____

b) What makes the cellulose side wall of both A and B impermeable to water and solutes? (1mk)

_____

_____

_____

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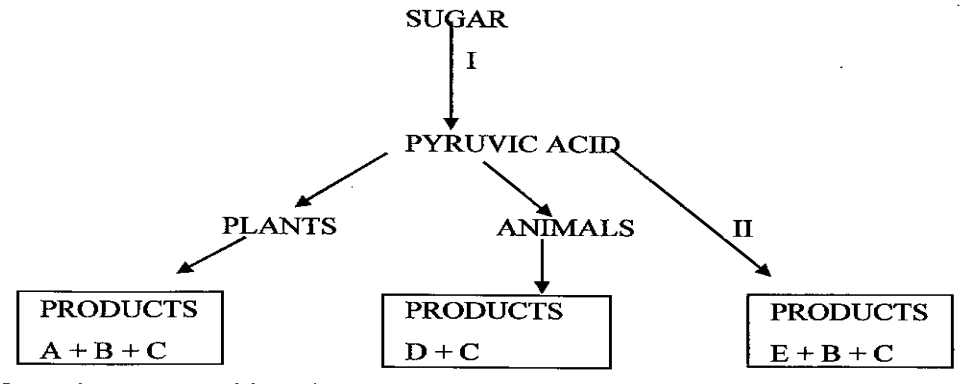
8. State **two** advantages of natural selection to organisms. (2mks)

_____

_____

9. Study the flow chart below and answer the questions that follow.



a) Name the process taking place in step labeled I (1mk)

_____

b) Give **two** reasons why accumulation of substances D in the body leads to an increase in the heart beat. (2mks)

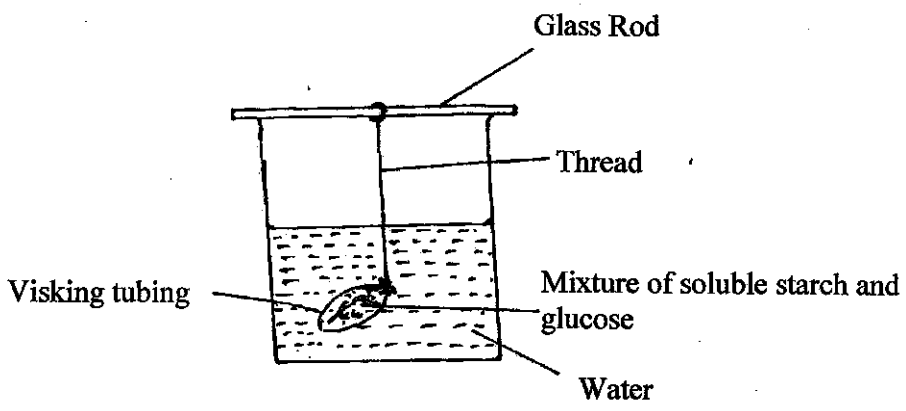
_____

_____

c) Identify substance E (1mk)

_____

10. In an experiment to investigate certain physiological process, a student had his experiment set up as shown below.



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To ascertain the occurrence of the physiological process investigated he carried out food test on the water in the beaker. Both starch test and reducing sugar test at the beginning of the experiment were negative. After the set up was left undisturbed for 20 minutes, starch test was still negative but that of reducing sugar was positive.

a) State the physiological process which takes place in the human body illustrated by the set up above. (1mk)

_____

b) Name the part of the human body where the processes stated in (10) (a) above takes place. (1mk)

_____

11. A group of students were walking in the forest and they came across two organisms A and B showing the following characteristics

A	B
- two pairs of walking legs per segment - one pair of antennae - jointed appendages	- one pair of walking legs per segment - one pair of antennae - jointed appendages

State the class to which each organism belongs (2mks)

_____

_____

12. (a) Name the principal site of gaseous exchange in the lungs of humans (1mk)

_____

(b) State **two** ways in which the structure named in (12) (a) above is adapted to its function (2mks)

_____

_____

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13. An investigation was carried out on a terrestrial ecosystem. The population sizes and species biomass were determined and recorded as shown in the table

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

a) If these organisms had feeding relationships, construct a simple food chain involving all the organisms (1mk)

b) Construct pyramid of numbers using the data provided above. (2mks)

c) State **one** disadvantage of using pyramid of numbers in expressing feeding relationships in ecological ecosystem. (1mk)

_____

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14. Why is excretion of nitrogenous wastes more of a problem to animals than plants? (2mks)

_____

_____

15. (a) Give **two** possible ways of establishing the genotype of an organism whose genotype is unknown. (2mks)

_____

_____

_____

(b) Why is that a father can only transmit hemophilia to his daughter but not to his son? (1mk)

_____

_____

16. (a) Explain why swallowing and breathing in cannot occur at the same time. (2mks)

_____

_____

(b) Why is it necessary that pepsin be produced in its inactive forms? (1mk)

_____

17. (a) Name the part of the brain which deals with regulation of body temperature. (1mk)

_____

(b) The graph below shows the temperature of two organisms A and B under different external temperature. Study it and answer the questions that follow.

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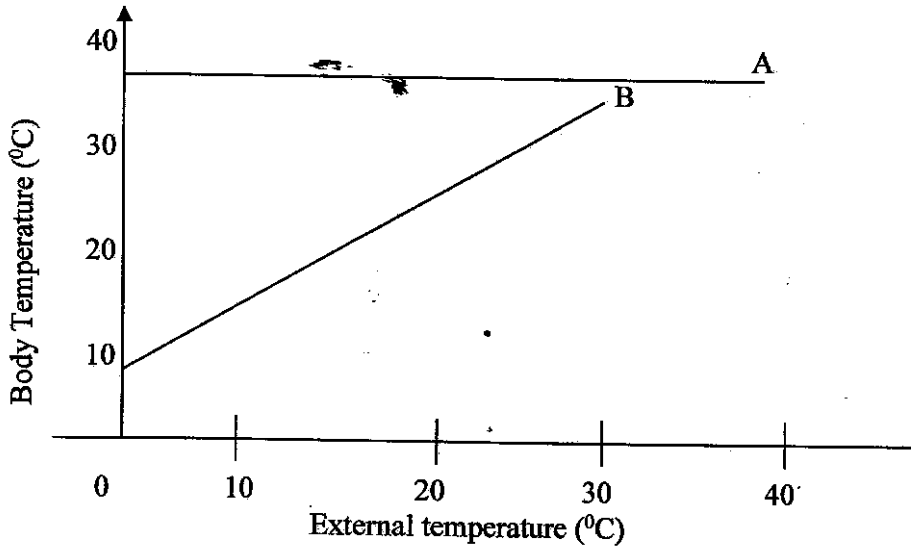

Give the terms used to describe organisms A and B (2mks)

_____

_____

(c) What advantage does organism A have over B

(1mk)

_____

_____

18. State **two** distinguishing features used in separating members of the phylum Arthropoda into various classes.
(2mks)

_____

_____

19. (a) Name **two** kinds of nuclei found in a mature pollen grain.
(2mks)

_____

_____

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(b) State what is meant by double fertilization in flowering plants. (2mks)

_____

_____

20. Carbon (iv) oxide can be transported from the tissues t the lungs within the red blood cells. Give **two** advantages of this mode of transport. (2mks)

_____

_____

21. (a) Differentiate between the primary growth and secondary growth in woody plants. (2mks)

_____

_____

(b) Name **two** tissues responsible for secondary growth in flowering plants. (2mks)

_____

_____

22. (a) State **two** significance of myelin sheath. (2mks)

_____

_____

(b) Name the cell that secretes the myelin sheath.
(1mk)

_____

_____

(c) List the following in order in which they are involved in a simple reflex action. Motor neurone, effectors, stimulus, intermediate (relay) neurone, sensory neuron, impulse, receptor. (1mk)

_____

_____

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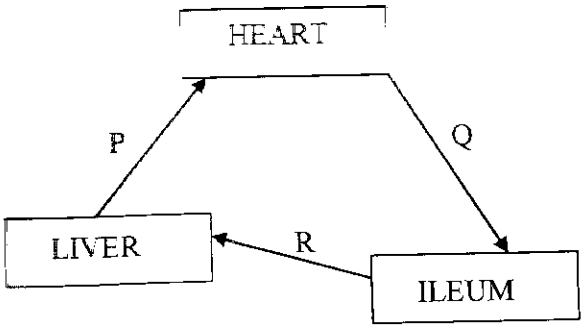
23. The diagram below shows part of the mammalian circulatory system.



a) Identify the blood vessel marked Q
(2mks)

_____

_____

b) State **two** differences in the composition of blood in vessel R and P(2mks)

_____

_____

24. Name **two** strengthening tissues in woody plants. (2mks)

_____

_____

25. State **three** structural adaptations of a thoracic vertebra to its function (3mks)

_____

_____

_____

26. (i) Name the type of response exhibited by the growth of pollen tube towards the ovary in a flowering plant. (1mk)

_____

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(ii) State **two** importance of response named in 26 (i) above to the plants. (2mks)

_____

_____

27. Explain why sweat accumulates on a person's skin in a hot humid environment. (2mks)

_____

_____

_____

28. Name the deficiency disease caused by lack of vitamin A in human. (1mk)

_____

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name……Adm No……

Signature……Date……

231/2

BIOLOGY

PAPER 2

CLASS OF KCSE 2024

2 HOURS

THE NYANZA & WESTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES.

1. Write your **Name** and **Admission Number** in the spaces provided.
2. Sign and write the **date** of examination in the spaces provided above.
3. This paper has **Two** SECTIONS; **A** and **B**.
4. Answer all questions in section **A** in the spaces provided.
5. In Section **B** answer question **6(Compulsory)** and either question **7** or **8** in the space provided after question **8**
6. Ensure all the pages are printed as indicated below and no question is missing

For Examiner's Use only

Section	Question	Maximum Score	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
Total score		80	

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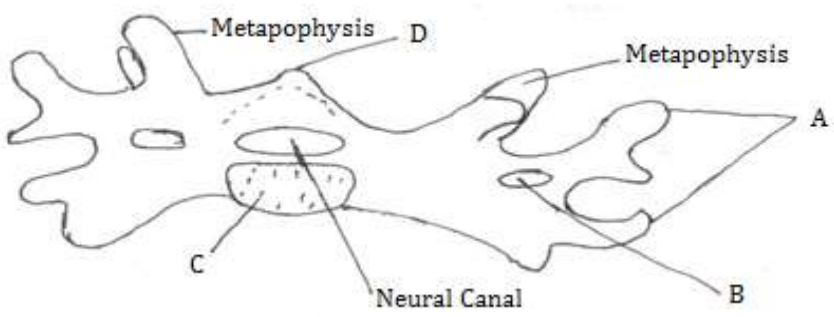
SECTION A (40 MARKS)

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

1. The diagram illustrates a bone found in a mammal



i) Label the Parts A, B, C and D (4mks)

A----------

B----------

C----------

D----------

ii) Identify the bone (1mk)

---

iii) Give one reason for your answer in (ii) above (1mk)

---

iv) State the function of the part labeled B (1mk)

---

v) Name the part of the skeleton where the above bone can be found (1mk)

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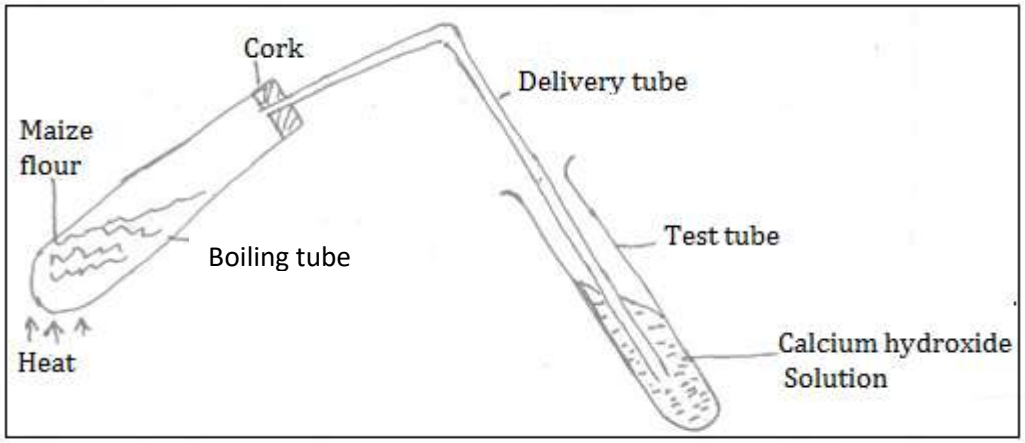
2. A set up was done as shown below



a) What was the aim of the experiment? (1mk)

---

b) State two observations in the test tube (2mks)

---

c) State an observation in the boiling tube 1mk)

---

d) List two conclusions made at the end of the experiment (2mks)

---

e) A man weighing 90kg requires 200KJ per gram of body weight while a rat weighing 50g requires 2500KJ per gram of body weight. Explain (2mks)

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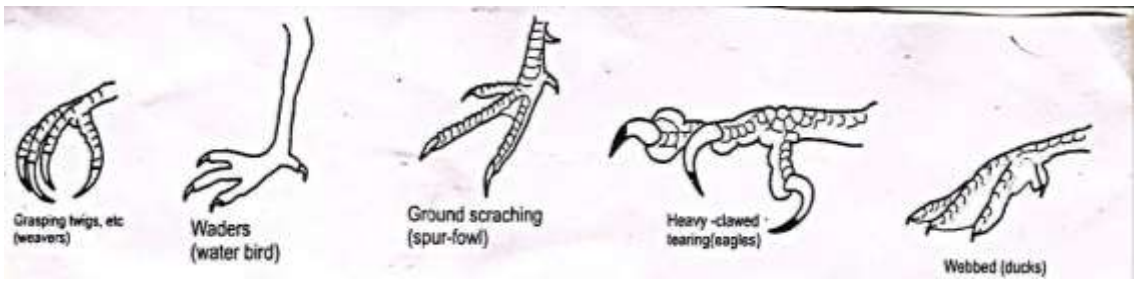
3. Study the diagram below and answer the questions that follows



(a) What type of evolution is illustrated by the limbs (1mk)

……..

(b) What does the origin of the limbs suggest about the ancestry of these animals (1mk)

(c) (i.) What are vestigial structures? (1mk)

……

……

……

……

……

(ii). State an example of vestigial structure in humans (1mk)

……

……

(d) (i) What is natural selection? (2mks)

……

……

……

……

……

(ii) Give one example of nature selection in action (1mk)

……

……

……

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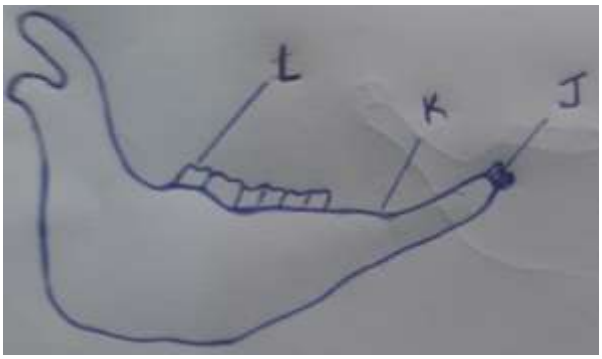
(e) Explain comparative serology as evidence of evolution. 1mk

……
……

4. The diagram below represents the lower jaw of mammals.



(a) Name the mode of nutrition of the mammal whose jaw is shown. (1 mark)

……

(c) State one structural and one functional difference between the teeth labeled J and L. (2marks)

. . . . . .

. . . . . .

. .. .

(c) i) Name the toothless gap labelled K. (1 mark)

. . . . . .

. .. .

ii) State the function of the gap. (1 mark)

. . . . . .

(d) Name the substance that is responsible for hardening of teeth. (1 mrk}

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(e) Distinguish between the terms homodont and heterodont. (1 mark)

. . . . . .

5. In a population of guinea pigs a certain mutant gene (b) was discovered. It causes the Beta cells

in the pancreas fail to release insulin in order to control blood sugar level. In Homozygous

condition the victims are born dead. In heterozygous condition the animals grow to maturity and

reproduce. In a certain season 390 still births were counted.

(a) Write down the genotypes of parents who some of their offspring were born dead. (2 marks)

. . . . . .

.. . . . .

(b) Carry out a cross using a punnet square to show the occurrence of the still birth. (4 marks)

(c) Work out the total number of the offspring that grew to maturity. (2 marks)

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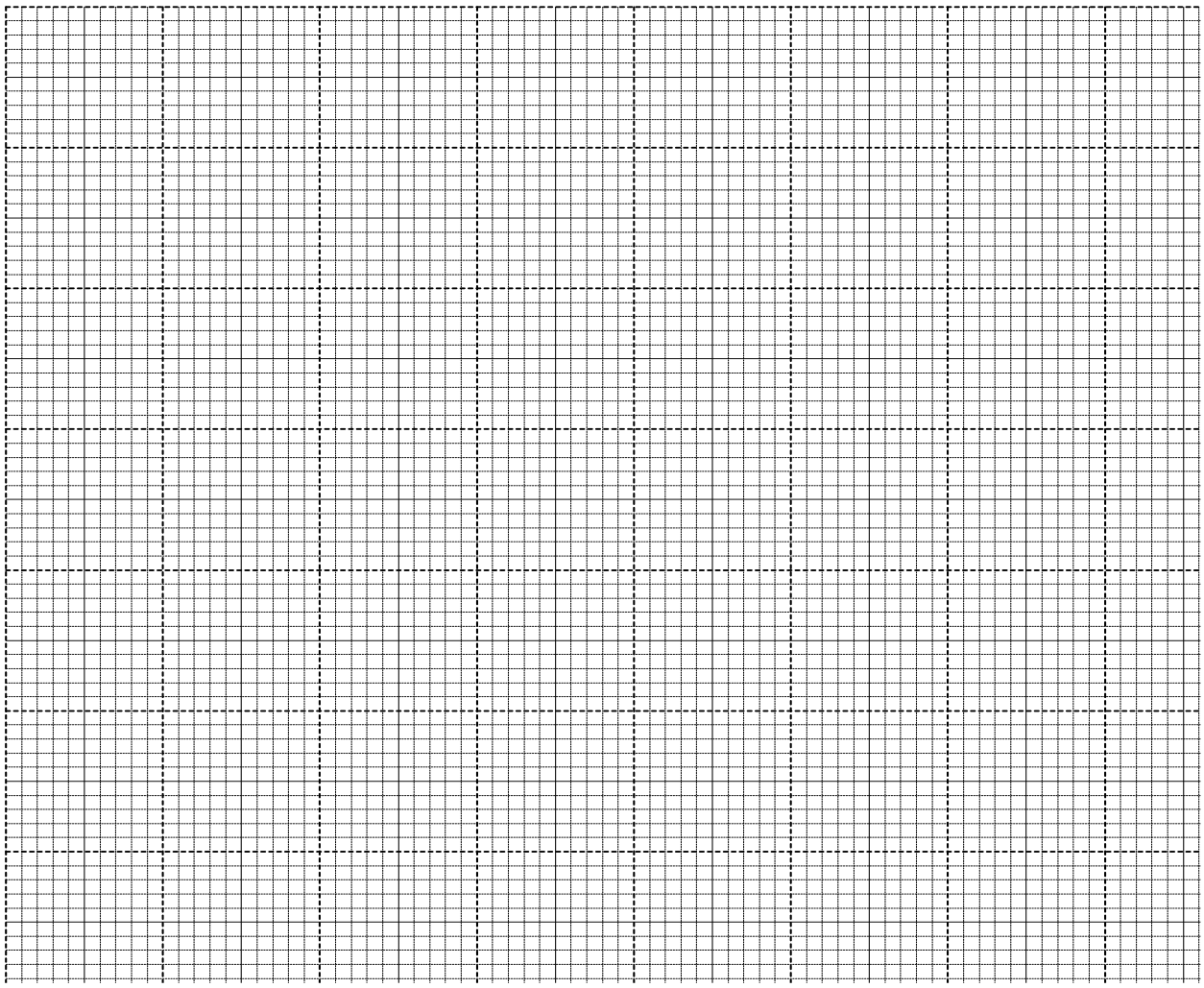
SECTION B (40 MARKS).Answer question 6 (Compulsory and either question 7 or 8.)

6. An experiment was carried out to investigate haemolysis of human red blood cells.
The red blood cells were place in different concentrations of sodium chloride solution. The
percentage of haemolysed cells was determined. The results were as shown in the table below.

Salt concentration (g/100cm) (%)	0.33	0.36	0.38	0.39	0.42	0.44	0.48
Red blood cells (Haemolysed) (%)	100	91	82	69	30	15	0

(a) (i) On the grid provided, plot a graph of haemolysed red blood cells against salt concentration. (6 marks)



(ii) At what concentration of salt solution was the proportion of haemolysed cells equal of non-
Haemolysed cells? (1 mark)

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. . . . . .

. .

(iii) State the percentage of cells haemolysed at salt concentration of 0.45% (1 marks)

. . . . . .

(b) Account for the results obtained at:

(i) 0.33 percent salt concentration. (3 marks)

. . . . . .

. . . . . .

. . .. . .

. . .. . .

(ii) 0.48 percent salt concentration. (3 marks)

. . . . . .

. . .. . .

. . .. . .

. . . .

(c) What would happen to the red blood cells if they were placed in 0.50 percent salt solution? (3 marks)

. . . . . .

. . .. . .

. . .. . .

(d) Explain what would happen to onion epidermal cells if they were place in distilled water. (3marks)

. . . . . .

. . . .

. . . . . .

. . . . . .

. . . .

. . . . . .

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7 Describe how human kidneys function. (20 marks)

8. Describe secondary growth in Dicotyledonous plants.
(20 marks)

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name……Adm No……

Signature……Date……

231/3

BIOLOGY

PAPER 3 PRACTICAL

CLASS OF KCSE 2024

2 HOURS

THE NYANZA & WESTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate of Secondary Education (KCSE)

CONFIDENTIAL

INSTRUCTIONS TO SCHOOL

1. The information contained in this paper is to enable the head of school and the teacher in charge of Biology to make adequate preparations for this Biology Practical examination. **NO ONE ELSE** should have access to this paper or acquire knowledge of its contents. Great care **MUST** be taken to ensure that the information here does not reach the candidates either directly or indirect.
2. The **Biology teacher** should note that it is his / her responsibility to ensure that each apparatus acquired for this examination agrees with the specifications given.

The question paper will not be opened in advance

Each candidate should be provided with the following:

(1) Specimen **K** (Orange fruit)

(2) About **3cm³** of substance **B** (olive oil)

(3) About **3cm³** of liquid **C** (fresh cow milk)

(4) About **2cm³** of **0.01**% DCPIP (supplied with a dropper)

(5) About 2cm³ of Iodine solution

(6) About **2cm³ $NaHC0_3$** solution (supplied with a dropper)

(7) **6** test tubes in a test tube rack

(8) Distilled water in a wash bottle

(9) Scalpel

(10) **Two** 10ml measuring cylinder

(11) **One** 100ml beaker

(12) **2** Labels

(13) Two droppers

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name……Adm No……

Signature……Date……

231/3

BIOLOGY

PAPER 3 PRACTICAL

CLASS OF KCSE 2024

1 HOUR 45 MINS

THE NYANZA & WESTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES

(i) *Write, index number and admission number in the spaces provided at the top of this page.*
(ii) *Sign and write the date of examination in the spaces provided above.*
(iii) *Answer ALL the questions.*
(iv) *You are required to spend the first 15 minutes of the 1¾ hours allowed for this paper reading the whole paper carefully before commencing your work.*
(v) *Answers MUST be written in the spaces provided in this question paper.*
(vi) *Additional pages MUST NOT be inserted.*
(vii) *This paper consists of five (5) printed pages.*
(viii) *Check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.*

FOR EXAMINERS USE ONLY

Question	Maximum Score	Candidate's Score
1	13	
2	11	
3	16	

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1. You are provided with **Specimen K** .Carefully cut a transverse section through specimen **K** using a scalpel provided.

(a) (i) By observing one of the two halves of specimen **K**, Give **two** reasons to **prove** that specimen **K** has **axile** placentation
(2mks)

……

……

(ii) Squeeze some juice from **specimen K** into 100ml beaker provided and label it as **juice K.** using a portion of **juice K**, carry out the food test using the reagents provided and complete the table below. (**NB preserve the remaining portion of juice K for use in question 2.)** **(8mks**)

Food substance	Procedure	Observation	conclusion

(iii) Name the **deficiency** disease that results from **lack** of the food substance **present** in juice **K.** (1mk)
……..

(iv) Highlight **two** symptoms of the disease named in **(a) (iii)** above . (2mks)

……

……..

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……
……

2. Put **2cm³** of liquid labelled **C** into a test tube. Draw some of the juice from specimen **K** into a dropper. Add 4 drops of the juice into the test tube with solution ***C*** and shake.

(a) (i) State your observation. (1mk)

……

(ii) **State** the part of the human body where the process demonstrated above occurs and the enzyme that carries out the process.

Part of body……..…(1mk)

Enzyme…….……(1mk)

(iii) **Which** gland produces the enzyme stated in (a)(ii) above? (1mk)

……

(b) Take a small amount of substance **B** provided and add to it **2cm³** of sodium hydrogen carbonate solution.

(i) **State** your observations (1mk)

……..

(ii) Which **process** in the body is illustrated above? (1mk)

……..

(iii) **State** the part of **the body** where the above process takes place (1mk)

……

(iv) **State** two functions of substance **B** in the body (2mks)

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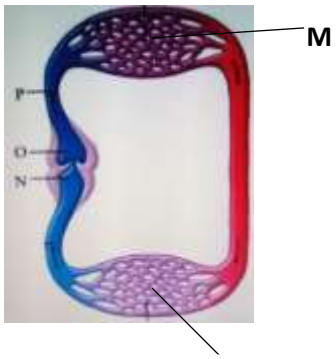
(v) Name **two** diseases of the cir tory system caused by **excess** cholesterol in food. (2mks)

3. **(A)** photograph **J** shows the circulatory system of organism represented by photograph **G**.

J



G

(i) Giving **two** reasons to your answer name the **class** to which specimen **G** belongs.

Class……..…….. (1mk)

Reasons…… (2mk)

…….

…….

(ii) Name the part labelled: M……(1mk)

N……..…….…. (1mk)

O ……..……..… (1mk)

(iii) Giving **one** reason to your answer state the type of **closed** circulatory system shown by photograph **J**

Type of circulatory system……... (1mk)

Reason……..….(1mk)

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(iv) State two features of specimen **G** that enhances its **streamlined** shape (2mks)

……

……..

(B) Below are photographs of **Venus flytrap** (an insectivorous plant). Study them and answer the questions that follow.

A B C

(i) Name one major nutrient that is **deficient** in the soil where the above plant grows. (1mk)

……

(ii) Name the type of response shown by plate **C** (1mk)

……..

(iii) **Describe** how the above plant **trap** the insect (4mks)

……

……

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……

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name:……..Index number:……

Candidate's signature:…… Date:……

231/1
Biology
Paper 1 (THEORY)
Class of KCSE 2024
2 hours

THE COASTAL & EASTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate Of Secondary Education (KCSE)

INSTRUCTION TO CANDIDATES

a) **Write your name and admission number in the spaces provided above.**
b) **Sign and write the date of the examination in the spaces provided.**
c) **Answer ALL the questions in this question paper.**
d) **Answers must be written in the spaces provided**
e) **This paper consists of 10 printed pages.**
f) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
g) **Candidates should answer all the questions in English.**

FOR EXAMINER'S USE ONLY.

QUESTION	1	2	3	4	5	6	7	8	9
SCORE									

10	11	12	13	14	15	16	17	18	19

20	21	22	23	24	25	26

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Answer all the questions in the spaces provided.

1. State two characteristics of organisms that are easily observed in both animals and plants. (2 marks)

……
……
……
……
……

2. Fingerlings of fish were introduced to two different ponds. Those fingerlings in bond one all died within four days but the fingerlings in pond two survived.

Suggest the likely reasons why the fingerlings in pond one died. (3 marks)

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3. A student observing a specimen through a microscope viewed a blurred image of the specimen. Suggest two possible reasons for this observation. (2 marks)

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4. State two processes that take place during anaphase of mitosis. (2 marks)

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5. Distinguish between convergent and divergent evolution. (1 mark)

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6. (a) Terrestrial insects such as locusts were captured and their blood was analysed. It was found that the blood does not have blood pigments such as haemoglobin. Explain. (2 marks)

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……

(b) State how the tracheal system in insects is adapted to gaseous exchange. 3 marks)

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7. State two functions of a diastema in herbivores. (2 marks)

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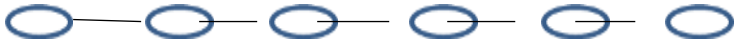
8. The diagram below shows part of a starch molecule.



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

Circles

……
……

Lines

……
……

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

Drawing:

Products

……
……

9. Explain two ways in which the chloroplast is adapted to photosynthesis.(2 marks)

……
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……
……

10. The diagram shown below represent cells from a certain type of epithelial tissues in mammals.

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(a) Name the part labeled V. (1 marks)

……
……..

(b) Identify the region of the mammalian body where the epithelial tissue maybe found. (1 mark)

……
……

(c) What is the role of the numerous mitochondria in the epithelial cells as shown above. (2 marks)

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……

11. Explain what would happen to red blood cells if blood glucose concentration increased due failure of the secretion of insulin. (3 marks)

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……

12. State three biotic factors that could affect an antelope living in Masai Mara. (3 marks)

……
……
……
……
……

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

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

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……
……

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

(i) Blood group A

……
……

(ii) Blood group AB

……
……

14. list three methods used to show energy flow through the ecosystem. (3 marks)

……
……
……
……
……

15. Name three organelles that would be abundantly present in secretory cells.
(3 marks)

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16. Give three ways in which the red blood cell is adapted to transport oxygen?
(3 marks)

……
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17. Describe how the leaves of submerged plants are adapted to gaseous exchange. (3 marks)

……
……
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……

18. Name the part of the seed whose growth brings about epigeal germination. (1 mark)

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19. State three aspects of light that affect the rate of photosynthesis. (3 marks)

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20. (a) Identify the class with organisms that have three body parts and three pairs of legs. (1 mark)

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(b) Suggest three reasons why members of the class named in (a) above are adapted to all types of habitats. (3 marks)

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21. (a) List three types of gene mutation. (3 marks)

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(b) (i) What are sex-linked genes? (1 mark)

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(ii) Name two conditions that are sex-linked. (2 marks)

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22. (a) State any two rules of binomial nomenclature. (2 marks)

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(b) Define the term species. (2 marks)

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23. (a) Name two digestive enzymes produced in their inactive form. (2 marks)

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(b) Explain why the enzymes named in (a) above are produced in inactive form.
(2 marks)

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24. (a) Define immunity. (1 mark)

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(b) Giving an example in each case, give two main types of immunity. (4 marks)

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25. Identify three methods that cause fruit dispersal. (3 marks)

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26. State three factors that increase the rate of traspiration. (3 marks)

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name:……..Index number:……

Candidate's signature:…… Date:……

231/2
Biology
Paper 2 (THEORY)
Class of KCSE 2024
2 hours

THE COASTAL & EASTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate Of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES:-

- Write your **name** and **admnumber** 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** in the spaces provided after question 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**	

This paper consists of 10 printed pages. Candidates should check to ascertain that all the pages are printed asindicated and that noquestions are missing.

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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

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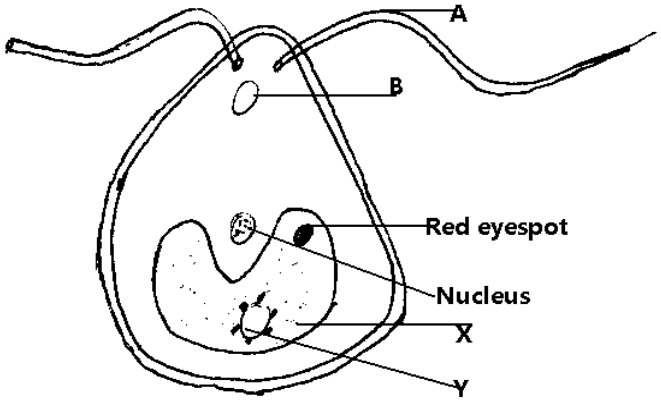

(a) **State** the kingdom in which the organism belongs. (1mk)

……

(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)

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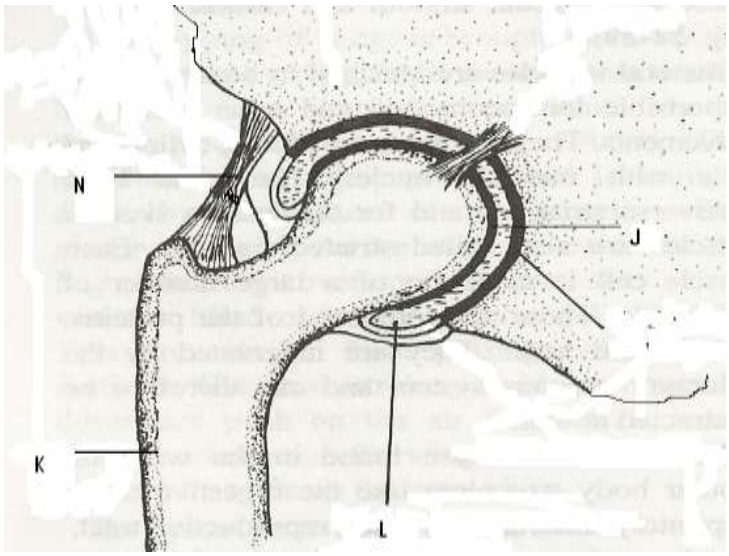
3a) The diagram below shows some of the features of a synovial joint. Study the diagram carefully and answer the questions that follow.



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

……

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

J ……...

L ……..

(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

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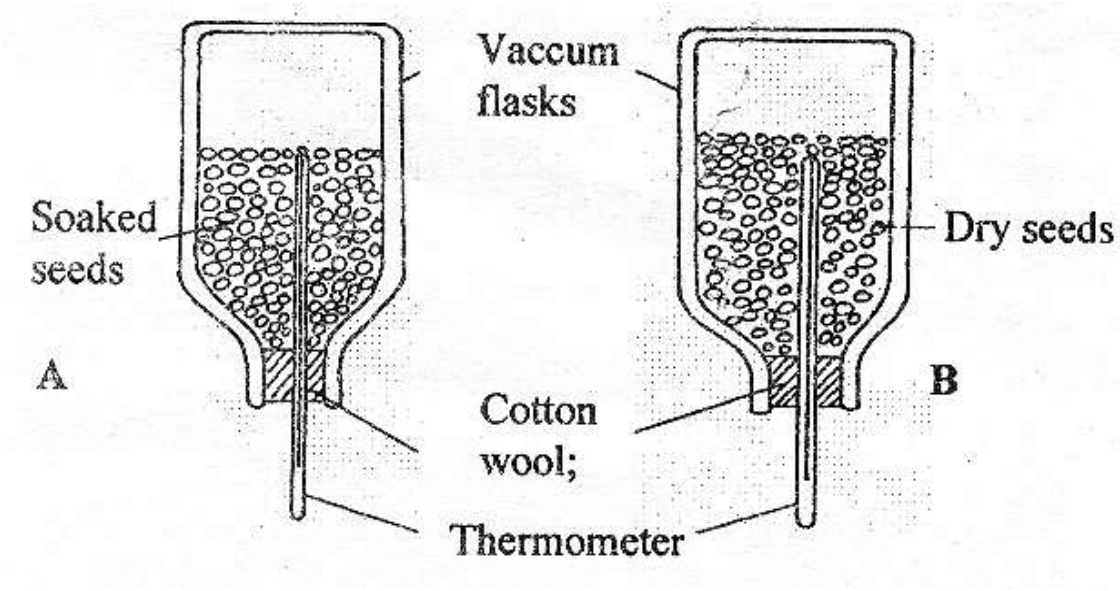
……

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)

……

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

……

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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)

……

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……

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

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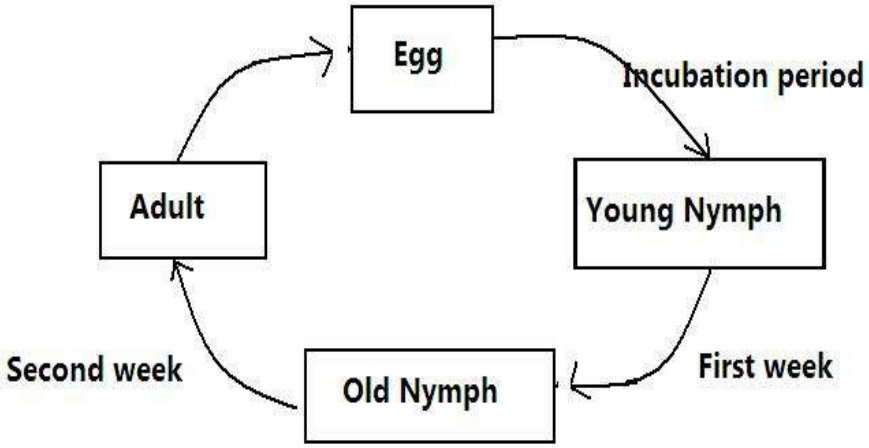

a) Name the hormone that would be at high concentration during.

(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)

……

……

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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

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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)

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

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……

……

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

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

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a) State the function of the following.

(i) Ovary (1mark)

……

……

(ii) Progesterone (1 mark)

……

……

(iii) Oestrogen (1 mark)

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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)

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231/3
Biology
Paper 3 (PRACTICAL)
Class of KCSE 2024
2 hours

THE COASTAL & EASTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate Of Secondary Education (KCSE)

CONFIDENTIAL

a) Specimen A-potato tissue-half @ student
b) Specimen K-bread mould-growth duration-substrate-bread/ugali-5 days
c) Hydrogen peroxide- 3 ml@ student
d) Distilled water -4ml @ student
e) Sodium hydroxide- 4ml @ student
f) Dilute hydrochloric acid -4 ml @ student
g) 10 ml measuring cylinder -1@ student
h) Dropper
i) Hand lens-shared
j) Knife/scalpel-shared
k) Mortar and pestle
l) Spatula
m) Ruler
n) 100 ml beaker
o) Source of heat
p) Solution B-Starch solution
q) Solution C1-UNBOILED amylase-4ml@ student.
r) Solution C2-BOILED amylase
s) Benedict's solution.
t) 5 test tubes@ student
u) 5 labels @student
v) Stop watch
w) Iodine solution-shared
x) Thermometer.

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

Name:……..Index number:……

Candidate's signature:…… Date:……

231/3
Biology
Paper 3 (PRACTICAL)
Class of KCSE 2024
2 hours

THE COASTAL & EASTERN REGIONS KCSE JOINT NATIONAL MOCKS 2024

Kenya Certificate Of Secondary Education (KCSE)

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 in the question paper.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $1^3/_4$ Hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Section	Question	Maximum Score	Candidates Score
	1	14	
	2	12	
	3	14	
	TOTAL SCORE	40	

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1. You are provided with specimen labeled A. Obtain a cube measuring 1cm by 1cm from the specimen.

(a) Crush the cube using mortar and pestle, place the crushed parts in measuring cylinder, add 2 ml of hydrogen peroxide and quickly determine the volume of foam after 20 seconds and fill the table below. (1 mark)

Specimen	Volume of foam
Crushed cube A	

Explain why the reaction in (a) above occurs in living cells. (2 marks)

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(b) You are provided with a solution labeled B, unboiled C1 and boiled C2. Place 2ml of the solution B into two test tubes and carry out a food test using the reagents provided. Record your observation in the table below. (2 marks)

FOOD SUBSTANCE	PROCEDURE	OBSERVATION	CONCLUSION

Place 2ml of solution B into four test tubes labeled F, G, H and K. Carry out the following steps.

(i) To test tube labeled F and its contents add 3ml solution C1 and 3 ml distilled water.

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(ii) To test tube labeled G and its contents, add 3ml solution C1 and 3 ml dilute hydrochloric acid.

(iii) To test tube labeled H and its contents, add 3 ml solution C 1 and 3 ml sodium hydroxide solution.

(iv) To test tube labeled K and its contents, add 3 ml solution C2.

(v) Place the test tubes in a water bath at 37 ^{0}C for 20 minutes.

(vi) Carry out a Benedict's test and fill the table below. (4 marks)

Test tube	PROCEDURE	OBSERVATION	CONCLUSION
F			
G			
H			
K			

(a) Account for the observation in:

(i) Test tube G. (2 marks)

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(ii) Test tube H. (1 mark)

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(iii) Test tube K. (2 marks)

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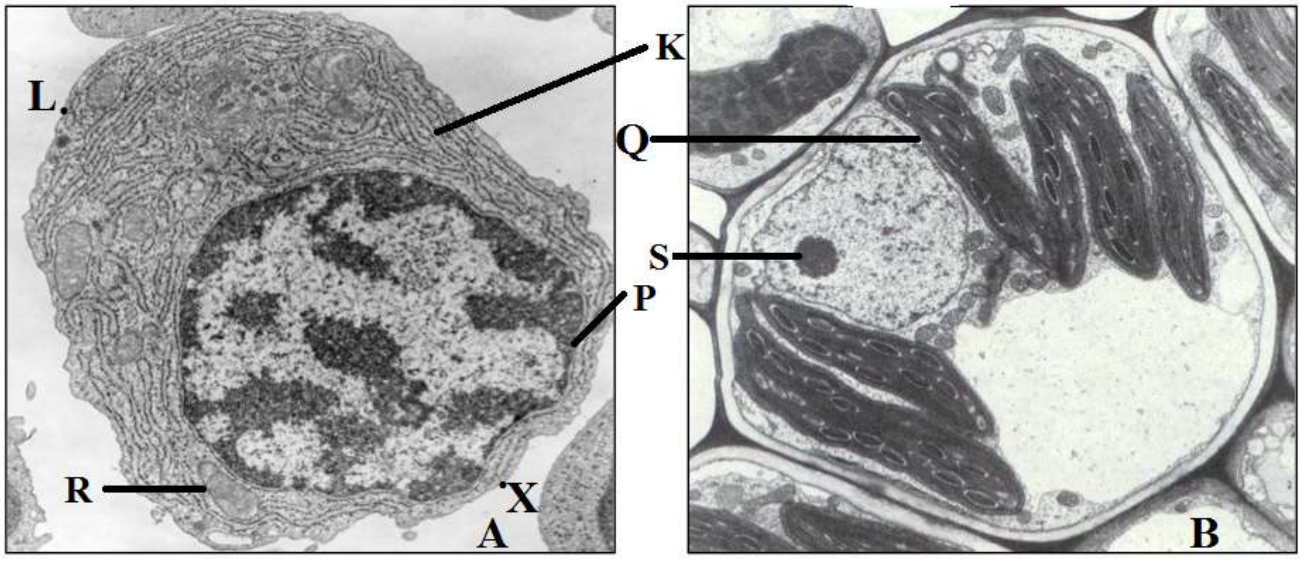
2. Use the illustration below to answer questions



(a) Identify the organism from which the cell labelled B was obtained from while giving a reason.

(ii) B. (1 mark)

……

……

Reason. (1 mark)

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(b) Give the functions of the parts labeled:

(i) R. (1 mark)

……

……

(ii) S. (1 mark)

……

……

(b) Name the parts labeled:

(iii) Q. (1 mark)

……

……

(iii) P. (1 mark)

……

……

(iv) K. (1 mark)

……

……

(d) Calculate the actual length of cell A in micrometers if its magnification Is X1000 000.Use the points marked L and X. (3 marks)

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(e) Explain why cell A and B are believed to have a common ancestry. (2 marks)

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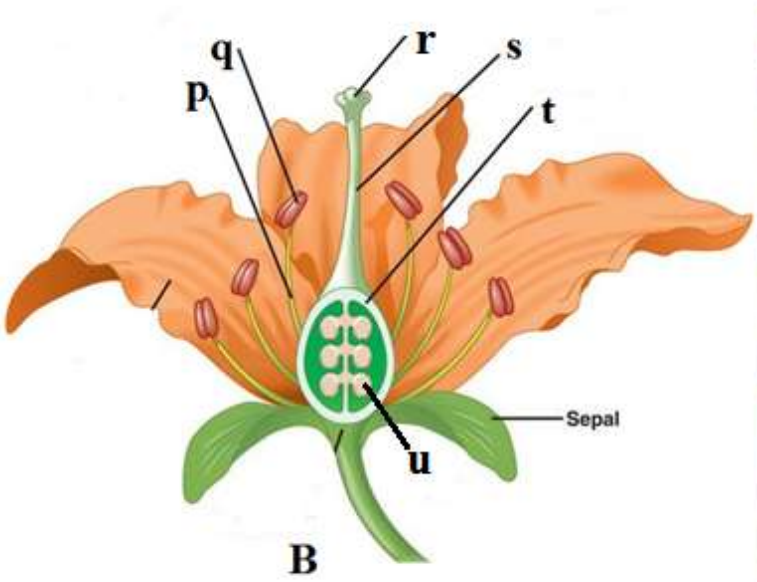
3. Use the photographs below to answer questions



(a) (i) Name the type of flowers shown in A1 and A2.

(i) A1. (1 mark)

……

……

(ii) A2 (1 mark)

……

……

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(ii) Describe the feature in flowering plants depicted in (a)(i) above. (1 mark)

……
……

(iii) Explain how flower labeled A1 is modified for pollination. 1 mark)

……
……
……
……

(b) Give the functions of the parts labeled p, r and s in specimen labeled B.

(i) p. (1 mark)

……
……

(ii) r. (1 mark)

……
……

(iii) s. (1 mark)

……
……

(c) State the structural descriptions of flower B. (2marks)

……
……
……
……
……

(d) Explain what would happen to the following parts after pollination.

(ii) t. (1 mark)

……
……

(iii) u. (1 mark)

……
……

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(e) You are provided with a specimen labeled K in a petri dish, observe the specimen using a hand lens and answer questions that follow.

(i) Make well labeled diagram to show the reproductive structure of the organism. (3 marks)

(ii) Give the type of asexual reproduction exhibited by the organism. (1 mark)

……

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

NAME……INDEX NO……

SCHOOL……..
DATE……
ADM NO……..

231/1
BIOLOGY
PAPER 1
(THEORY)
CLASS OF KCSE 2024
TIME: 2 HOURS

THE RIFT VALLEY & NORTH EASTERN KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES

- *Write your name, Index and Adm number in the spaces provided above.*
- *Answer all questions in the spaces provided on the question paper.*
- *Sign and write the date of examination in the spaces provided above.*
- *Additional pages must NOT be inserted.*

FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidate's Score
1-27	80	

This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. Name the blood vessel that supplies:

(a) The heart with nutrients. (1mk)

……

(b) The foetus with oxygen (1mk)

……

2. Explain why it is important to stain specimen to be observed under a light microscope. (2mks)

……

……

3. What is wilting? (2mks)

……

……

4. State the significance of the following steps while testing for disaccharide in food sample. (2mks)

(a) Addition of dilute hydrochloric acid

……

(b) Addition of sodium bicarbonate.

……

5. a) (i) Name the fluid produced by sebaceous gland. (1mk)

……

(ii) State **two** function of the fluid name in 5 a) (i) above. (2mks)

……

……

b) Explain how malpighian layer of the skin is adapted to perform its function. (1mk)

……

……

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6. A certain animal had one cell from its alimentary canal observed under light microscope. A total of 40 chromosomes were seen.

(a) State the number of chromosomes in

(i) The spermatozoan of this animal (1 mk)

……

……..……...……

(ii) One of cells in the tongue. (1mk)

……

……..……...……

(b) Name a structure in mature plant where meiosis takes place. (1mk)

……

……..……...……

7. A biological washing detergent contain enzymes which remove stain like mucus and oil from clothes which are soaked in water with the detergent.

(a) Explain why stain would be removed faster with detergent in water at 35^{o}C rather than 50^{o}C (1mk)

……

……..……...

(b) Why is boiling clothes with the detergent less likely to remove stain. (1mk)

……

……..……...

(c) Name an enzyme that catalyses the decomposition of sodium hydrogen carbonate to facilitate transportation of carbon (IV) Oxide. (1mk)

……

……..……...

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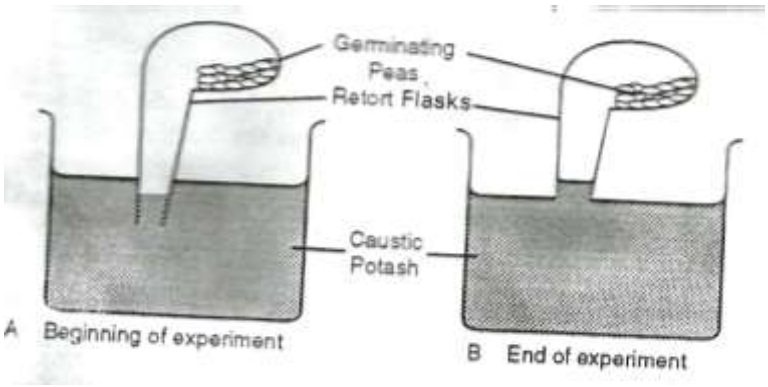
8. Form 2 students from samba secondary school set up an experiment as shown below.



(a) Explain the change observed at the end of the experiment. (2mks)

……

……

a) Explain what would happen if water has been used instead of potassium hydroxide. (2mks)

……

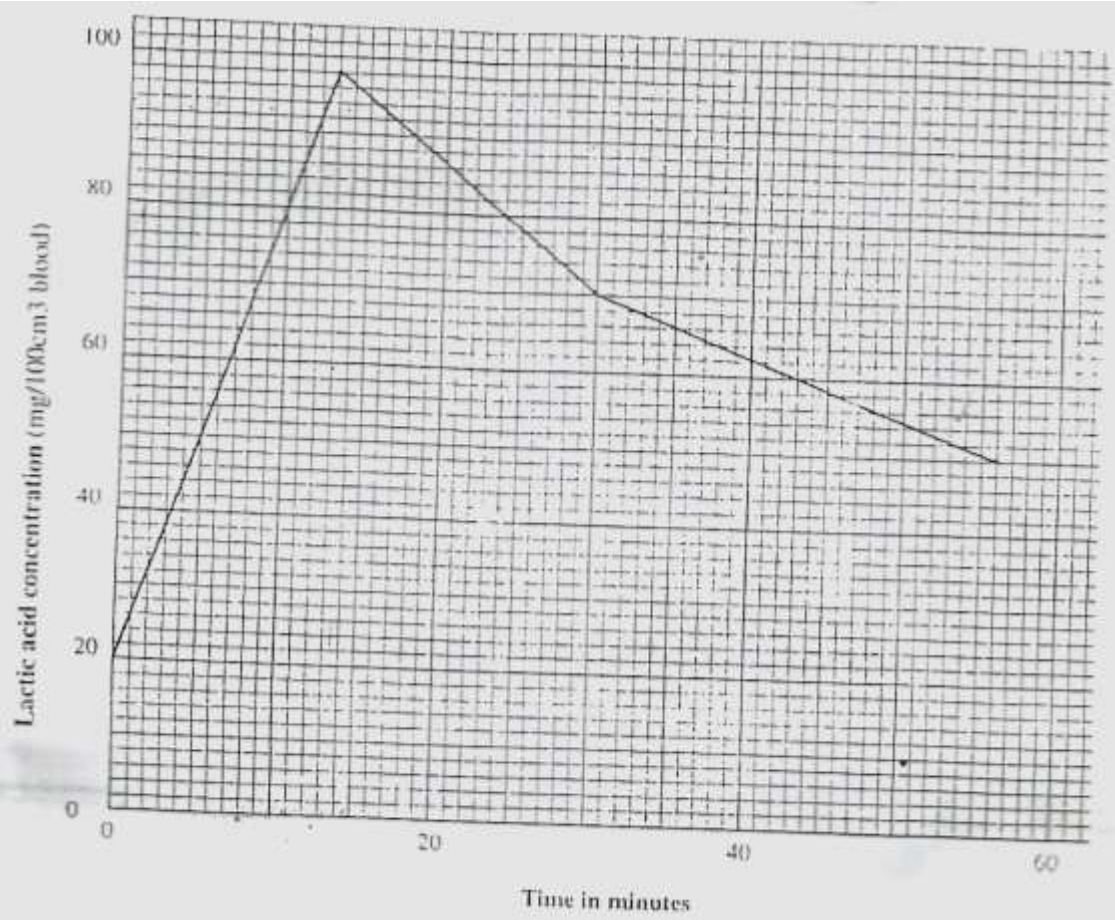
……

9. State **two** advantages of metamorphosis to the life cycle of insects. (2mks)

……

……

10. The concentration of lactic acid in blood during and after an exercise was determined. The results are shown in the graph below.



(a) (i) By how much did the lactic acid increase at the end of 10 minutes? (1mk)

……

……..……..

(ii) After how many minutes was the lactic acid concentration 78mg/100cm^3 (2mks)

……

……..……

(iii) What would be the concentration of lactic acid at the 60th minutes. (1mk)

……

……..……...

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(b) Give a reason for the high rate of production of lactic acid during the exercise. (1mk)

……

……

11. Name the part of human brain that perform the following function (2mks)

(a) Controls peristalsis

……

……...

(b) Control intelligence

……

……...

12. Outline the differences between Darwin's theory and Lamarck's theory of evolution. (2mks)

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13. Give **three** functions of cystokinin hormone in plant (3mks)

……

……

……

14. Explain why plants do not require specialized excretory organ. (3mks)

……

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15. The diagram below represents a stage in cell division.

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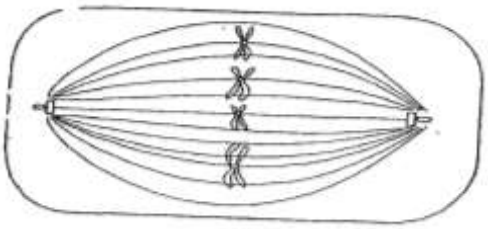

(a) Identify the stage of cell division (1mk)

……

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

……

16. Outline **three** functions of colon . (3mks)

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17. State **two** advantages of closed circulatory systems in mammal. (2mks)

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18. Explain what happens to excess amino- acids in the liver of humans (3 Mks)

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19. (a) Which portions of the human nephron are only found in the cortex? (3 mks)

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……

(b) (i) What would happen if a person produced less antidiuretic hormone?
(2 marks)

……

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……

……

(ii) What term is given to the condition described in (b) (i) above (1 mark)

……

……

20. Explain double fertilization as used in flowering plants. (2mks)

……

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……

21. State one survival value for each of the following in plants (*1mark)*

a) Haptotropism in stems

……

……

b) Thigmonasty in *Mimosa pudica* (*1mark)*

……

……

c) What is meant by the term polyploidy? (*1mark)*

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……

……

d) Give an example of a genetic disorder caused by non-disjunction in somatic cell *(1mark)*

……

……

22. (a) Explain how mammalian trachea is adapted to its function (2mks)

……

……

(b) Name the gaseous exchange site in bony fish. (1mk)

……

……

23. Explain the role of the following hormone in homeostasis

(a) Insulin (3mks)

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(b) Aldosterone hormone when there is less water in blood stream. (2mks)

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……

24. Outline **three** difference between plant divisions Bryophyta and Pteridophyta (3mks)

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25. Name **two** products of light stage of photosynthesis that are useful in light independent stage. (2mks)

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……

26. State **two** functions of xylem tissue. (2mks)

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27. State **two** function of golgi apparatus (2mks)

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

NAME……INDEX NO……

SCHOOL……..
DATE……
ADM NO……..

231/2
BIOLOGY
PAPER 2
(THEORY)
CLASS OF KCSE 2024
TIME: 2 HOURS

THE RIFT VALLEY & NORTH EASTERN KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above
- Sign and write the date of examination in the spaces provided above
- This paper consists of **TWO** sections A and B.
- Answer **ALL** questions in section A in the spaces provided
- In section B answer **question 6(compulsory**) and either question 7 or 8in the spaces provided after question 8
- This paper consists of 8 printed pages
- Candidates should check the question paper to ascertain that all the pages are printed and that no questions are missing

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

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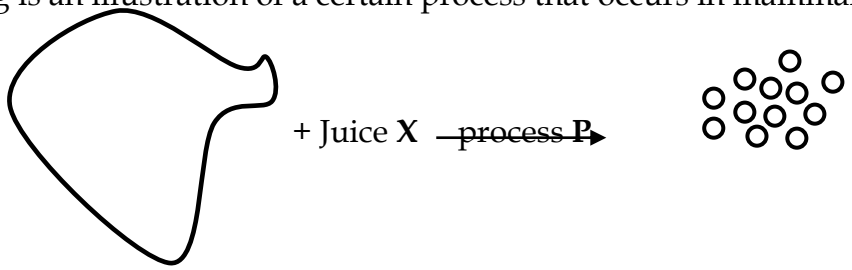
SECTION A

1. The following is an illustration of a certain process that occurs in mammals



A fat molecule

(a) Name process **P**…… (1mark)

(b) Name the juice involved in the process **P**

…… (1 mark)

(c) List two Salts found in the juice name in (b) above that aids in process **P** (2 marks)

……

……

(c) Give a reason why liver damage leads to impaired digestion of fats

(1 mark)

……

……

(e) What would be the likely effect on digestion if the small intestine of a human is reduced in an operation? (2 marks)

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(f) State the fate of excess glucose in the human body. (1 mark)

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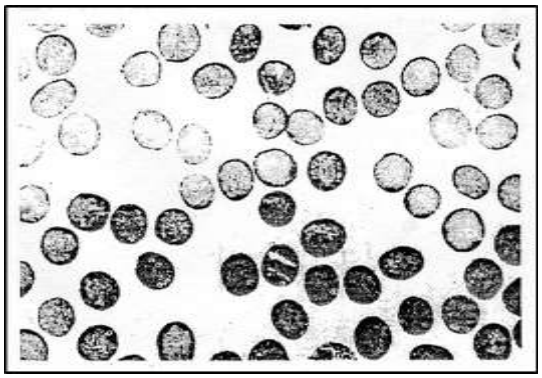
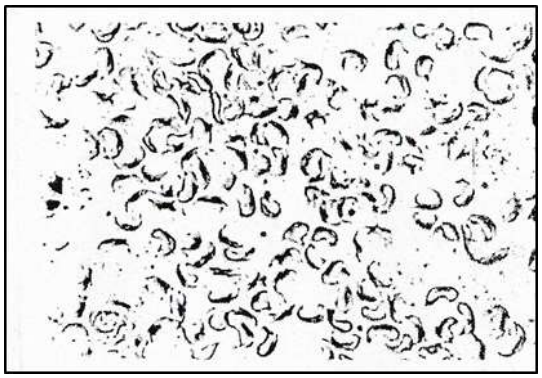
2. The diagrams below shows samples of blood obtained from two different persons **A** and **B.**



Blood sample from person **A**



Blood sample from person **B**

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

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(b) State one advantage and one disadvantage of the disorder in (a) above when its in heterozygous state. (2 marks)

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

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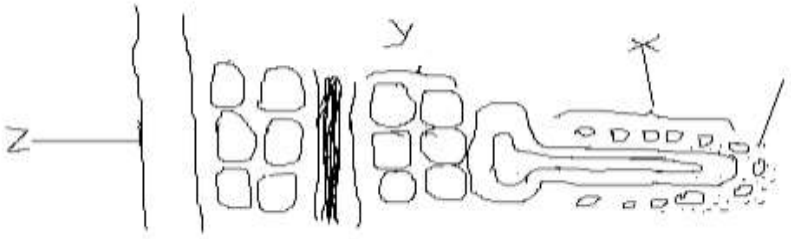
3. The diagram below represents the pathways of water from the soil into the plant.



(a)Name the parts X, Y and Z.
(3marks)
X……

Y……

Z……

(b) Explain how water moves from point X to Z. (5mks)

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4. During an ecological study of a grassland ecosystem, a group of students recorded the following observations.

i. Grasshoppers feed on grass
ii. Guinea fowls feed on grasshoppers, termites
iii. Vultures feed on guinea fowls and leopards
iv. Leopards feed on gazelles
v. Termites feed on grass
vi. Gazelles feed on grass

(a) From this record of observations construct a food web. (4 marks)

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(b) Write down, the food chains in which the guinea fowls are secondary consumers. (2 marks)

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(c) Name the organisms through which energy from the sun enters the food web.

……(1 mark)

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(d) Name the organism that has the least biomass in the food web. (1mark)

……

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5. Below is a chemical equation, study it and answer the questions that follow:-

Carbon (IV) oxide + water $\underset{B}{\overset{A}{\rightleftharpoons}}$ Oxygen + glucose

(a) Name process A and B (2 marks)

A……

B……

(b) What is the biological significance of process **A** (1 mark)

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(c) In which organelle does process **A** and **B** take place? (2 marks)

A……

B……..

(d) Name two stages of process **B** (2 marks)

……

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(e) Define compensation point (1mark)

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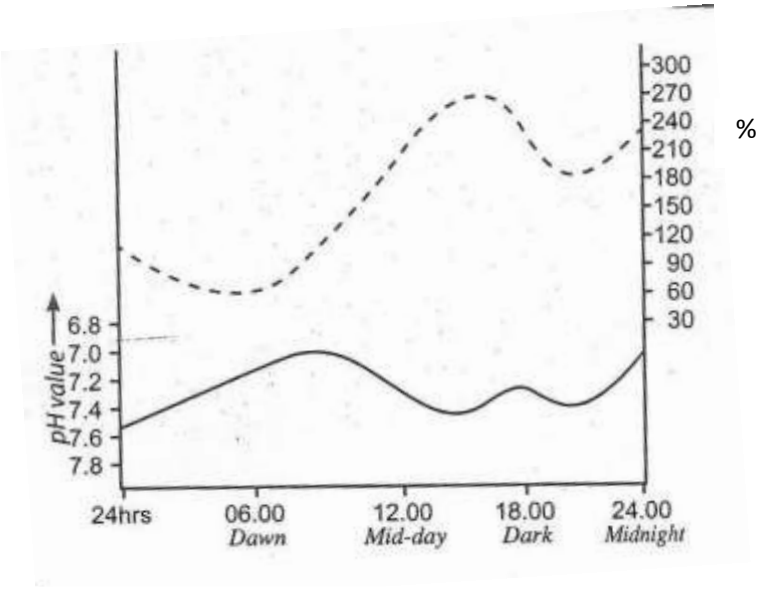
SECTION B (40 MARKS)

Answer Question 6 (Compulsory) And Either Question 7 Or 8 In The Spaces Provided After Question 8

6. The graph below shows changes in pH and oxygen saturation in river water over a 24 hour period



a) when is the pH value and dissolved oxygen saturation % highest(2 marks)

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(b) Account for the pH value recorded

(i) Between 08.00 and 1.00 p.m (2 marks)

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(ii) Between 2100 and 2400 midnight (2 marks)

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(c) Explain the influence of light intensity on % saturation of oxygen dissolved in this study (4 marks)

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(d) State two structural adaptations that the submerged plants in this river have, which enable them to carry out photosynthesis (2 marks)

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(e) Explain the variations that will be recorded if a similar study was carried out in a river near a nitrate fertilizer industry. (4 marks)

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7. Explain the various ways in which a typical cell is adapted to its functions (20 marks)

8. Discuss the causes, effects and control measures for water pollution(20 marks)

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

NAME……INDEX NO……

SCHOOL……..
DATE……
ADM NO……..

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
CLASS OF KCSE 2024
TIME: 1 HOURS 45 MINUTES

THE RIFT VALLEY & NORTH EASTERN KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

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Each candidate should have the following:
80 ml of iodine solution supplied with a dropper
8 cm visking tubing.
2 pieces of strong cotton thread 20 cm long.
100 ml beaker (glass or plastic)
Means of timing. A wall clock will be appropriate.
10 ml measuring cylinder.
100 ml water is 250 ml beaker.
10 ml of 10 % Starch solution labelled X.
10 ml of Benedict's solution supplied with a dropper
2 Test tubes
Hand lens

Specimen J: *Hibiscus rosaninensis*

K: *Bougainvillea glabra*

L: *Jacaranda mimosifolia*

M: *Zea mays*

N: *Lantana camara*

Preparation of 10 % Starch solution

Dissolve 10 gm of starch powder in 100 ml of distilled water.

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MINISTRY OF EDUCATION (KNEC COMPLIANT)

NAME……INDEX NO……

SCHOOL……..
DATE……
ADM NO……..

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
CLASS OF KCSE 2024
TIME: 1 HOUR 45 MINUTES

THE RIFT VALLEY & NORTH EASTERN KCSE JOINT NATIONAL MOCK 2024

Kenya Certificate of Secondary Education (KCSE)

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

For Examiners Use Only

Question	Maximum score	Candidate's score
1	16	
2	12	
3	**12**	
TOTAL	**40**	

This paper consists of 5 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. You are provided with iodine solution, Benedict's solution, visking tubing, test tubes, a beaker and a solution labelled X (shake thoroughly before use)

a) Using the reagents provided test the identity of solution labeled X. (6 mrks)

Foot test	Procedure	Observation	Conclusion

Tie one end of the visking tubing provided with a thread tightly. Measure 5ml of solution X. Pour 5ml of solution X into the visking tubing. Tie the other end of the tubing tightly. Ensure there is no leakage. Rinse the outside of the tubing with distilled water and immerse it with its contents in a beaker containing iodine solution. Allow it to stand for 20 minutes.

b (i) Record your observation at the beginning and end of the experiment. Record your results in the table below. (4 mrks)

Experimental set up	Solution X inside the visking tubing	Iodine solution outside the visking tubing
Beginning of experiment		
End of experiment		

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(ii) Suggest the nature of visking tubing. (1 mrk)

(iii) Account for the results obtained in a (i) above. (4 mrks)

c) Which physiological process was being investigated in this experiment? (1 mrk)

2. You are provided with specimens labelled:

J: *Hibiscus rosaninensis*

K: *Bougainvillea glabra*

L: *Jacaranda mimosifolia*

M: *Zea mays*

N: *Lantana camara*

a) Using the characteristics given below and in the order in which they occur, construct a dichotomous key to identify the specimens.(8mks)

Characteristics

1. Type of leaf
2. Leaf venation
3. Leaf margin
4. Texture of leaf lamina

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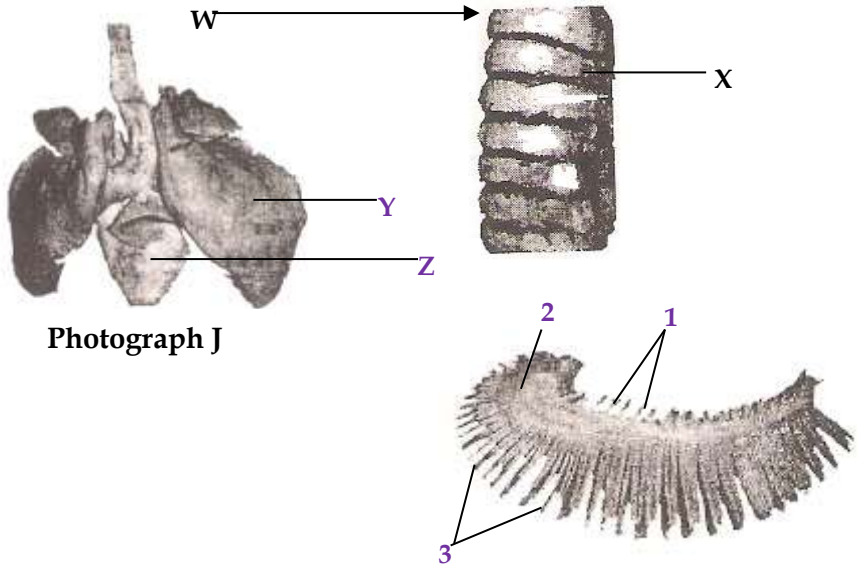
b i) Identify the likely habitat of the plant from which specimen labelled N was obtained from. (1 mrk)

ii) Give a reason for your answer in bi) above. (1 mrk)

c i) Name the class of the plant from which specimen M belong. (1 mrk)

ii) Give a reason for your answer in c i) above. (1 mrk)

3. Below are photographs labelled J and K of organs obtained from different animals. Examine them and answer the following questions.



Photograph J

Photograph K

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(a) Identify the organs labelled: (2 mrks)

X:

Y:

(b i) State the function performed by the above named organs. (2 mrks)

Organ X:

Organ Y:

ii) State **three** adaptations of organ labelled Y to its function. (3mrks)

c i) Identify the parts labelled **1, 2** and **3** in photograph K.(3 mrks)

1:

2:

3:

ii) Using observable features, state how the parts labelled **1** and **3** you identified in (i) above are adapted to their functions. (2 mrks)

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