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2019 FORM FOUR END OF TERM ONE EXAMINATION

Kenya Certificate of Secondary Education

231/1 BIOLOGY

PAPER ONE

TIME: 2HRS

INSTRUCTIONS

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

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)

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2. Which organelles should be abundant in;

   i) Skeletal muscle (1mk)

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   ii) Palisade tissue (1mk)

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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)

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4. Why are lysosomes many in phagocytic cells (2mks)

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5. Differentiate between guttation and transpiration (2mks)

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6. a) Give a reason why xylem vessel should be dead (1mk)

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b)What is the role of lignin in the wall of the xylem vessel (1mk)

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7. Name the disease of the blood characterized by,

a) Abnormally large number of white blood cells (1mk)

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b) Cresent –shaped haemoglobin (1mk)

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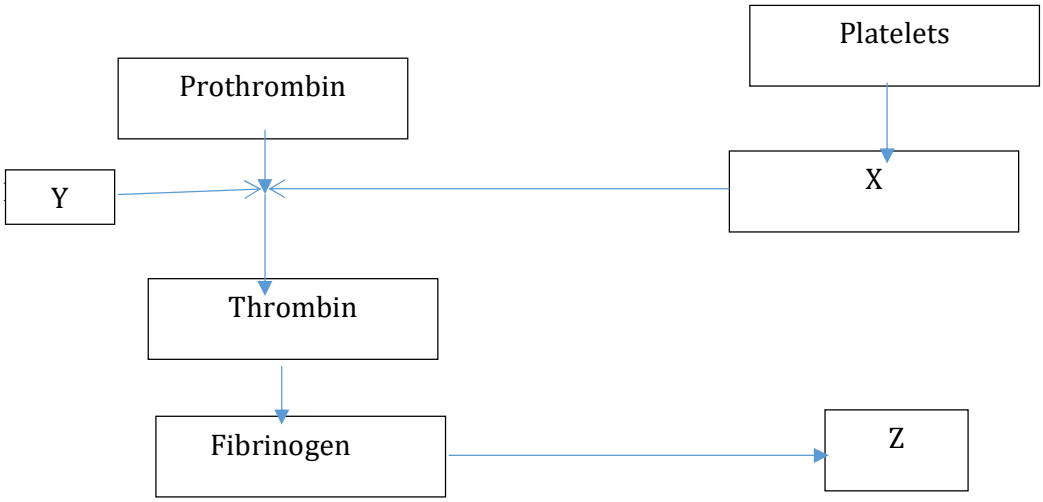
8. The chart below is a summary of blood clotting mechanism in a man.



Name;

i) The metal ion represented by Y (1mk)

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ii) The end product of the mechanism represented by Z (1mk)

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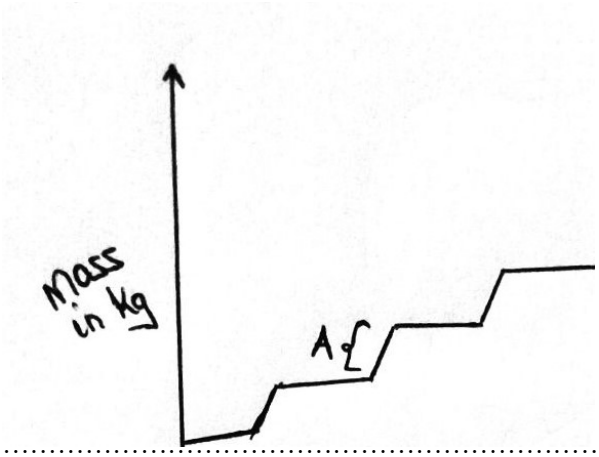
9. The graph below represents the growth of animals in a certain phylum. Study it and answer the questions that follow.



a) Name the type (1mk)

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b) Identify the process represented by letter B (1mk)

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……

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

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10. Explain why a mule is infertile (1mk)

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11. Phylum Arthropoda is the most successful of invertebrates. Explain two characteristics that make them most successful (2mks)

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12. Name phylum whose members possess a notochord (1mk)

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13. a) Define evolution and homologous structures (2mks)

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b)State three limitations of using fossil records as an evidence that supports organic evolution (3mks)

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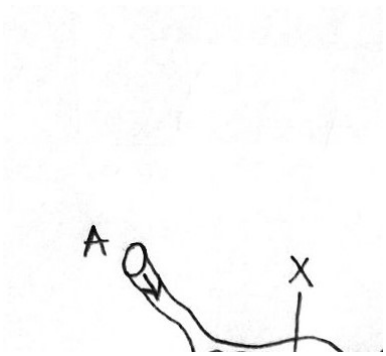
14. The following is part of a kidney nephron



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)

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……

b) Identify with a reason vessel A (1mk)

……

……

c) Name any two blood components that are present in vessel (A) but are absent in vessel B (2mks)

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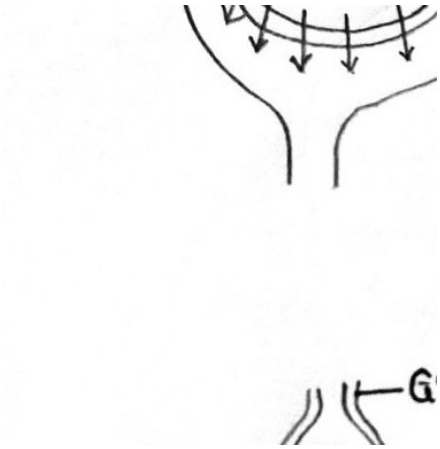
15. The diagrammatic representation below illustrates one of the process that occurs in mammals during feeding. Carefully study it and answer the following questions



i) Identify the process (1mk)

……

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ii) State two structural adaptations of gullet to its functions (2mks)

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iii) Name one enzyme already present in the food bolus within the gullet in man (1mk)

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b) State two functions of mucus secreted by the intestines (2mks)

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16. Explain each of the following;

a) Variegated plants accumulates less food than non-variegated plants under similar conditions. (2mks)

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b) Most leaves are thin with broad leaf surface (2mks)

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17. State the economic importance of the following plant excretory products (3mks)

a) Papain

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b) Caffein

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c) Colchicine

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18. a) State two processes which occurs during anaphase of mitosis (2mks)

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b)What is the significance of first meiotic division (1mk)

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c)State two ways in which HIV/AIDS is transmitted from mother to child (2mks)

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19. State the function of the following during pregnancy (3mks)

a) Amnion

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b) Amniotic fluid

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c) Umblical cord

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20. Name the process by which;

i) Producers convert sunlight energy into chemical energy (1mk)

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ii) Chemical energy is converted into heat energy by consumers (1mk)

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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)

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22. State any two methods that can be used at home to properly manage domestic effluents (2mks)

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23. a) Explain how the following factors increase the rate of diffusion (3mks)

i) Temperature

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ii) Diffusion gradient

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iii) Size of diffusing particles

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b) Diffusion is a passive process while active transport is an active process. Explain (2mks)

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24. a) Waterlogging in terrestrial plants inhibit uptake of certain mineral ions from the soil by the plants. Explain (3mks)

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b) State two illustrations of Osmosis in plants (2mks)

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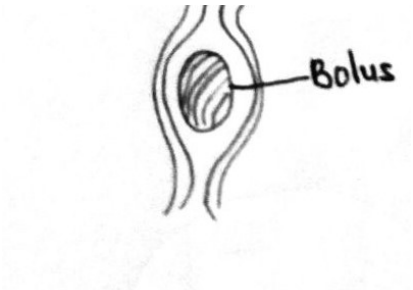
25. The diagram below represents a gill of a fish



i) State two ways in which a large surface area is created in structures labelled K (2mks)

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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)

……

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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)

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……

ii) Give two observable differences likely to be noted between the twins (2mks)

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2019 FORM FOUR END OF TERM ONE EVALUATION

Kenya Certificate of Secondary Education

231/1 BIOLOGY

PAPER TWO

TIME: 2HRS

INSTRUCTIONS

1. Answer all questions in section A and question 6 in section B (It is compulsory)
2. Answer either question 7 or 8.

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)

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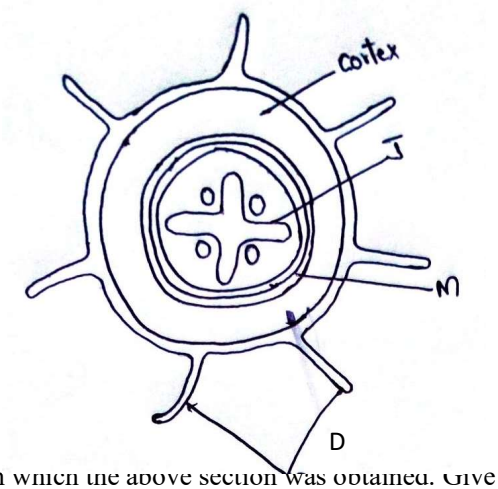
2. The figure below represents an organ obtained from a section of a plant. Use it to answer questions that follow.



a) i) Name the organ from which the above section was obtained. Give a reason for your answer (2mks)

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ii) Structure labelled J is described as a mechanical tissue. Explain (1mk)

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b) i) Name the process by which water passes across structure M (1mk)

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ii)Explain two ways by which cells with structures Dare adapted to their functions (2mks)

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c) Name two strengthening materials that strengthen the collenchyma tissue (2mks)

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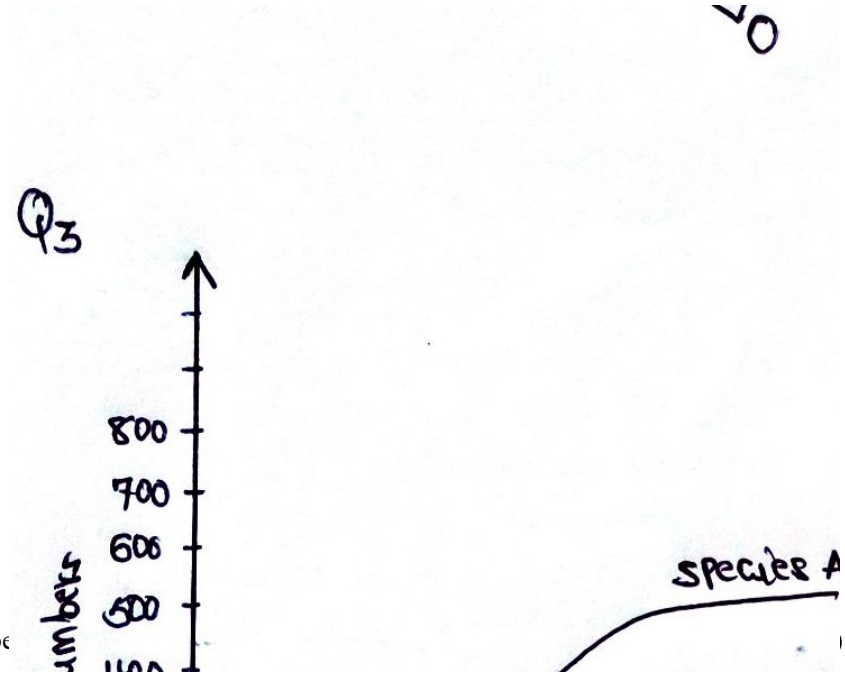
3. The herbivorous mammalian species were introduced into an ecosystem at the same time and in equal numbers. The graph below represents their populations during the first seven years. Study the graph and answer the questions that follow.



a) i) Which spe

……

……

ii) Give reason for your answer (1mk)

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b) Account for the shape of the curve of species A between

i) One year and three years (2mks)

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ii) Three years and seven years (2mks)

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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)

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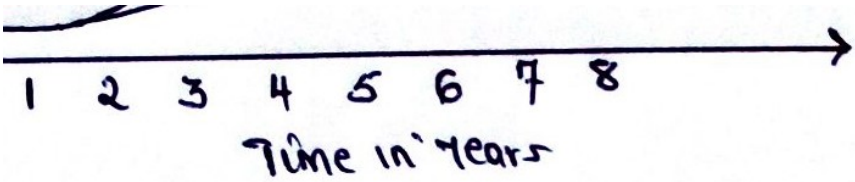
4. A student from Abogeta secondary set up an experiment as illustrated below.



The visking tubing was left in iodine solution for 4 hours.

a) State the physiological process being investigated (1mk)

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b) i) What were the expected results in the visking tubing and in the beaker (2mks)

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ii)Account for your expected result in visking tubing (2mks)

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c) Mention three factors that influences the rate of active transport (3mks)

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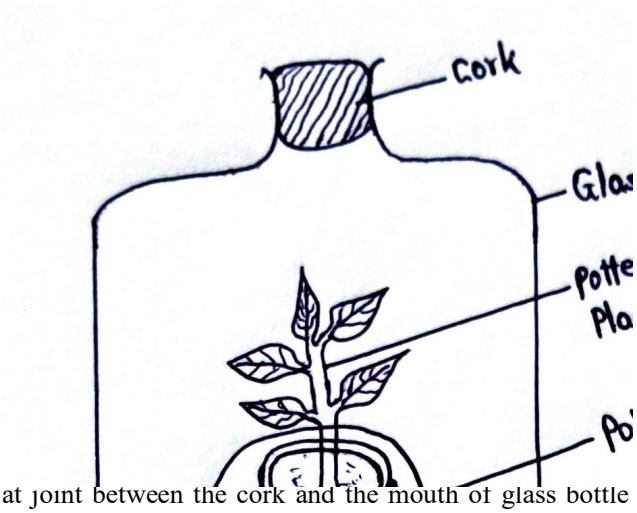
5. An experiment was set up to investigate a factor in autotrophism in green plants.



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)

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ii) To cover the pot with polythene paper (1mk)

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iii) What was the purpose of including the small animals? Give two reasons. (2mks)

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b) i) What would happen to the small animal if the set up was left over night in darkness (1mk)

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ii)Account for the answer in b (i) above (1mk)

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c) State the respiratory surface of the following organism (2mks)

i) Amoeba

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ii) Fish

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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)

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ii) 1-2 hours (3mks)

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iii) 2-4 hours (3mks)

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iv) 5-7 hours (2mks)

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c) Account for the difference in the concentration of glucose in hepatic portal vein and the iliac vein between 2 and 4 hours (2mks)

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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)

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Essays

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)

2019 FORM FOUR END OF TERM ONE EXAMINATION

Kenya Certificate of Secondary Education

231/3 BIOLOGY

PAPER THREE

TIME: 1¾ HRS

INSTRUCTIONS

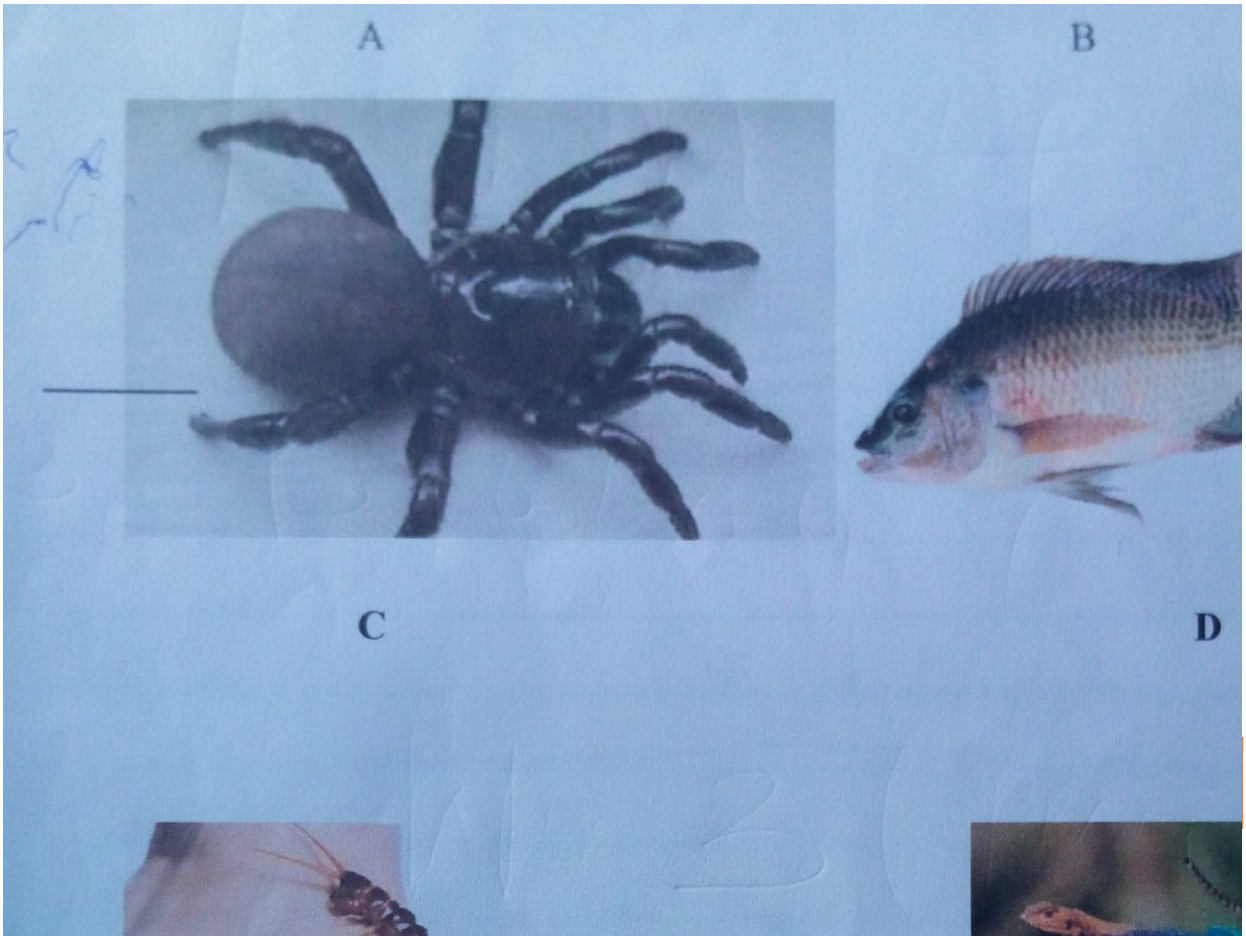
1. Answer all questions in spaces provided

Examiner's Use

QUESTIONS	MAX.MARKS	CAND.SCORE
1	9	

2	13	
3	18	
TOTAL	40	

1. Study the organisms below



a) Complete and use the key below to identify the organisms (2mks)

1.a) Organism with endoskeleton ……...go to 2

1. b) _____.....go to 4

2. a) Has scales on the body ……..…..go to 4

2 b) Has no scales on the body ……..…mammalian

3a) Has cephalothorax ……...Arachnida

3b) Has no cephalothorax ……..……..go to 5

4a) _____.....Pisces

4b) Has no fins ……go to 7

5a) Has three pairs of legs ……..Insect

5b) Has more than three pairs of legs …….go to 6

6a) Two pairs of legs per segment ……..Diplopoda

6b) One pair of legs per segment …….Chilopoda

7a) Has feathers …… Aves

7b) Has no feathers ……go to 8

8a) Has a tail ……Reptilia

8b) Has no tail ……Amphibia

b) Identify the organisms above using the completed key above (6mks)

Specimen	Steps followed	Identity
A		
B		
C		
D		
E		
F		

c) Name the phylum in which specimens C, E and F belong to. (1mk)

……

d) Give three reasons for your answer in (c) above (3mks)

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e) Name one feature that is common in organisms B, E and D (1mk)

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2. You are provided with the following;

   i) Hydrogen peroxide
   ii) Specimen K
   iii) Pestle and mortar
   iv) 4 test tubes
   v) A scalpel
   vi) Source of heat
   vii) Test tube holder

   Using a scalpel, obtain three peeled cubed from specimen K measuring about 1cm x 1cm x 1cm. For the first cube, you are required to boil it in water for five minutes. For the second cube, you are required to crush it into a paste. For the last cube, you are required to use it as it is.

Label three test tubes A, B and C and put 2ml of hydrogen peroxide in each test tube. To test tube A, add the boiled cube and record your observation.

To test tube B. add the crushed paste and record your observation.

To test tube C, add the unboiled cube remaining and record your observation.

a) Complete the table below (3mks)

Test tube	**Observation**
A	
B	
C	

b) Explain your observation in test tube A (1mk)

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c) Between test tubes B and C, in which test tube was the volume of foam produced the highest? Explain (3mks)

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d) Apart from temperature, state two other factors that affect the rate of enzyme controlled reactions (2mks)

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3. The photographs below shows specimen of different types of fruits. Examine them and answer the questions that follow.

a) mks)

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b) State the types of gynoecium and placentation of specimen P, S and V (4mks)

i) Specimen P Gynoecium ……..

Placentation …….

ii) Specimen S Gynoecium …….

Placentation……

iii) Specimen V Gynoecium ……..

Placentation ……..

c) In the table below name the mode of dispersal for each specimen and the features that adapt the specimen to its mode of dispersal. (6mks)

Specimen	**Mode of dispersal**	**Adaptive features**
P		
Q		
R		
S		
T		
v		

d) Draw and label a plan diagram of specimen V (4mks)

NAME: _____ ADM NO.:_____

CLASS : _____ SIGNATURE: _____ DATE: _____

FORM 4

BIOLOGY PRACTICAL

CONFIDENTIAL

END OF TERM 1, 2019

TIE: 2½HRS

Each candidate shall require the following

i) 10ml hydrogen peroxide solution
ii) Specimen K (Irish potato)
iii) Mortar and a pestle
iv) Four test tubes
v) Distilled water in a wash bottle
vi) A scalpel
vii) Means of heating (source of heat)
viii) Test tube holder

Name…….. ADM No…….. Class……

Candidates Signature…… Date……..

231/1

BIOLOGY

Paper 1

(THEORY)

TIME 2 HOURS

231/1

BIOLOGY

Paper 1

(THEORY)

TIME: 2 HOURS

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	

Candidates should check the question paper to ensure that all the 10 pages are printed as indicated and no questions are missing.

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

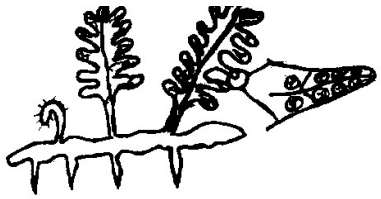
a) Organisms for the sake of classifying them.

.....

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)**

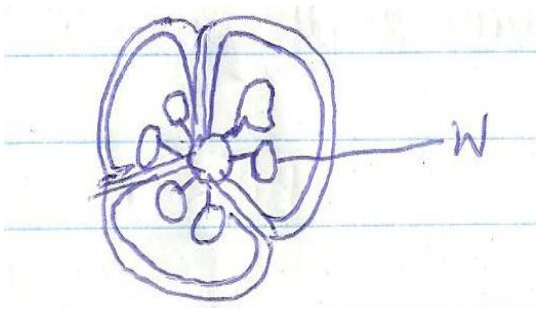
……..

(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)**

……

(i) 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 attractinsect 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.

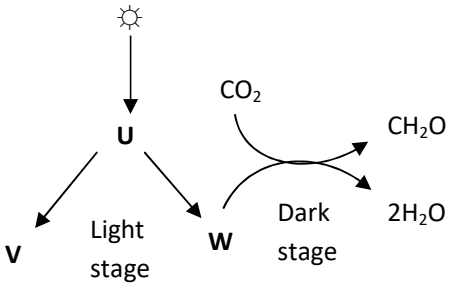
(a) What type of solution was the cell placed in respect to the cell's cytoplasm**?** **(1 mark)**

……..

(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 marks)**

U:……

V:……

W:……..

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

(i) B_1 …….

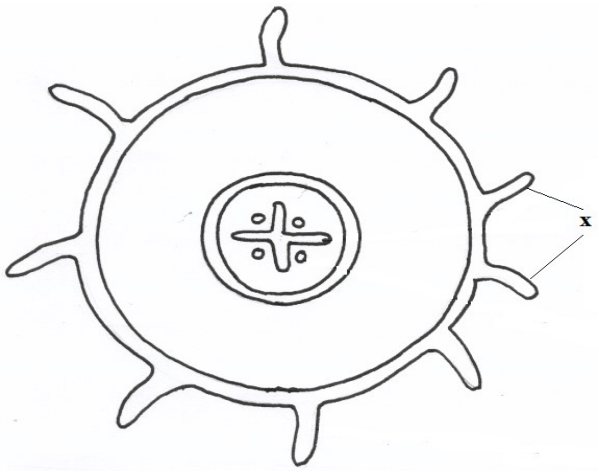
(ii) B_2 …….

(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)**

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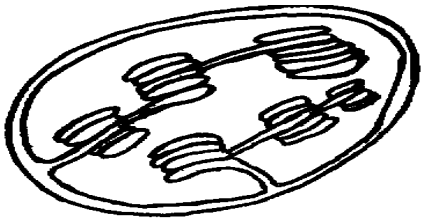
12. Below is a diagram of an organelle.



(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)**

……

……

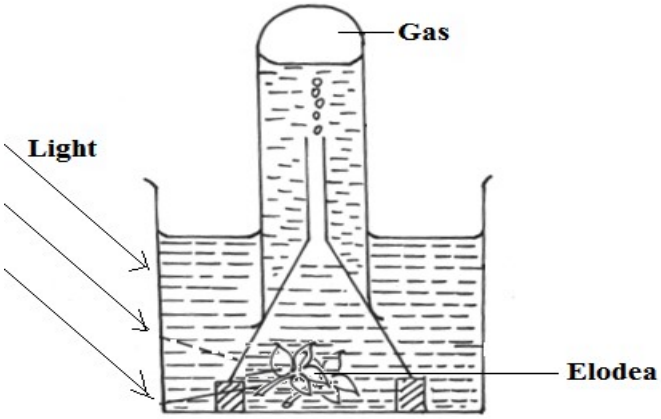
……

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

……

……

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 marks)**

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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 **(3marks)**

……..

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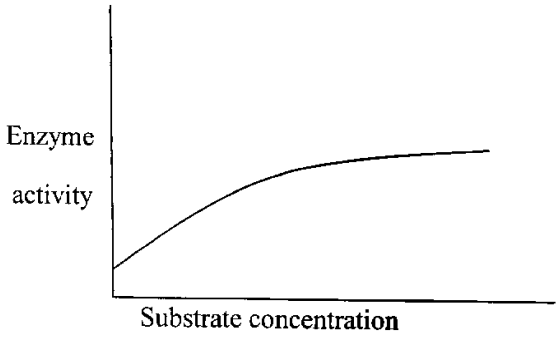
……..

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. **(3marks)**

……..

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……..…….

……..…….

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

……..…….

……..……

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

……..…….

……..……..

……..……..

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

……..

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……

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

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

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……..……..

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

……..…….

……..……..

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

……..…….

……..……..

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

……..…….

……..…….

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)**

……

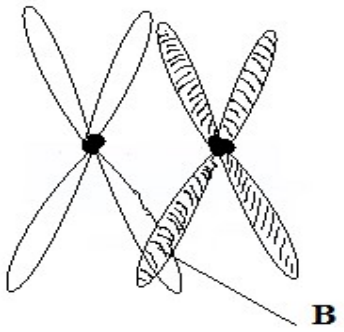
28. Distinguish between natural and acquired immunity. **(2 marks)**

……

…...……

……

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 marks)**

……

……

……

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

……

NAME……INDEX NO……

CANDIDATE'S SIGN……DATE…….

SCHOOL…….

231/2
BIOLOGY
PAPER 2
THEORY
MARCH/APRIL 2019
TIME: 2 HOURS

NYANDARUA WEST CLUSTER EXAMINATION

Kenya Certificate of Secondary Education (K.C.S.E)

231/2
BIOLOGY
PAPER 2
THEORY
MARCH/APRIL 2019
TIME: 2 HOURS

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** in the spaces provided after question **8.**

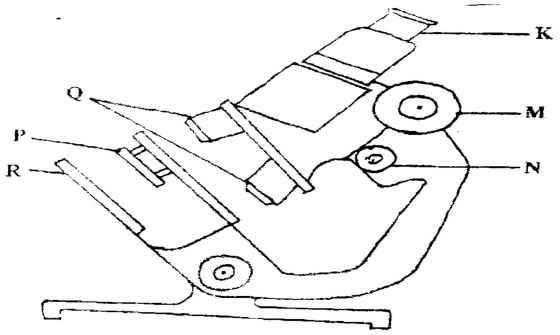
FOR EXAMINERS' USE ONLY.

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**	

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

1. The diagram below shows some components of a light microscope.



a), Name the parts labeled 1mks
K –
M –

b), State the functions of 2mks
P –
Q –

c) A student was viewing a prepared slide of a plant cell under high power microscope. The features of the cell were blurred. Which one of the labeled parts of the microscope would the student use to obtain;-

(ai), A sharper outline of the features 1mk

ii), Give the formula used to calculate magnification in a light microscope 1mk

d), A student was preparing a section of a plant cell to be viewed on a light microscope. Give a reason for each of the following steps.

i), Cutting a very thin section 1mk

ii), staining the section 1mk

iii), Putting the section in water. 1mk

2. Haemophilia is a sex linked disorder due to a recessive gene. A carrier woman married a normal man. Let H represent gene for normal condition and h to represent gene for haemophilic condition.

a), State the genotypes of

i), Man 1mk

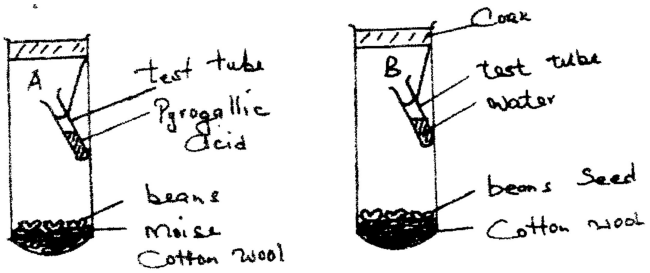
ii), woman 1mk

bi), Using a punnet square, show the genotypes of the children resulting from this marriage 3mks

ii), State the probability of getting a carrier daughter. 1mk

c), Give an explanation why haemophilia is more common in males than in females. 2mks

3. In an experiment a group of students set up the test tubes as shown below



a), What was the aim experiment? 1mk

b), Why was pyrogallic acid included in the gas jar. A? 1mk

c), What results would you expect in each of the gas jar A and B at the end of experiment? 2mks

d), State two artificial ways of breaking seed dormancy. 2mks

e), Name two harmones that bring about rapid cell division in plants 2mks

4. a. i), Distinguish between single circulatory system and closed circulatory system. 2mks

ii), Name the blood vessels that transports blood from
a), small intestines to the liver 1mk

b), Lungs to the heart 1mk

bi), Name one defect of circulatory system in humans. 1mk

ii), State three functions of blood other than transport. 3mks

5. An experiment was set up to demonstrate the necessity of carbon (IV) oxide for photosynthesis in a certain green plant as shown below. The plant was first kept darkness for 48 hours before the experiment.

a), Why was the plant kept in darkness for 48 hours before the start of this experiment. 1mk

b), What was the role of sodium hydroxide? 1mk

ci), What happened to the leaf in the flask when it was tested for presence of starch after the set up was exposed to light for a day?. 1mk

ii), Give reasons for your answer in (c) I above 2mks

d. Suggest a control for this experiment. 1mk

e), Name other two limiting factors in this experiment. 2mks

SECTION B 40MKS

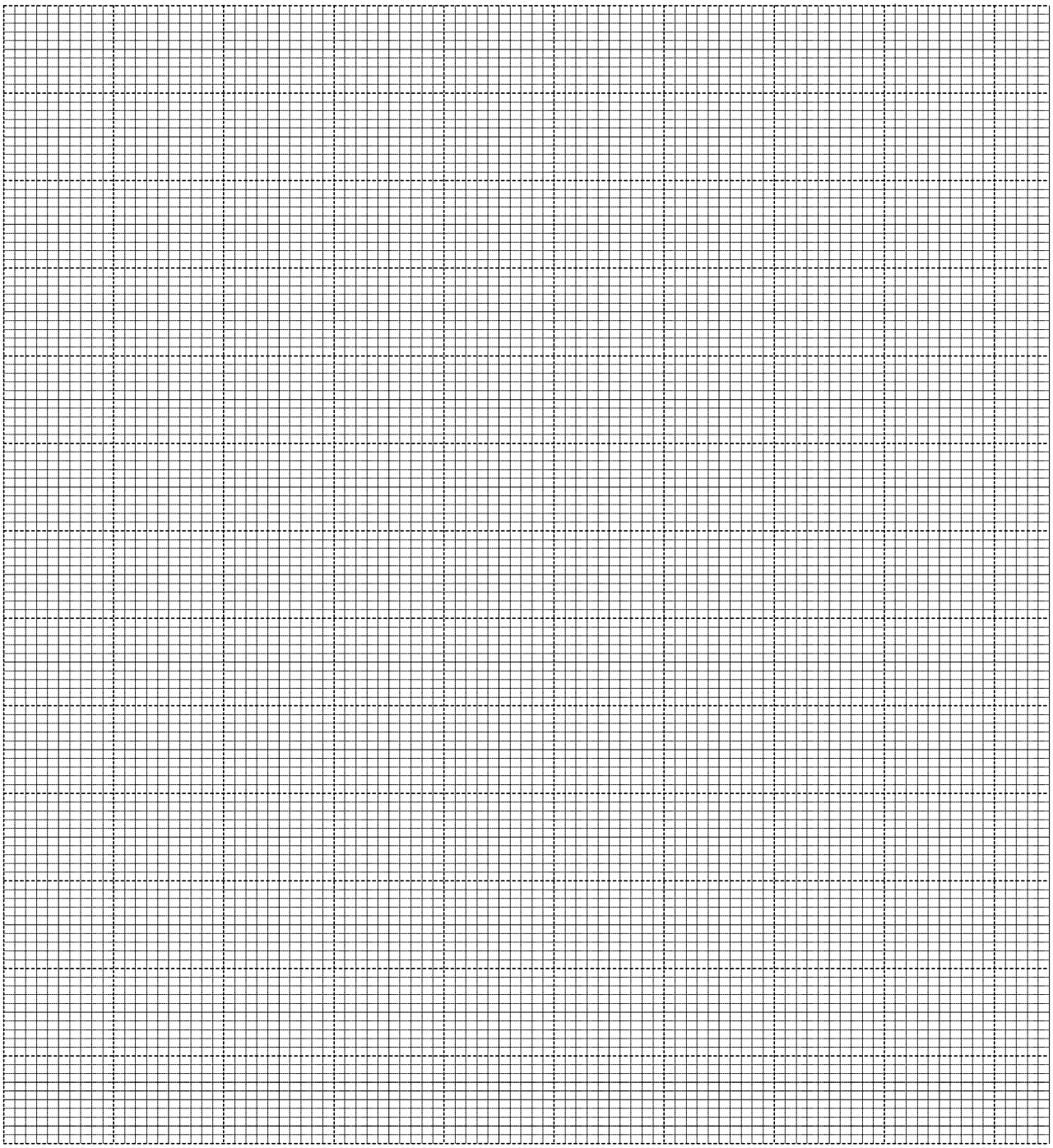
Answer question 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8.

6. A certain experiment was performed to demonstrate the effect of sweating on human body temperature. Boiling tubes **A** and **B** were filled each with water their initial temperatures recorded. This was repeated after every 5 minutes. The surface of tube **A** was continuously wiped with a piece of cotton wool which had been soaked in methylated spirit. The results are as shown below

Time (min)	Temperature 0^c in tube	
	A	B
0	80	80

5	54	67
10	40	59
15	29	52
20	21	47
25	18	46

a), On the same axis, plot graphs of water temperature against time (min) 8mks



b), Find the rate of cooling in **A** 1mk

c), Why was test **B** included in the set up? 1mk

d), Name two ways through which heat is lost in tube **B**. 2mks

e), State the expected results if tube **A** was insulated. 1mks

f), Name the structures in the following organisms that would insulate heat loss.

i), Birds 1mk

ii) Mammals 1mk

g), Name any two receptor cells on the skin of man. 2mks

h), Describe the response of hair on the skin during cold weather. 3mks

7. a) Describe gaseous exchange in alveolus. 8mks

b) Describe the process of exhalation in mammals. 8mks

c) Discuss the characteristics of gaseous exchange sites in an animal. 4mks

8. Discuss the nitrogen cycle. 20mks

Name: …… Index no ……..……

School: ……..Candidate's sign ……

Date: …….

231/3

BIOLOGY

PAPER 3

MARCH/APRIL 2019

TIME: $1^{3/4}$ HOURS

NYANDARUA WEST CLUSTERS EXAM

Kenya Certificate of Secondary Education (K.C.S.E.)

Biology

Practical

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **index number** in the spaces provided.*
- *Sign and write **date** of examination in the spaces provided above*
- *Answer **all** the Three questions*
- *You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully.*

For Examiner's Use Only:

QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE

1	12	
2	14	
3	14	
TOTAL	**40**	

1. You are provide with a food solution mixture labeled Y. you are also provided with the following reagents. 1% copper (II) sulphate solution, 10% sodium hydroxide solution, 0.1% DCPIP solution and a filter paper. Carry out tests to determine the food substances present in Y (12 marks)

Food substance being tested	Procedure	Observation	Conclusion

2. The Diagram below shows two organisms (R and S) belonging to the same phylum

R S

(a) Name the class in which the organisms shown above belong. (2 Mark)

i) Organism R

……

……

ii) Organism S

……

……

b) Other than presence of exoskeleton, list**two** observable similarities between the two organisms
(2 Marks)

R	S

c) List**two** observable differences between the two organisms (2 Marks)

P	S

d) Explain how the organism labelled P is adapted to safeguard itself from the predator (2 Marks)

……

……

……

……

……

e) (i) Name the gaseous exchange system exhibited by organism S (1 Mark)

……

……

ii) State the respiratory surface used by organism S (1 Mark)

……

……

f) Discuss**four** functions of exoskeleton (4 Marks)

……

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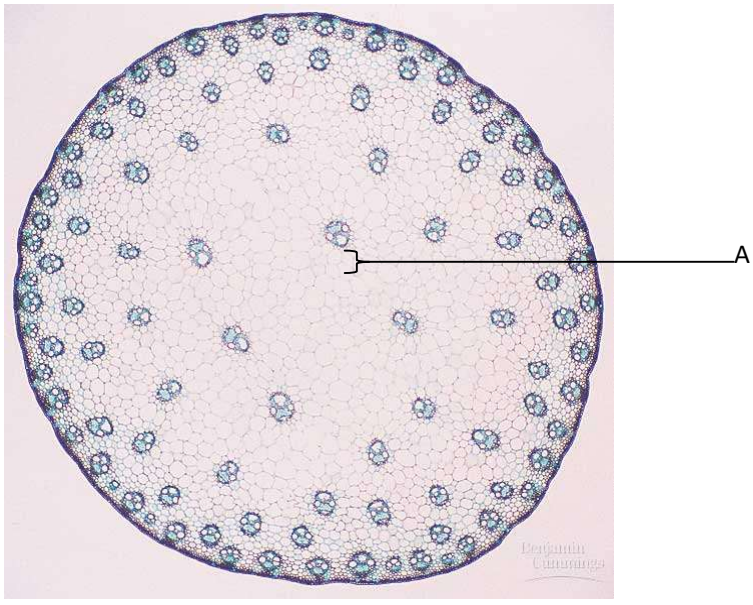
……

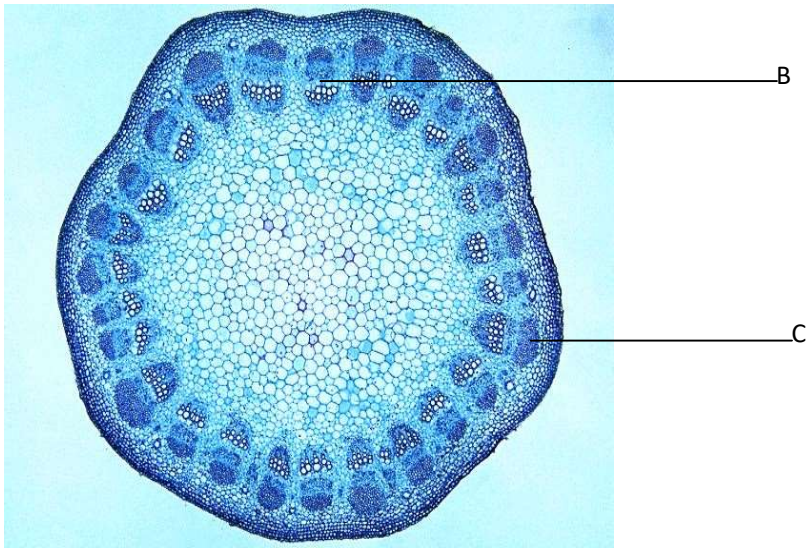
……

3.The following micrographs show images taken from a transverse section of a various stems by a light microscope. Analyze them closely and use them to answer questions that follow.

T



Q



a)On the diagram, label part A, B and C (3 Marks)

b) Explain the adaptation of the parts C and D to their functions (2 Marks)

C……

……

D……

……

c) Identify**five** differences between cross section T and Q and record them in the table below. (5 Marks)

T	Q

d) Explain how part B facilitates the process of secondary growth (4 Marks)

……

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……

Name: …… **Adm No**: ……

School: …… **Candidate's Sign**: ……

Date: ……

231/1

BIOLOGY

PAPER 1

THEORY

TIME: 2 HOURS

END OF TERM 1 EXAM 2019

Kenya Certificate of Secondary Education (K.C.S.E.)

FORM FOUR

INSTRUCTIONS TO CANDIDATES:

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

For Examiner's Use Only:

QUESTIONS	MAXIMUM SCORE	CADNIDATE'S SCORE
1 – 26	**80**	

1. Identify the structure of the cell that performs the following functions

a) Synthesis of ribosome

(1mk)

……

……

b) Regulate exchange of substances in and out of the nucleus (1mk)

……

……

c) Formation of spindle fibres (1mk)

……

……

2. State the importance of the following processes

a) Ultra-filtration

(1mk)

……

……

b) Selective reabsorption

(1mk)

……

……

3. The diagram below represents an organism.

(i) In which kingdom does the organism belong (1mk)

……

……

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

……

……

(iii) Name the structure labeled A (1mk)

……

……

4. What difference would you expect to see between pea seedlings grown for ten days in total darkness and pea seedlings grown in light for the same period of time

(3mks)

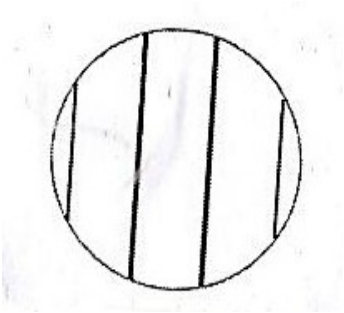
……

……

……

……

5. A form one student trying to estimate the size of onion cells observed the following on the microscope's field of view



(i) Define the term resolving power (1mk)

……

……

(ii) If the student counted 20cells across the field of view, calculate the size of one cell in micrometers

(2mks)

……

……

……

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…

6. During a strenuous exercise, the chemical process represented by the equation below takes place in human muscles

$C_6H_{12}O_6$ ——————→ $2CH_3CH(OH)COOH$ + 150KJ

(Glucose) (Substance X) (Energy)

a) What is the name of this process

(1mk)

……

……

b) Name the substance X

(1mk)

……

……

c) Explain what happens in the body when substance X accumulates in the muscle in high amounts (1mk)

……

……

……

7. State the effect of damping untreated sewage into a river (3mks)

……

……

……

……

……

……

8. (a) What is meant by double fertilization in plants (2mks)

……

……

(b) Mention two development stages that take place in the ovary of a flower after fertilization. (2mks)

……

……

……

9. What is meant by the following terms

a) Hybrid vigour

(1mk)

……

……

……

b) Polyploidy

(1mk)

……

……

……

10. Name the causative agent of the following human diseases

a) Malaria (1mk)

……

……

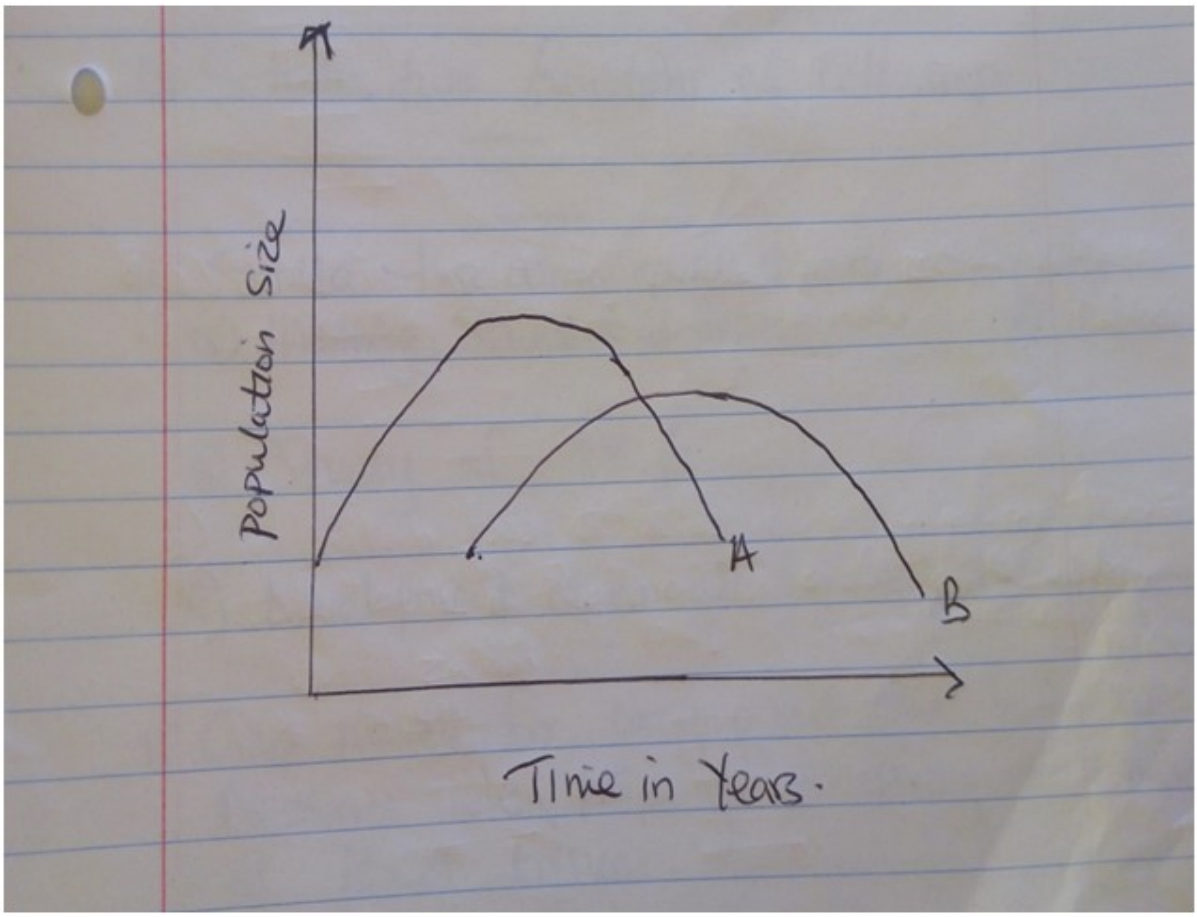
b) Typhoid

(1mk)

……

……

11. The graph below shows relationship between two species a and B. species B is a predator feeding on species A



a) When the predators are too efficient, what happens to both populations?

(1mk)

……

……

b) If predators were entirely removed, what might happen to the prey population?

(3mks)

……

……

12. Define the following terms

(i) Test cross

(1mk)

……

……

(ii) Phenotype

(1mk)

……

……

(iii) Dominant gene

(1mk)

……

……

13. State two functions of cell sap

(2mks)

……

……

……

14. State the name given to the study of:

a) Structure of tissues

(1mk)

……

……

b) Study of fishes (1mk)

……

……

c) Development of animals from egg to adult

(1mk)

……

……

15. Give reasons for carrying out the following procedures when preparing temporary wet mounts of plant tissues.

a) Making thin plant sections

(1mk)

……

……

b) Adding water on plant section (1mk)

……

……

c) Placing a cover slip over the plant sections

(1mk)

……

……

16. (a) What is diffusion?

(2mks)

……

……

(b) How do the following factors affect the rate of diffusion?

i) Diffusion gradient

(1mk)

……

……

ii) Surface area to volume ratio

(1mk)

……

……

iii) Temperature

(1mk)

……

……

17. The table below shows the concentration of sodium and iodine in sea water and cell sap of a plant.

	Sodium ion concentration	**Iodide concentration**
Sea water	250	35
Cell sap	100	550

If the plant was sprayed with a chemical that inhibit respiration:

(i) Which of the two ions uptake will be affected (1mk)

……

……

(ii) Give a reason for your answer in (i) above

(1mk)

……

……

18. What is the role of vascular bundles (3mks)

……

……

……

……

19. Describe what happens during light stage photosynthesis (3mks)

……

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……

……

20. What happens to the end products of photosynthesis

(4mks)

……

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……

……

……

21. (a) Name one appropriate food substance for each of the following enzymes

(i) Ptyalin

(1mk)

……

(ii) Pepsin

(1mk)

……

(b) State two symptoms of Beri-Beri

(2mks)

……

……

……

22. How is the human stomach adapted to

(i) Protein digestion

(3mks)

……

……

……

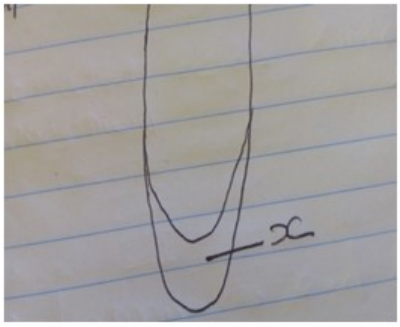
(ii) Churning

(1mk)

……

……

23. the diagram below represents the region of a root tip



a) Name the three regions above X in ascending order

(3mks)

……

……

……

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

……

……

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

……

(b) Explain three protective role of mammalian blood
(3mks)

……

……

……

25. How are mitochondria adapted to their functions
(2mks)

……

……

……

26. State two ways in which anaerobic respiration is applied in industries
(2mks)

……

……

……

Name: …… **Adm No**: ……

School: …… **Candidate's Sign**: ……

Date: ……

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

END OF TERM 1 EXAM 2019

Kenya Certificate of Secondary Education (K.C.S.E.)

FORM FOUR

Biology

Paper 2

INSTRUCTIONS TO CANDIDATES:

- *Write **your name** and **admission number** in the spaces provided.*
- *Sign and write the date of examination.*
- *This paper consists of **two** sections A and B.*
- *Answer **all** the questions in Section **A** in the spaces provided.*
- *In section **B** answer questions **6** (compulsory) and either question **7** or **8** in the spaces provided.*
- *Check and ascertain that no questions are missing.*

For Examiner's Use Only:

SECTIONS	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)

Answer all questions in this section

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

a) What were the parental genotypes?

(2mks)

……

……

……

……

……

……

b) Work out the cross between f1 generations

(4mks)

……

……

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……

……

……

c) State the phenotypic and genotypic ratios of the f2 generations

(2mks)

……

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.....

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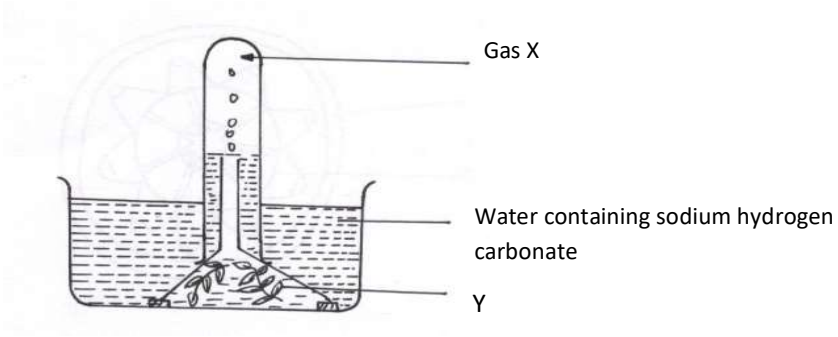
2. The set up shown was used to investigate a certain process. The set up was left in bright sunlight for 4 hours.



a) State the aim of experiment

(1mk)

.....

.....

b) Name X and Y

(2mks)

.....

.....

.....

c) Other than sunlight name three factors that would affect the experiment

(3mks)

.....

.....

.....

.....

d) State how the identity of gas X could be confirmed

(1mk)

.....

.....

e) Explain why submerged water plants was used in the experiment

(1mk)

.....

.....

.....

3. (a) What is meant by:

i) Autecology

(1mk)

.....

.....

ii) Synecology

(1mk)

.....

.....

(b) Using the table below, answer the questions that follow

	Number of stomata	
Leaf	**Upper epidermis**	**Lower epidermis**
A	300	0
B	150	200
C	02	13

Suggest the possible habitat of the plants from the leaves were obtained

(3mks)

A

.....

B

.....

C

.....

(c) State the modifications in the stomata of leaf C

(3mks)

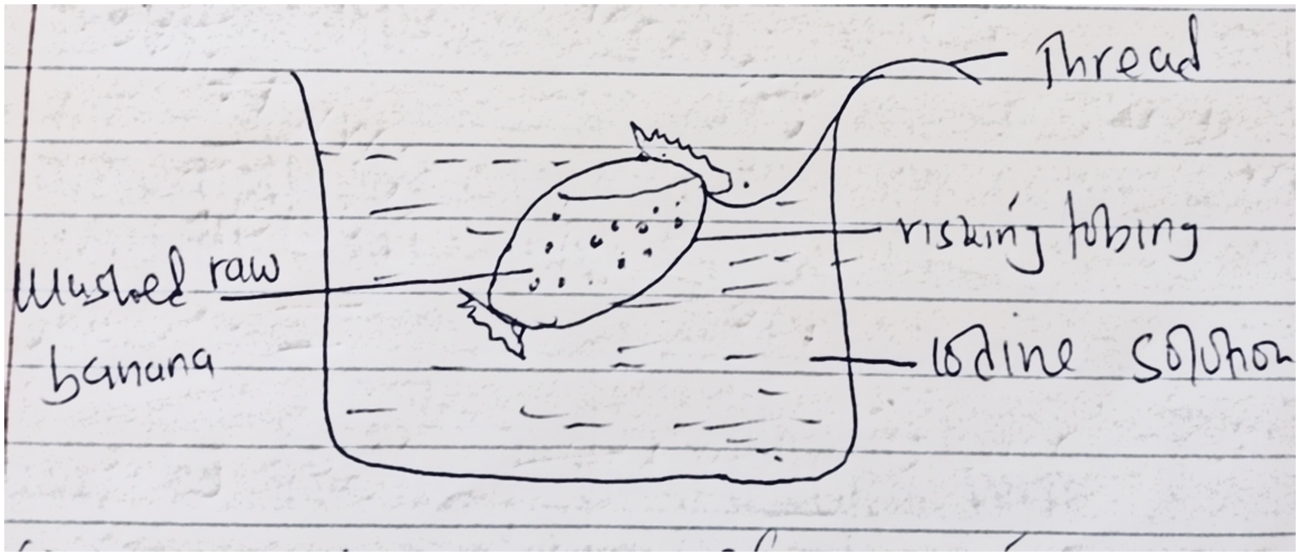
.....

.....

.....

.....

4. In an investigation, a raw banana was peeled, mashed into a paste and treated as shown in the set up below.



a) Name the physiological process being investigated

(1mk)

.....

.....

b) State the expected observations in the above set up after 30 minutes

(2mks)

.....

.....

.....

c) Account for the observations made in (b) above.

(2mks)

.....

.....

.....

.....

d) State three role of active transport in human
(3mks)

.....

.....

.....

.....

.....

5.

substance	% in blood Plasma	% in glomerular Filtrate	% in urine
Water	100	90	60
Protein	6.5	0	0
Urea	0.03	0.03	1.8
glucose	0.1	0.1	0

a) Why is the concentration of protein in glomerular filtrate and urine zero? (1mk)

.....

.....

b) (i) By how many times is urea more concentrated in urine than in glomerular Filtrate? (1mk)

.....

.....

(ii) Explain why there is greater concentration of urea in urine than glomerular filtrate (1mk)

.....

.....

.....

c) Explain why there is no glucose in urine (1mk)

.....

.....

.....

d) State the economic importance of the following plant excretory products

i) Rubber (1mk)

.....

.....

ii) Papain (1mk)

.....

.....

e) State two reasons why plants lack complex excretory organs. (2mks)

.....

.....

.....

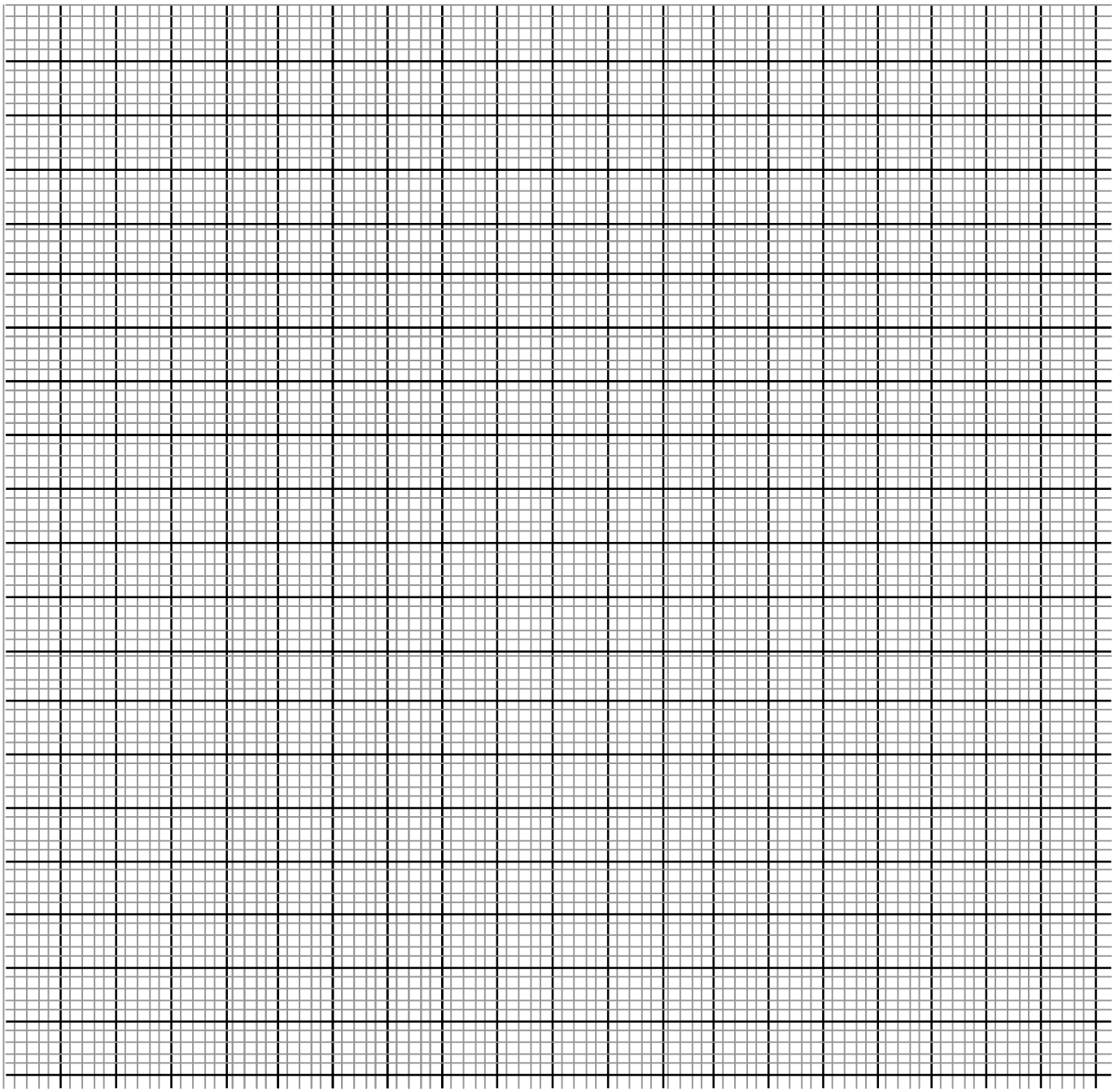
SECTION B: (40MARKS)

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

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

Time after planting (days)	Dry weight of endosperm (mg)	Weight of embryo (mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	16	37
8	10	25	35
10	6	33	39

(a) On the same axes, plot a graph of dry weight of endosperm, weight of the embryo and the total dry weight against time.
(8mks)



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

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.....

(c) Account for the;

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

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ii) Increase in weight of the embryo from day 0 to 10
(2mks)

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

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iv) Increase in the total dry weight after day 8

(1mk)

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(d) State two factors within the seed and two outside the seed that cause dormancy. Inside seed

Inside seed

(2mks)

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Outside seed (2mks)

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(e) Give one characteristic of meristematic cells (1mks)

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7. (a) Describe the process of fertilization in flowering plants

(15mks)

(b) State five adaptive features of red blood cells to their function

(5mks)

8. (a) Explain inspiration in the gills of bony fish

(10mks)

(b) Explain the factors affecting the rate of breathing in humans

(10mks)

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Name: …… Index no ……..……..

School: ……..Candidate's sign ……..

Date: ……

231/3

BIOLOGY

PAPER 3

TIME: 1 ¾ HOURS

END OF TERM 1 EXAM 2019

Kenya Certificate of Secondary Education (K.C.S.E.)

FORM FOUR

Biology

Practical

INSTRUCTIONS TO CANDIDATES:

- *Write your **name** and **admission number** in the spaces provided.*
- *Sign and write **date** of examination in the spaces provided above*
- *Answer **all** the questions in section **A** and **B***
- *You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully.*

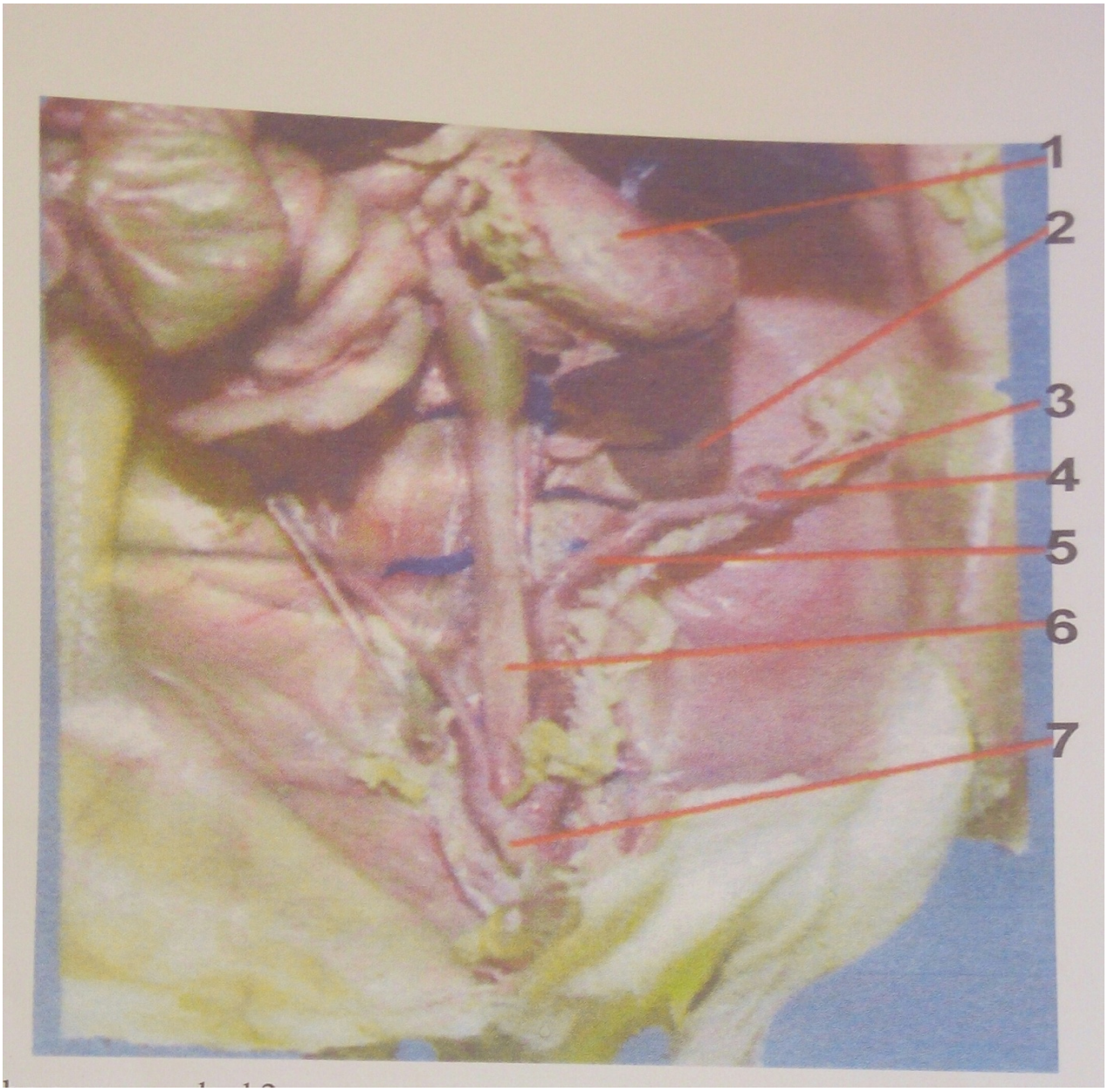
For Examiner's Use Only:

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1	14	
2	15	
3	11	
TOTAL	40	

1. You are provided with solution W. Using the provided reagents; carry out possible food tests to identify food substances present in solution. (14mks)

Food substance	Procedure	Observation	Conclusion

2. Examine the photograph which shows parts of the urogenital system of a female rat and answer the questions that follow. The organ marked 1 is the stomach.



a) (i) Name the organ marked 2

(1mk)

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(ii) State two functions of the organ

(2mks)

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(iii)What is the functional unit of the organ in (a)(i) above

(1mk)

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b) (i) Identify and name each of the organs marked 3 and 4

(2mks)

3

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4

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(ii) State two functions of the part marked 4

(2mks)

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c) (i) Identify the organs marked 5

(2mks)

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(ii) Explain two functions of the organ named in c (i) above.
(2mks)

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d) The organ marked 6 is the large intestine. State three function of the large intestine.
(3mks)

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3. You are provided with seven specimens of plants. They are labeled D1, D2, D3, D4, D5, D6, and D7.

The dichotomous key

1. a) Leaves needle like ……go to 2

b) Leaves broad …….. go to3

2. a) Leaves arranged in clusters on stem…… Pinnacea

b) Leaves not arranged in clusters on stem ……..Araucariaceae

3. a) Leaves compound…….. go to 4

b) Leaves simple…… go to 7

4. a) Leaflets pointed at the end ……go to 5

b) Leaflets rounded at the end……go to 6

5. a) Leaflets attached to many small stalks that join the main one ……..Mimosaceae

b) Leaflets attached to one stalk ……Rosaceae

6. a) Leaflets attached to many small stalks that join the main one…….. Bignonaceae

b) Leaflets attached to one stalk ……Compositae

7. a) Leaves green ……go to 8

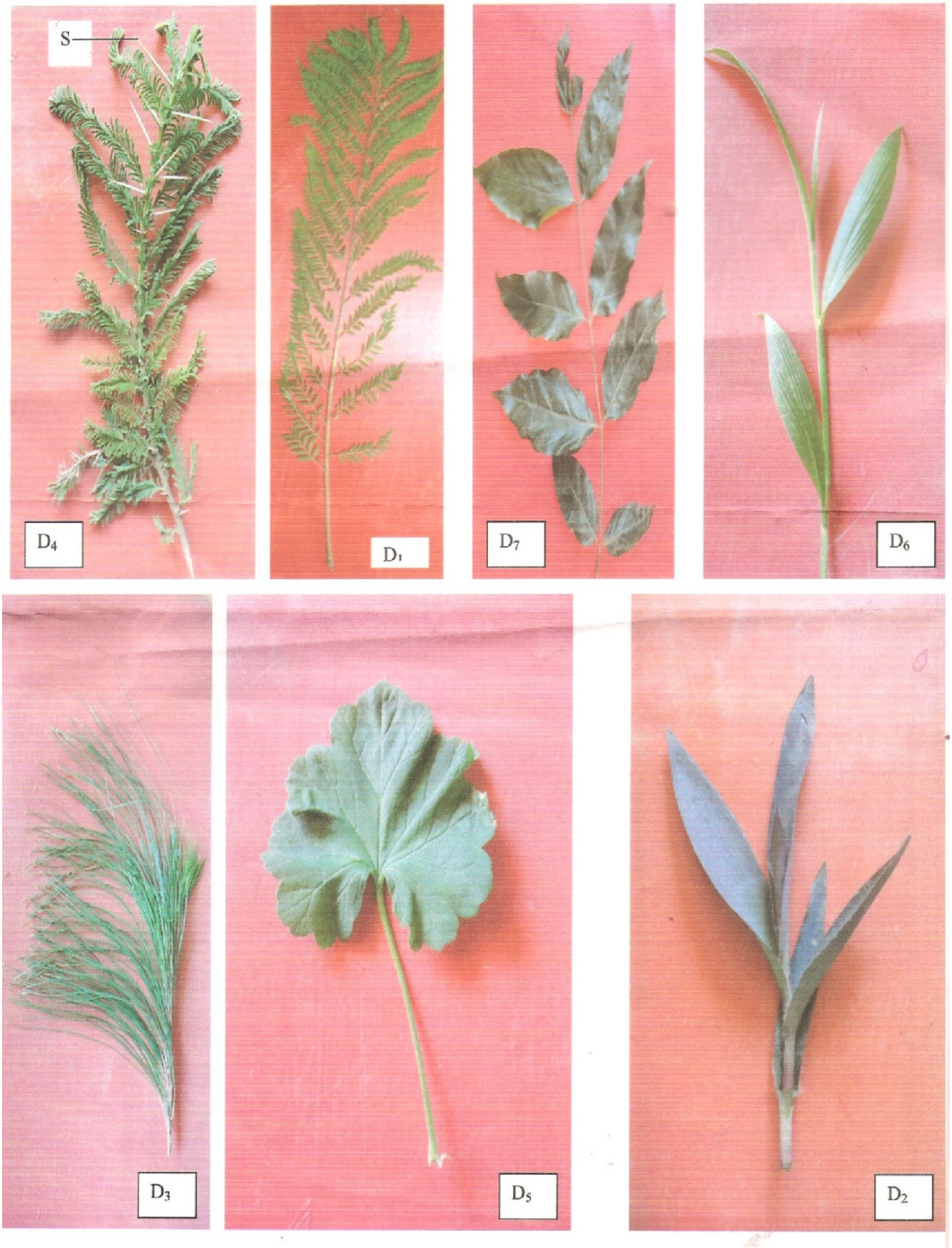
b) Leaves purple …….. go to 9

8. a) Leaves parallel veined ……..Graminae

b) Leaves net veined …….. Geranaceae

9. a) Leaves parallel veined ……Commelinaceae

b) Leaves net veined ……..Euphorbiaceae



a) Use the dichotomous key to identify the taxonomics group of each of the seven specimens in the photographs provided. (7mks)

Specimen	Steps followed	Identity
Dl		
D2		
D3		
D4		
D5		
D6		
D7		

b) (i) Suggest the possible habitat that specimen D4 is adapted to (1mk)

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(ii) Name one observable feature that adopts D4 to the habitat you have mentioned in (b) (i) above (1mk)

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(iii)Give a reason for your answer in (b) (i) above (1mk)

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(iv) State the importance of the structure labeled S in specimen D4 (1mk)

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BIOLOGY

CONFIDENTIAL

231/3CONFIDENTIAL

1. Each candidate should be supplied with the following

(i) 4 test tubes and test tube rack.

(ii) Iodine solution – supplied with a dropper

(iii) 10cm^3 solution of a mixture of soluble starch and glucose labeled W. NB: 30gms of glucose mix with 3g of starch add 100cm^3 water, heat to boil, and then cool

(iv) Adequate distilled water

(v) Benedict solution

(vi) Means of heating

(vii) Sodium Hydroxide

(viii) Copper (II) Sulphate

(ix) DCPIP

NAME …… **ADM NO** ……..

SCHOOL …… **SIGNATURE** ……..…….....

DATE ……..……..

231/2
BIOLOGY
PAPER 2
(THEORY)
MARCH/APRIL, 2019

2 HOURS

MOKASA JOINT EVALUATION TEST, 2019

Kenya Certificate of Secondary Education (K.C.S.E)

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.**
- **This paper consists of 9 Printed pages. Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing**

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)

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

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(c) Describe the adaptations of the male parts of a wind pollinated flower to their function? (3 Marks)

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

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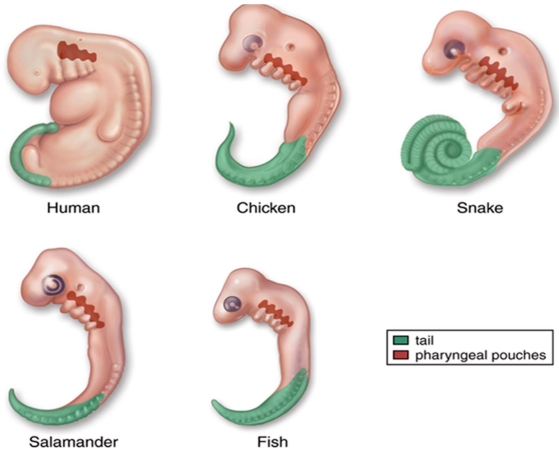
(b) The diagrams below show some organism structures that have been used as evidence of the process of evolution.



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

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

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

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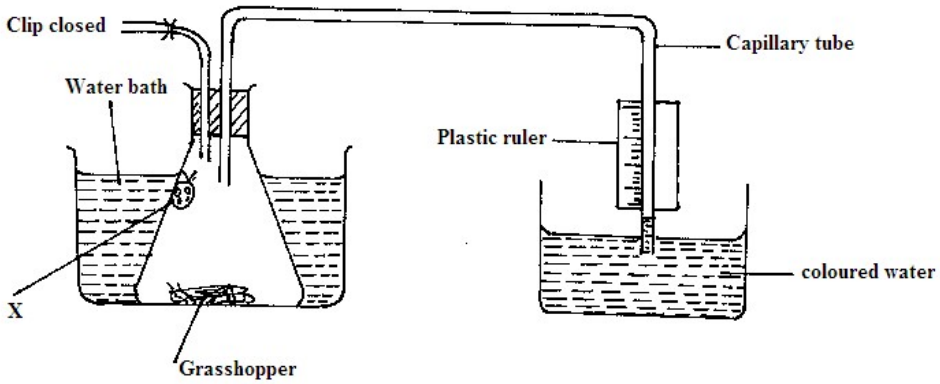
(b) The diagram below illustrates an experiment to determine the rate of respiration in a small insect.



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

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(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)

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

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

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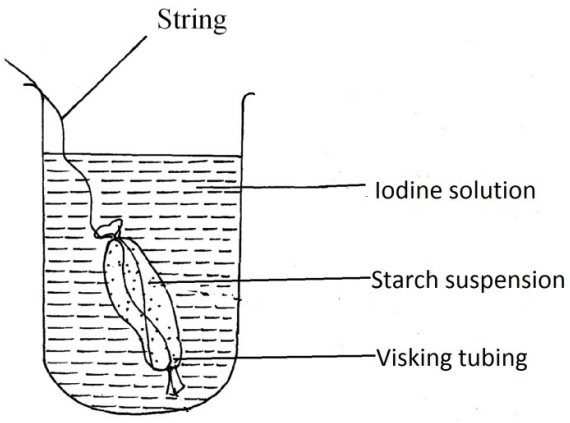
4. An investigation was performed by a group of students as shown in the set up below.



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)

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

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(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)

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(d) Define cell physiology. (1 mark)

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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)

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(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)

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(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)

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

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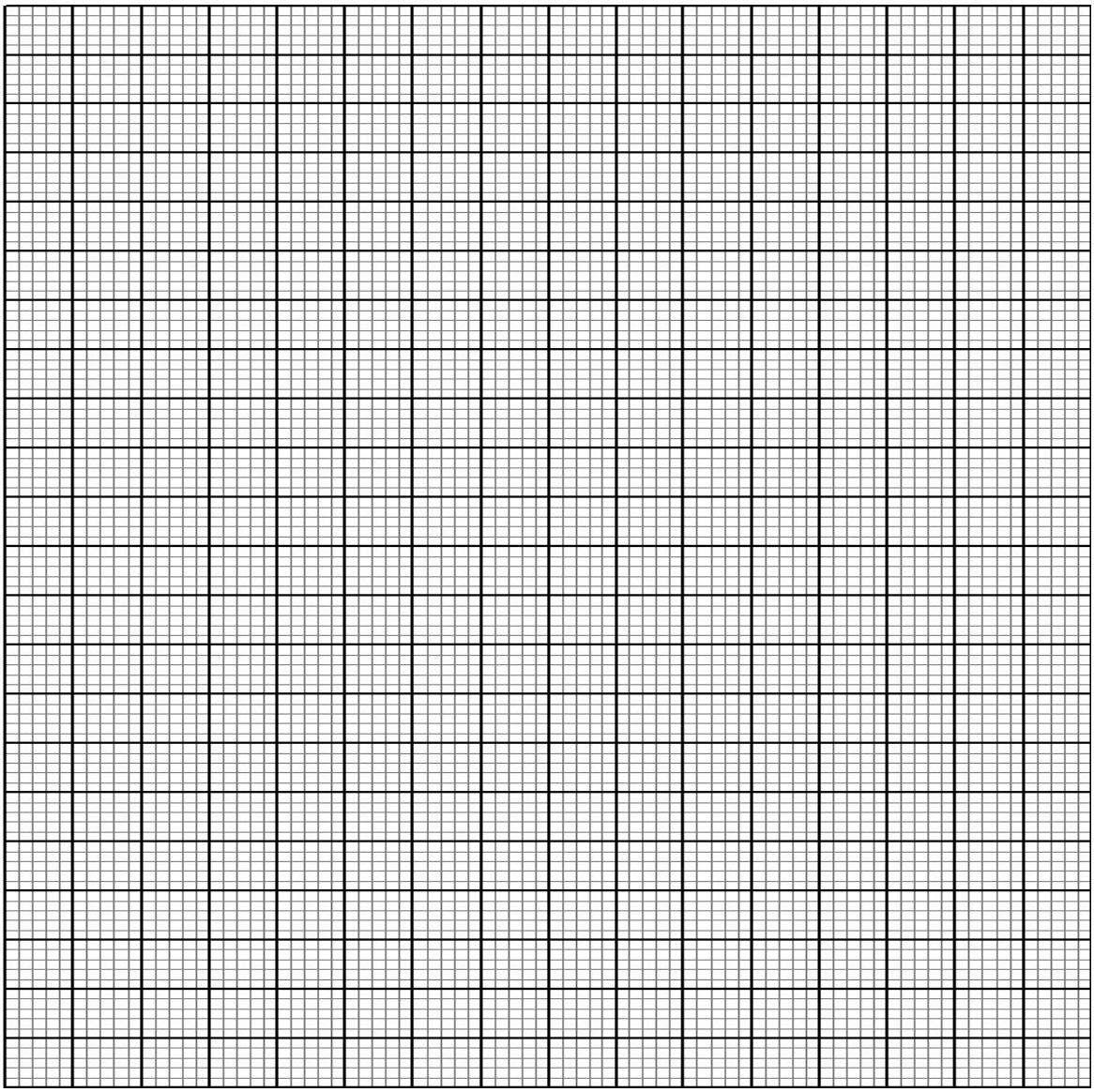
SECTION B (40 Marks)

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

6. 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 marks)



(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)**

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

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

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

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

(i) Locomotion. (2 marks)

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(ii) Protection. (2 marks)

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(iii) Feeding. (2 marks)

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

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

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

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8. Describe the role of the liver in;

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

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

(c) Name and explain the process that occurs when blood reaching the liver carries excess amino acids. **(5 marks)**

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NAME: _____ INDEX NO: _____

DATE: _____ CANDIDATE'S SIGN: _____

231/3
BIOLOGY
PAPER 3
PRACTICAL
MARCH/APRIL, 2019
TIME: 1 ¾ HOURS

MOKASA 1 JOINT EVALUATION EXAMINATIONS

Kenya Certificate of Secondary Education

231/3

BIOLOGY

PAPER 3

PRACTICAL

MARCH/APRIL, 2019

TIME: 1 ¾ HOURS

INSTRUCTIONS TO CANDIDATES

- Write your Name and Index No. in the spaces provided above
- Answer ALL the questions in the spaces provided

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1		
2		
3		
TOTAL		

1. You are provided with the following: suspension labeled L, dilute HCl, NaOH, unboiled solution M_1 and boiled solution M_2.

a) Perform procedures (i) to (iii) and in each procedure maintain the mixture at a temperature of between 34^0C to 38^oC for 30 minutes and fill in the table that follows.

(i) Mix suspension L with 1ml of solution M_1 and add 1ml of dilute HCl to the mixture.

(ii) Mix suspension L with 1ml of solution M_1 and add 1ml of NaOH solution to the mixture.

(iii) Mix suspension L with 1ml of solution M_2 and 1ml of HCl to the mixture.

Fill in the table below: (3marks)

Procedure	Observation
i)	
ii)	
iii)	

i. Account for the difference in observation between procedure (i) and (ii) and (i) and (iii). (2mks)

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b) Identify solution M and give two reasons for your answer.

i) Identity …… (1mark)

ii) Reason (1 mark)

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c) You are provided with specimen K, hydrogen peroxide (H_2O_2) solution, stop watch, motor and pestle. Make two cylinders each measuring 2cm long. Crush one of the potato cylinders to make a paste and add 1ml of H_2O_2 solution to each of the potato paste and cylinder.

(i) Between the two which one takes a longer time to stop producing foam?

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ii) Record the time taken by the crushed potato to stop producing foam. (1mark)

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iii) Account for the above difference in time taken for foam to stop forming. (3marks)

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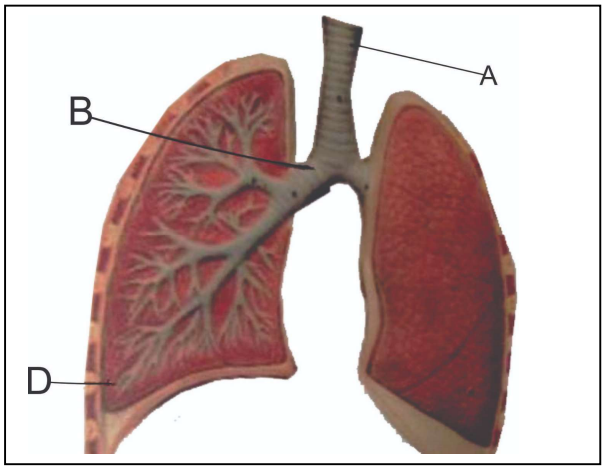
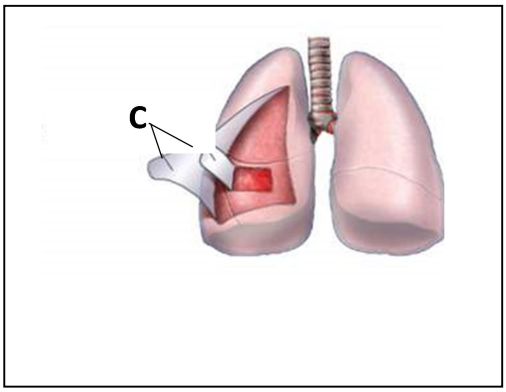
iv) Calculate the rate of foam formation in the crushed potato cylinder. (3marks)

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





a) (i) Name the parts labeled A, B, C and D. (4marks)

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(ii) State the adaptation of the part labeled A to its function. (2marks)

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(iii) State **one** function of the part labeled C. (1mark)

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……State **three** adaptations of the parted labeled D. (3marks)

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……Identify the structures that perform similar function as D, above, in:

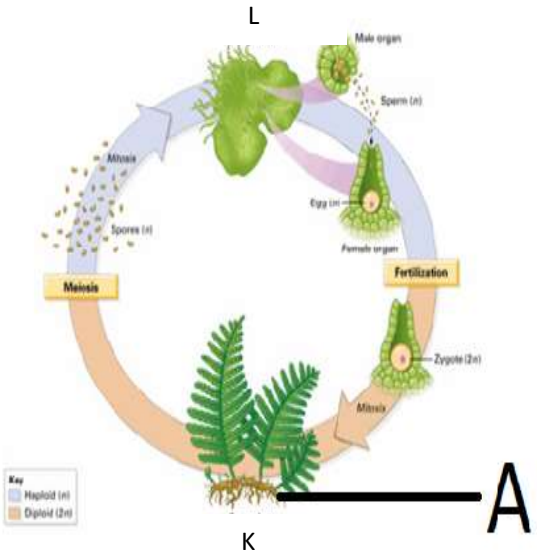
(i) Amoeba……..

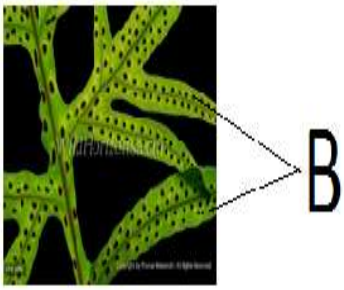
(1mark)

(ii) Fish ……..

(1mark)

3. The diagram below illustrates the life cycle of a certain organism.





a) (i) Giving reasons, name the division to which the organism belongs.

Division……

(1mark)

Reasons

(2marks)

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(ii) Which portion of the plant's life is independent? (1mark)

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b) (i) Name the parts labeled A and B. (2marks)

A ……

B ……

(ii) State one function of the part labeled B. (1mark)

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(i) Define the term alternation of generation. (1mark)

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(ii) Identify the generations labeled K and L. (2marks)

K ……

L ……

(iii) In what way is generation L advantageous to generation K? (2marks

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CONFIDENTIAL

Specimen K-Potato tuber-1 per student

Hydrogen peroxide.

Mortar and pestle

Stopwatch

Ruler

Dilute HCL

NaOH.

Unboiled Pepsin solution-M1

Boiled pepsin solution-M2

Albumen suspension-L

Thermometer.

Water bath maintained at 34 c-38c.

Cork and borer.

NAME…….INDEX NO……

SCHOOL…….. DATE……

ADM NO……

231/1 STREAM……
BIOLOGY
PAPER 1 (THEORY)
2019
TIME: 2 HOURS

NAMBALE DIOCESE

JOINT EVALUATION EXAMINATION 2019

INSTRUCTIONS TO CANDIDATES

- *Write your name, Index and Admission 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.*
- *Candidates may be penalized for false information and even wrong spellings of technical terms.*

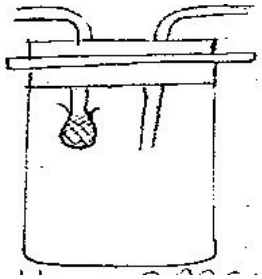
FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidate's Score
1-30	80	

This paper consists of 13 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

Attempt all questions in the spaces provided.

1. The diagram below shows apparatus used in biological study.



State its function. (1 mark)

……

2. Name the blood vessel that supplies:

a) The heart with nutrients. (1 mark)

……

b) The foetus with oxygen. (1 mark)

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3. Explain why it's important to stain specimen to be observed under a light microscope. (1 mark)

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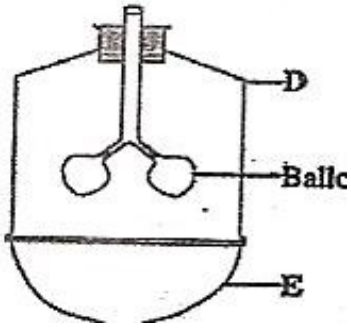
4. The diagram below represents a model used to demonstrate breathing in mammals.



a) Name the mammalian structure represented by parts labeled **D**. (1 mark)

……

b) What is the effect of contraction of the part labeled E during breathing in a mammal? (3marks)

……

……

……

5. State the significance of the following steps while testing for disaccharide in food sample.

(a) Addition of dilute hydrochloric acid. (1mark)

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(b) Addition of sodium bicarbonate. (1mark)

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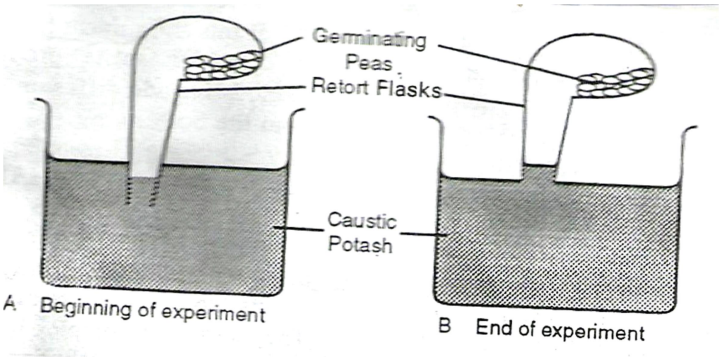
6. Form 2 students from samba secondary school set up an experiment as shown below.



Explain the change observed at the end of the experiment. (1mark)

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7. State **two** advantages of metamorphosis to the life cycle of insects. (2marks)

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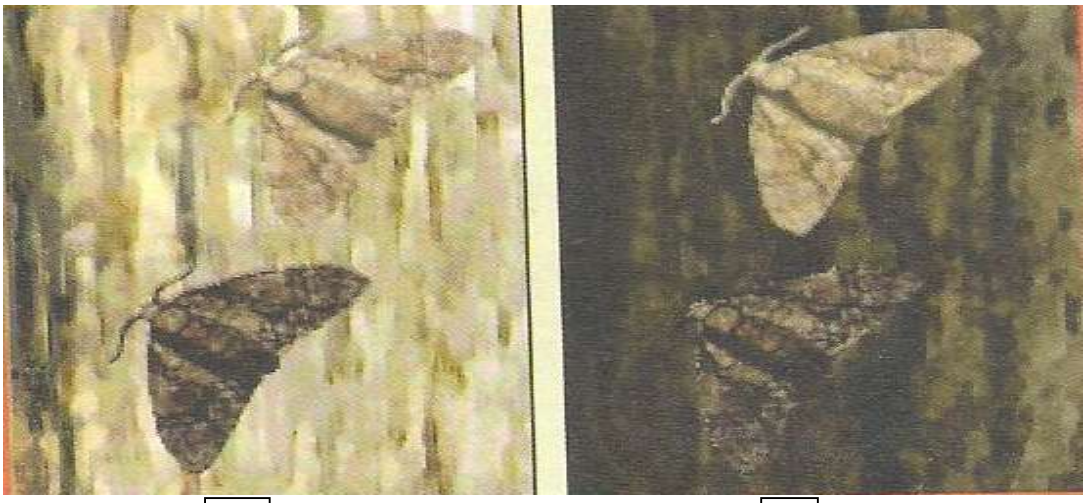
8. The photographs below are of organisms resting on different environmental backgrounds. Observe them and answer the questions that follow;



A B

a) Name the aspect of evolution depicted in the photograph (1mark)

……

b) Explain the phenomenon. (2marks)

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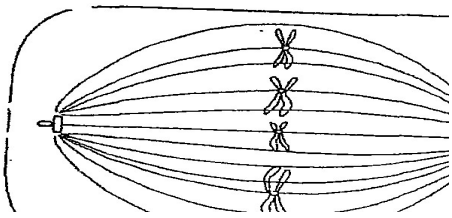
9. The diagram below represents a stage in cell division.



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

……

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

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10. Explain the role of the following hormone in homeostasis

(a) Insulin (2marks)

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(b) Aldosterone hormone when there is less water in blood stream. (1mark)

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11. Outline **three** difference between plant divisions *Bryophyta* and *Pteridophyta.* (3marks)

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

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13. State **two** functions of xylem tissue. (2marks)

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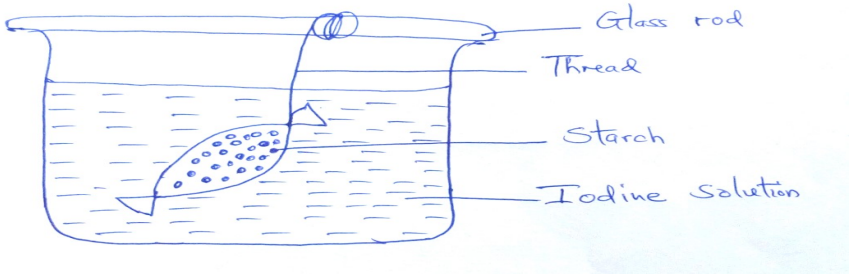
14. A student measured the length of a mitochondrion on a photomicrograph whose magnification was X 40000 found it to be 1mm. calculate the actual size of mitochondrion (2marks)

15. Form one student set up an experiment shown below to investigate a certain physiological process. The set up was left for 30 minutes.



(a) State the expected results after 30 minutes (1mark)

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(b) Explain your answer in (a) above (2marks)

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16. (a) Define the term mutation (1mark)

……

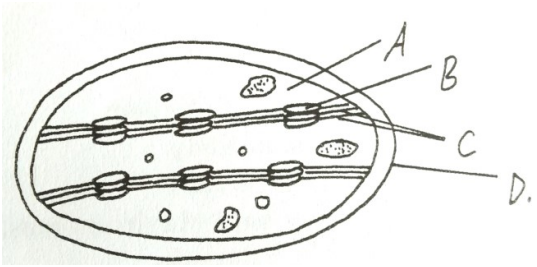
……

(b) Name two sex – linked traits in humans attached to **Y**- chromosomes (2marks)

……

……

17. The diagram below represents a section through a chloroplast as seen under the electron microscope



(a) Name the structure labeled D (1mark)

……..

(b) In which labelled structure do we find chlorophyll molecule (1mark)

……

(c) Name the structure labeled, where carbon (IV) oxide fixation occurs (1mark)

……

18. (a) State the significance of respiratory quotient (R.Q) values to a biologist (1mark)

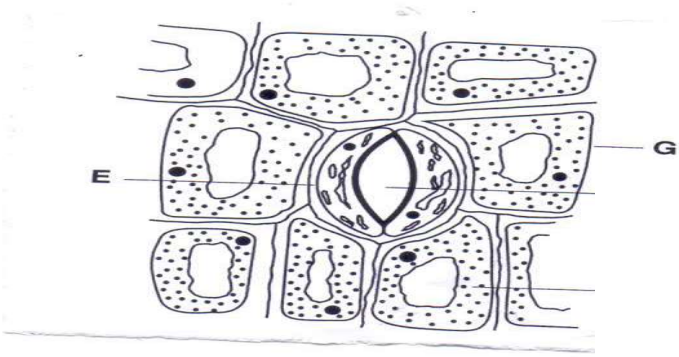
.....

.....

(b)The equation below is a respiratory reaction of a certain substrate. Study it and use it to determine its R.Q value. (1mark)

$C_{20}H_{40}O_{20} + 20\ O_2 \longrightarrow 20\ CO_2 + 20H_2O + Energy$

19. The diagram below represents a specialized plant structure



(a) Name the cell labelled **G**. (1 mark)

……

(b) State the adaptation of cell **E** to its function (1mark)

……

……

20. State the economic importance of the following excretory products in plants (2marks)

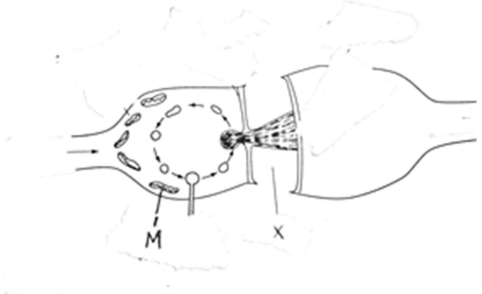
Nicotine……

……

Quinine……

……

21. The diagram below represents a synapse.



a)Name the:

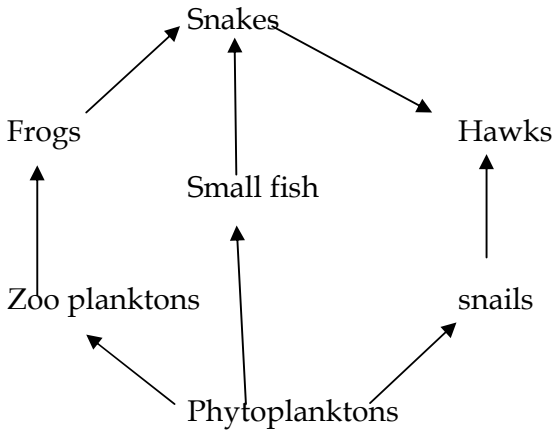
i)Structure labeled **M**.(1mark)……
……

ii)Transmitter substance labeled X.(1mark)

……..

b)On the diagram, show the direction of the nerve impulse transmission.(1mark)

22. The diagram below represents a feeding relationship in an ecosystem.



a) Name the type of ecosystem represented by the above food web. (1mark)

.....

b) Name the organism in the food web that:

i) Are producers (1mark)

.....

ii) Occupies the highest trophic level (1mark)

.....

c) i) Write a food chain that ends with the hawk as quaternary consumer. (1mark)

.....

ii) State **two** short term effects on the above ecosystem if all the small fish were killed. (2marks)

.....

.....

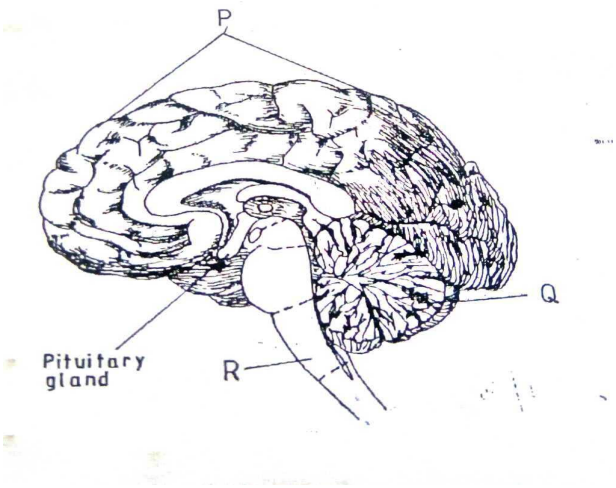
.....

d) State one way in which oil spills lead to death of fish. (1mark)

.....

.....

23. The diagram below represents a section of the human brain.



i) Name the structures labelled **P** and **Q**. (2marks)

P: .....

Q: .....

ii) State one functions of the part labelled **R.** (1mark)

.....

.....

24. Given below is a diagram of a mature fruit of a certain plant.

(i) State the agent of dispersal. (1 mark)

.....

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

.....

.....

(iii) State two advantages of fruit and seed dispersal. (2 marks)

.....

.....

.....

.....

25. Below is a nucleotide strand.

A	**A**	**G**	**T**	**C**

i. Identify the type of nucleic acid strand. (1 mark)

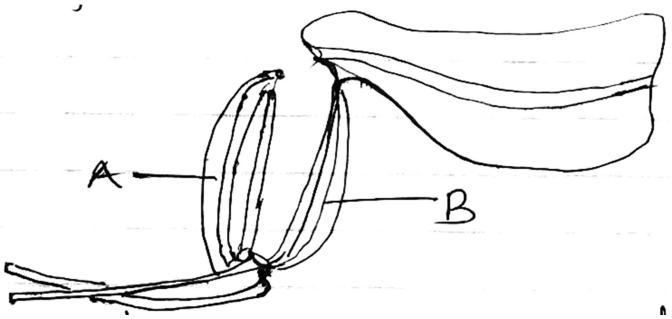
.....

ii. Write down the complimentary base sequence in the other strand. (1 mark)

.....

.....

26. (a) Study the diagram below and answer the questions that follow.



a) Name the muscle labelled: (2marks)

A:……..

B:……..

b) What happens to each muscle as the arm is straightened? (2marks)

……

……

27. The binomial name of housefly is MUSCA DOMESTICA.

a) State **<u>two</u>** mistakes in the way the scientific name is written. (2marks)

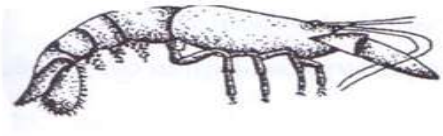
……

……

b) Re-write the name in correct manner following the rules of binomial nomenclature. (1mark)

……

28. Below is a photograph of an organism



(i) Identify the class to which this organism belongs to. (1 mark)

……..

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

……

……

29. The following table shows the volume of gases carried by 100cm^3 of blood.

Gas	Blood entering lungs	Blood leaving lungs
Nitrogen	0.9 cm^3	0.9 cm^3
Oxygen	10.6 cm^3	19.0 cm^3
Carbon (iv) oxide	58.0 cm^3	50.0 cm^3

(a) Which blood has a higher content of carbon (IV) oxide? (1 mark)

……

(b) Explain the difference in the content of oxygen and carbon (IV) oxide in blood entering the lungs and that leaving the lungs. (2 marks)

……

……

……

……

30. State **two** adaptations of each of the following structures to reproduction in animals.

(a) Oviduct (2 marks)

……

……

……

……

(b) Epididymis (2 marks)

……

……

……

……

NAME…….. INDEX NO…….....

SCHOOL…… DATE……..……

231/2
BIOLOGY

PAPER 2
(THEORY)
MAY, 2019
TIME: 2 HOURS

ACK DIOCESE OF NAMBALE

FOUR 2019 JOINT EXAMINTIONS

INSTRUCTIONS TO CANDIDATES:

(a) Write your **Name**, **Index Number** and **School** in the spaces provided above.

(b) **Sign** and write the **date** of examination in the spaces provided above.

(c) This paper consists of **two Section**; **A** and **B**.

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

(e) 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	MaximumScore	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: ANSWER ALL QUESTIONS

1. Bile and pancreatic juice are important secretions in animal nutrition

a) In which part of the digestive system do they exert their influence? (1 mark)

……

b) i). For efficient digestion, which of the two secretions should be mixed with chyme?

first?

……

ii). Explain your answer above (2 marks)

……

……

……

c) Explain why:

i). It is not necessary to eat too much protein in the diet (2 marks)

……

……

……

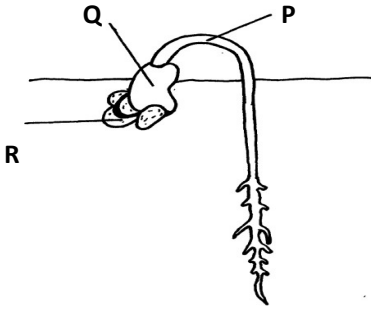
ii). Liver is recommended in the diet of anaemic persons (2 marks)

……

……

……

2. The diagram below represents a stage of growth in a seed during germination.



(a) (i) Name the type of germination illustrated above

(1mk)

……

….

(ii) Give a reason for your answer in (i) above

(1mk)

……

….

(b) Name the part labellled R in the above diagram.

(1mk)

……

….

(c) Give **two** functions of the part labeled Q (2mks)

……

….

……

….

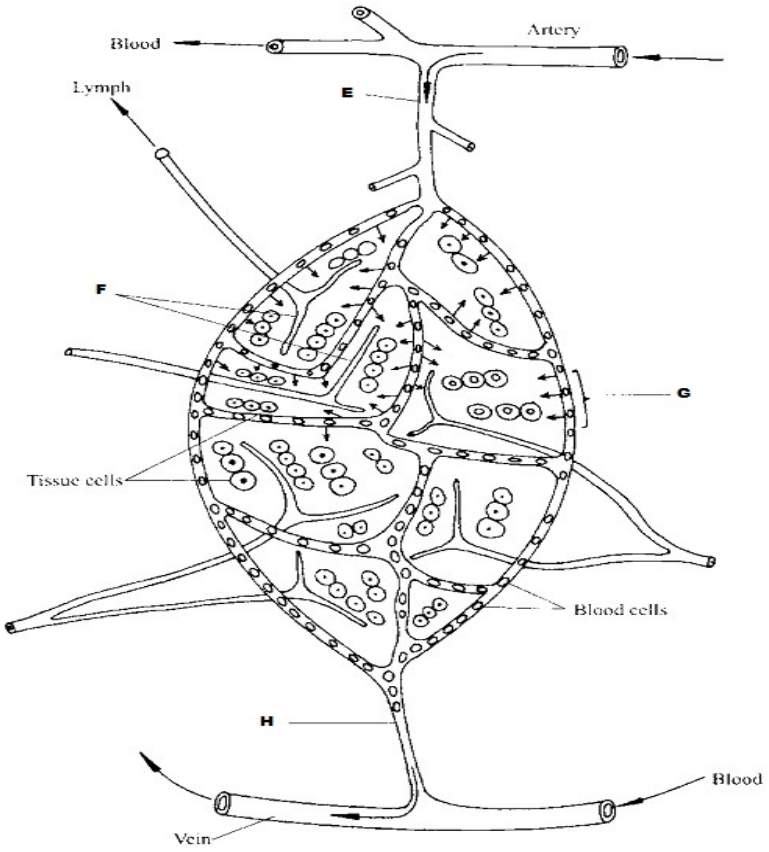
d) Explain how the part labeled P straightens. (3mks)

……

……

……

3 Study the diagram below and answer questions that follow.



a)Identify the parts labeled E, F and H. (3mk)

E……

F……

H……

b)State the importance of the process represented by G in bodies of living organisms. (2mk)

……

……

……

a) Compare the composition of blood in vessel E and H. (3mk)

……

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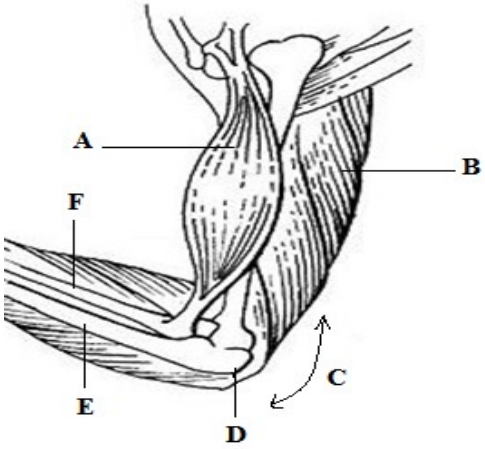
……

……

4. Study the diagram below and answer the questions which follow.



(i) Identify the muscle represented by letters A and B (2 marks)

A

……

……

B

……

……

(ii) Describe how muscles A and B cause straightening of joint C (2 marks)

……

……

……

(b) Name the joint C (1 mark)

……

……

(c) Name parts label D, E and F (3marks)

D……

……

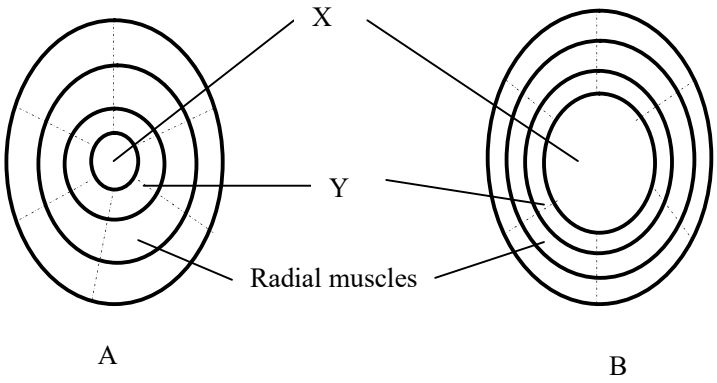
E……

……

F……

……

5. The diagram below shows how the iris and pupil of human eye appear under different conditions.



a) Name the structures labeled X and Y (2 marks)

X …….

Y ……

bi)State the condition that lead to the change in appearance shown in the diagram labeled B. (1mrk)

……

……..……

……

ii)Describe the changes that lead to the appearance of the iris and pupil as shown in the diagram labeled B.(4 marks)

……

……..……..……

……

……

……..……..……

……

i) What is the significance of the changes described in (b) (ii) above. (1 mark)

……

……..……..……

……

6. Form one students of St. Josephine carried out an experiment to determine the percentage change in weight of two tender stems of two different plants when placed in two different sucrose solutions of different concentrations.

Sucrose concentration (mg)	0	5	10	15	20	25	30	35
Percentage change in weight for plant N	7.0	6.6	5.0	3.6	1.6	-0.8	-2.3	-2.8
Percentage change in weight for plant D	3.2	2.2	0.8	-0.6	-1.4	-2.2	-2.8	-3.4

a) On the same axes, in the graph provided below, plot a graph of percentage weight change of the plant stem tissues against sucrose concentration (8 marks)

b) Account for the results obtained for the plant tissues at 15 mg/ml sucrose concentration (2 marks)

……

……

……

c) From the graph, determine the concentrations of the cells saps of the two plants
Plant N (1 mark)
……

……

……

Plant D (1 mark)
……

……

……

d) i). Identify the plant that was most likely obtained from a more saline environment?
……
ii). Explain your answer above (2 marks)
……

……

……

e) Describe the effect of high osmotic pressure of body fluids on urine formation (5 marks)
……

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……

7. a). Discuss the practical applications of auxins and gibberellins in agriculture (10 marks)
b). Discuss the role of living organisms in the nitrogen cycle (10 marks)
8. Describe the structural adaptations of the mammalian heart (20 marks)
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THIS IS THE LAST PRINTED PAGE

Name: ……..…….. Index No:……

School: …… Date: ……...

NAMBALE DIOCESE JOINT EXAMINATION
BIOLOGY PAPER 3 (PRACTICALS)
231/3
1 ¾ HOURS

INSTRUCTIONS TO STUDENTS

a) Write your **Name**, **Admissionnumber**, **School** and **Date** in the spaces provided above.
b) Answer **ALL** questions in the spaces provided.
c) You are required to spend the first **15** minutes of **1 ¾** hours allowed reading through the paper carefully before commencing your work.
d) Additional pages must not be inserted.
e) This paper consists of**4** printed pages
f) Candidates should answer questions in English.

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	11	
2	14	
3	15	
TOTAL SCORE	**40**	

1. You are provided with two potato cylinders and solutions labeled **X** and **Y** of different concentrations.
   - Place one potato cylinder in solution**X** and another in solution **Y**.
   - Leave the set – up for 30 minutes.
   - Remove each of the cylinders from solutions **X** and **Y.**
   - Press each of the cylinders gently between your fingers and note the texture in each case.

   (a) (i) Record the texture of each cylinder in solutions **X** and Y.

   Solution **X:**……. (1mk)

   Solution **Y:** …… (1mk)

   (ii) Account for the observation made for the potato cylinder placed in solution **X.** (3mks)

   ……

   ……

   ……

   ……

(iii) State the nature of the cells of the cylinder placed in solution **Y**. (1mk)

……

(b) (i) What observation would be expected if the potato cylinder were boiled before being placed in the solutions? (1mk)

……

(ii) Give an explanation for your answer in b (i) above. (2mks)

……

……

……

……

(c) Which potato cylinder is likely to increase in length? (1mk)

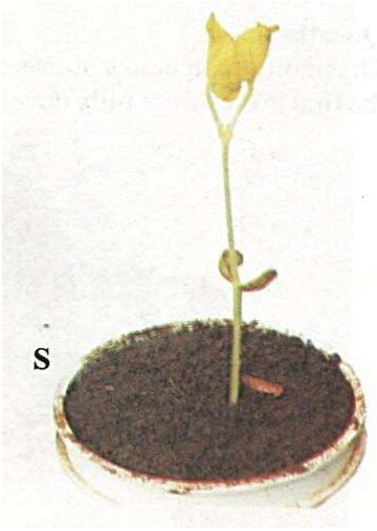
……

(d) Explain what will happen to the red blood cell when placed in solution **X**. (1mk)

……

……

2. You are provided with photographs of specimens labeled L and S. Examine them.



(a) State the conditions under which each set was grown:

Set **L** ……... (1mk)

Set **S** …….. (1mk)

(b) (i) Name the part labeled **G** in specimen **L.** (1mk)

……..

(ii) What is the role of the part named in b(i) above. (1mk)

……..

(iii) Explain how part **G** straightens to enable the seedling grow upright. (2mks)

……

……

……...

(c) State two functions of the part labeled **M.** (2mks)

……

……

State three differences between seedlings in set **L** and **S.** (3mks)

	Set L	**Set S**
(i)		
(ii)		
(iii)		

(d) State the role of the following in germination.

(i) Air …….....

……(1mk)

(ii) Water ……

……

……

……(2mks)

(e) State the biological significance of the phenomenon exhibited by the seedling in set – up **S.** (1mk)

……..

……..

3. You are provided with specimens labeled **K** and **L** obtained from the same mammal.

(a) (i) Identify specimens **K** and **L** (2mks)

Specimen **K:** ……

Specimen **L:** ……

(ii) State the functions of specimens **K** and **L.** (2mks)

Specimen **K:**……..

Specimen **L:** …….

(iii) Give two adaptations of specimen **L** to its function. (2mks)

……

……

……

(b) Give three differences between specimens **K** and **L.** (3mks)

	Specimen K	**Specimen L**
(i)		
(ii)		
(iii)		

(c) Draw and label the parts of specimen **K.** (4mks)

(d) Explain how tooth decay occurs. (2mks)

……

……

NAMBALE DIOCESE
CONFIDENTIAL

Biology Practical (231 /3)

(1) Each candidate requires each of the following:

- 2 Potato cylinders (20mm length and 5mm diameter)
- Distilled water labeled as solution **X** in a Petri- dish.
- Concentrated salt solution labeled as solution **Y** in a Petri – dish.

Note:

- Use a cork borer, Scapel/razor blade and a ruler to make potato cylinders.

(2) Each candidate should have access to:

- Incisor tooth labeled as specimen **K**
- Premolar tooth labeled as specimen **L**

Name …… Index No…….... …...…

Adm. No ……. Class…… Date: ……..

BIOLOGY PAPER 2

231/2

Time: 2 HRS

GOLDEN ELITE EXAMINATIONS

INTRUCTIONS TO CANDIDATES:

- *Write your **name** and **index number** in the spaces provided.*
- *Sign and write date of examination in the spaces provided above*

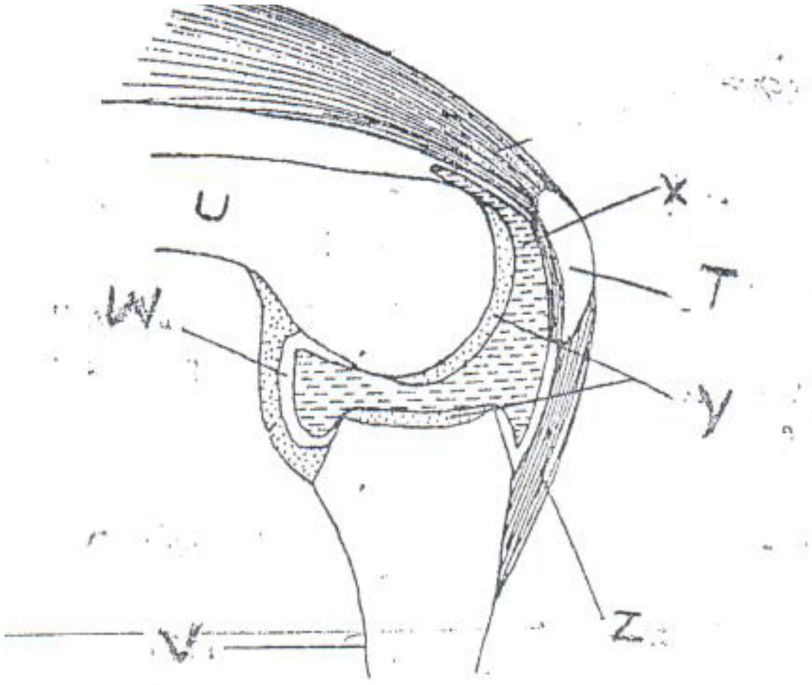
For Examiner's Use only:

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1	8	
2	8	
3	8	
4	8	
5	8	
6	20	

7or8	**20**	
Total score	**80**	

This paper consists of 9 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

1. Below is a diagram showing internal structures of a joint.



a) Name the bones labeled: (2mks)

U ……

V ……

b) State the functions of the following structures: (2mks)

W……

X ……

C i) Name structure Y. (1mk)

……

ii) What effect would wearing off of the structure Y have on the joint? (1mk)

……

……

d) Name a vestigial structure in man that is made of caudal vertebrae. (1mk)

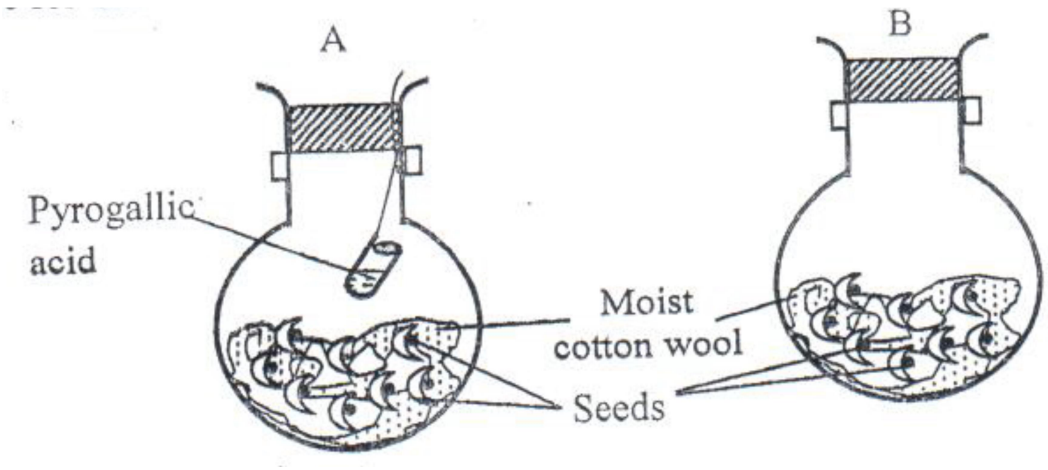
……

……

e) Name the compound responsible for making the bone hard? (1mk)

……

2. A student set up an experiment as shown in the diagram below. The set up was kept at room temperature for one week.



a) State the Experiment (1mk)

……

……

b) State expected observations in flask A and B at the end of the experiment. (2mks)

……

……

c) Account for the observation made in set up A. (1mk)

……

……

d) Explain the expected results in flask B if dry cotton wool was used instead of moist one. (2mks)

……

……

e) Name two factors that would affect availability of the factor being investigated. (2mks)

……

……

3. The table below shows a description of size of glomeruli and renal tubules of two fish which are adapted to living in two different aquatic environments:-

Structure B	Animal A	Animal
Bowman	Large and many	Small and few
Renal tubules	Short	Long

a) With a reason, name the likely environment in which animal A and B Lives. (4mks)
A

……

……

……

……

B ……

……

……

Bi) Suggest the main nitrogenous waste produced by animal **B** (1mk)

……

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

……

……

c) Name two components of blood that are not present on the glomerular filtrate. (2mks)

……

……

……

4. Two thirds of any human population can roll their tongues into a U- shape. One third cannot do it no matter how hard they try. This characteristics is controlled by a single pa*** of alleles represented by R and r

a) If R is dominant, write down the possible genotypes of:

i) Roller……

……

ii) Non- rollers …….....

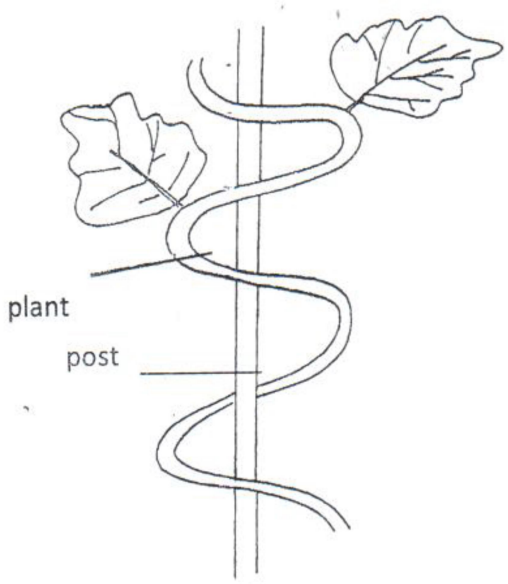
……

b) A man and a woman both of whom can roll their tongues marry and produce some children who cannot roll their tongues. Explain how this can occur by means of punnet square diagram. (4mks)

c) Name the type of variation that explain this occurrence of tongue rollers and non- rollers in human population. (1mk)

……

5. The diagram below shows a stem of a passion fruit twinning around a post.



a) What is the name given to the type of growth movement shown above? (1mk)

……

b) What is the biology importance of this growth? (1mk)

……..

c) (i) Account for the twinning growth responses exhibited by plants. (3mks)

……

……

……

……

(ii) Name three other types of growth response exhibited by plants. (3mks)

……

……

……

6. Cells of tradescantia plant were found to have an average diameter of 2.5 um. The cells in each solution were determined and results obtained were shown below.

Percentage sugar concentration	**Diameter of cells (um)**
1	5.0
5	4.0
10	3.0
15	2.0
20	1.5
25	1.0

a) Draw a graph of diameter of cells against percentage sugar concentrate. (6mks)

(a) From the graph determine the concentration of cell sap. (1mk)

……

(b) Give an explanation for the average diameter of cells placed in 2.5% sugar. (4mks)

……

……

……

……

……

……

(c) Describe the difference in appearance between cytoplasm before and after cells being placed in 25% sugar solution. (2mks)

……

……

……

……

……

(d) From the graph determine the concentrate of cell sap. (1mk)

……..

(e) Give an explanation for the average diameter of cells placed in 2.5% sugar solution. (4mks)

……

……

……

……

……

(f) Describe the difference in appearance between cytoplasm before and after cells being placed in 25% sugar solution. (2mks)

……

……

……

7. How are flowers adapted to wind and insect pollination? (20mks)

8. (a) using a relevant example describe how an allergic reaction occurs in a human being.

(10mks)

(b) Describe how environment factors increase the rate of transpiration in terrestrial plants.

(10mks)

KAPSABET

2019 FORM FOUR TRIAL 2

Kenya Certificate of Secondary Education

231/1 BIOLOGY

PAPER ONE

TIME: 2HRS

INSTRUCTIONS

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

SECTION A

4. 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)

   ……

……

……

5. Which organelles should be abundant in;

   iii) Skeletal muscle (1mk)

   ……

   iv) Palisade tissue (1mk)

   ……

6. A form 1 student was preparing temporary slides in the laboratory, in the course of preparation he carried out the following processes;

   iv) Sectioning

   v) Fixation

   vi) Staining

   State the importance of the above processes (3mks)

   ……

   ……

   ……

7. Why are lysosomes many in phagocytic cells (2mks)

   ……

   ……

8. Differentiate between guttation and transpiration (2mks)

   ……

   ……

   ……

9. 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)

   ……

10. Name the disease of the blood characterized by,

    c) Abnormally large number of white blood cells (1mk)

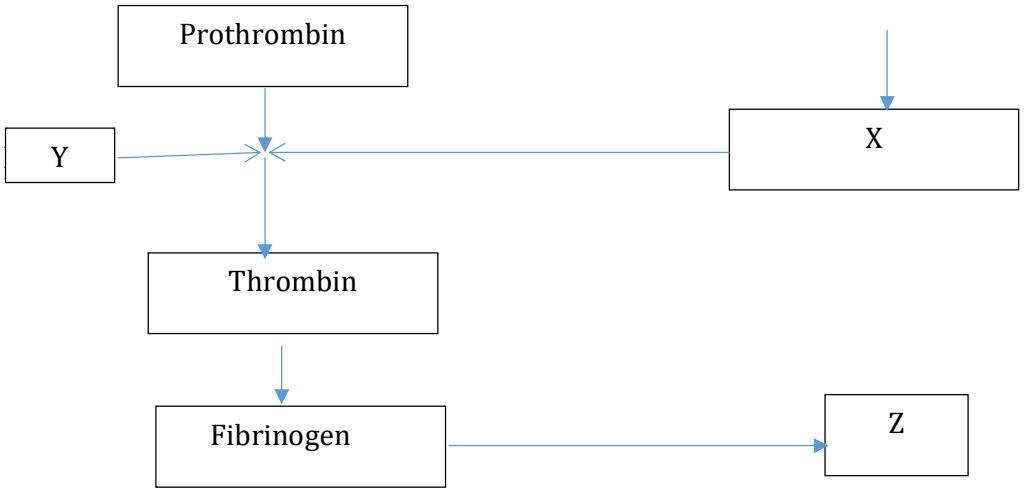
    ……

    d) Cresent –shaped haemoglobin (1mk)

    ……

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

Platelets



Name;

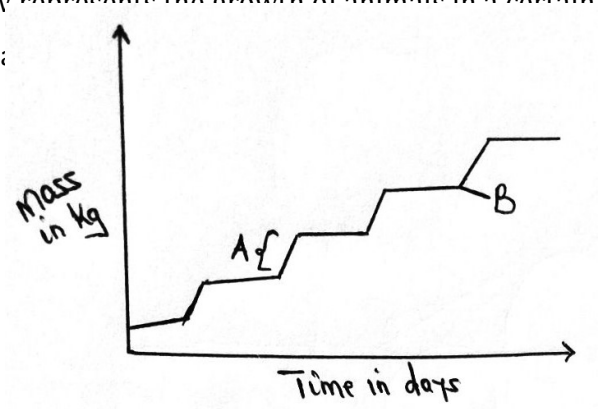
iii) The metal ion represented by Y (1mk)

……

iv) The end product of the mechanism represented by Z (1mk)

……

12. The graph below represents the growth of animals in a certain phylum. Study it and answer the questions th



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

……

e) Identify the process represented by letter B (1mk)

……

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

……

13. Explain why a mule is infertile (1mk)

……

……

14. Phylum Arthropoda is the most successful of invertebrates. Explain two characteristics that make them most successful (2mks)

……

……

……

15. Name phylum whose members possess a notochord (1mk)

……

16. a) Define evolution and homologous structures (2mks)

……

……

……

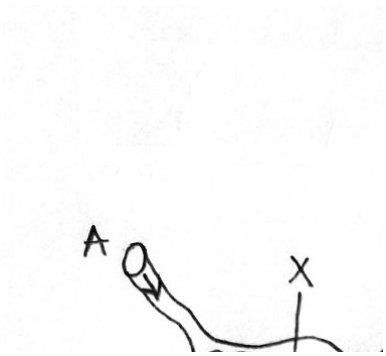
b)State three limitations of using fossil records as an evidence that supports organic evolution (3mks)

……

……

……

17. The following is part of a kidney nephron



d) 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)

……

e) Identify with a reason vessel A (1mk)

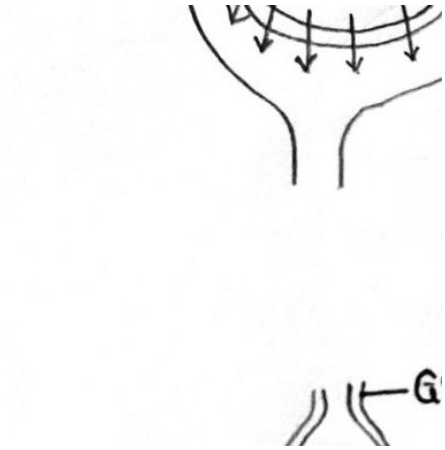
……

f) Name any two blood components that are present in vessel (A) but are absent in vessel B (2mks)

……

……

18. The diagrammatic representation below illustrates one of the process that occurs in mammals during feeding. Carefully study it and answer the following questions



iv) Identify the process (1mk)

……

v) State two structural adaptations of gullet to its functions (2mks)

……

……

vi) 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)

……

……

19. Explain each of the following;

c) Variegated plants accumulates less food than non-variegated plants under similar conditions. (2mks)

……

……

……

d) Most leaves are thin with broad leaf surface (2mks)

……

……

……

20. State the economic importance of the following plant excretory products (3mks)

d) Papain

……

e) Caffein

……

f) Colchicine

……

21. 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)

……

……

22. State the function of the following during pregnancy (3mks)

d) Amnion

……

e) Amniotic fluid

……

f) Umblical cord

……

23. Name the process by which;

iii) Producers convert sunlight energy into chemical energy (1mk)

……

iv) Chemical energy is converted into heat energy by consumers (1mk)

……

24. 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.

c) Using the data above, calculate the population of crabs in the pond (2mks)

d) Suggest three assumptions the students made during this study (3mks)

……

……

……

25. State any two methods that can be used at home to properly manage domestic effluents (2mks)

……

……

26. a) Explain how the following factors increase the rate of diffusion (3mks)

iv) Temperature

……

v) Diffusion gradient

……

vi) Size of diffusing particles

……

b) Diffusion is a passive process while active transport is an active process. Explain (2mks)

……

……

27. a) Waterlogging in terrestrial plants inhibit uptake of certain mineral ions from the soil by the plants. Explain (3mks)

……

……

……

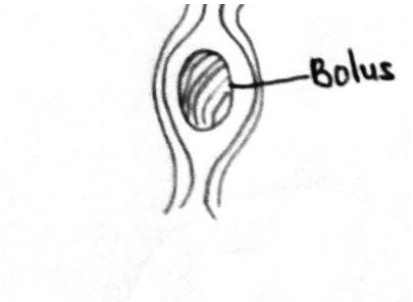
……

b) State two illustrations of Osmosis in plants (2mks)

……

……

28. The diagram below represents a gill of a fish



iv) State two ways in which a large surface area is created in structures labelled K (2mks)

……

……

v) Name the type of flow system that occurs between water and blood in the capillaries present on structures K (1mk)

……

vi) Name an organ in human beings that also display the flow system named in (ii) above (1mk)

……

29. 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.

iii) Name the type of variation the twins exhibited (1mk)

……

iv) Give two observable differences likely to be noted between the twins (2mks)

……

……

FORM FOUR TRIAL 2, 2019

Kenya Certificate of Secondary Education

231/1 BIOLOGY

PAPER TWO

TIME: 2HRS

INSTRUCTIONS

2. Answer all questions in section A and question 6 in section B (It is compulsory)
3. Answer either question 7 or 8.

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.

c) Name the chromosome onto which the gene for haemophilia is linked to (1mk)

……

d) A normal man for the condition marries a normal woman for the condition but sadly one of their sons develop this condition from birth.

iv) What are the likely genotypes of this couple? (2mks)

Man

……

Woman

……

v) Using a punnet square, carry out a cross to show why the couple gave birth to haemophiliac son (4mks)

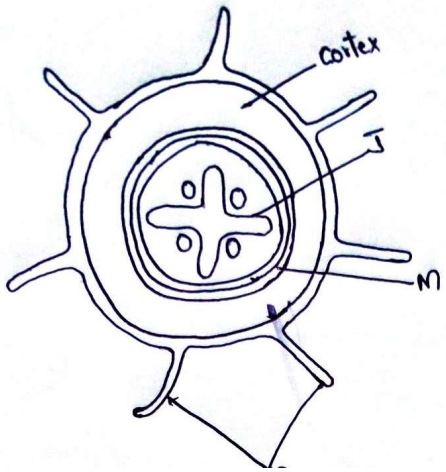
Use (H),to represent the gene for normal condition and (h) to represent the gene for haemophilia

vi) 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.



D

d) 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)

……

……

e) 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)

……

……

f) 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.

d) i) Which species has a better competitive ability (1mk)

……

ii) Give reason for your answer (1mk)

……

……

e) Account for the shape of the curve of species A between

iii) One year and three years (2mks)

……

……

……

iv) Three years and seven years (2mks)

……

……

……

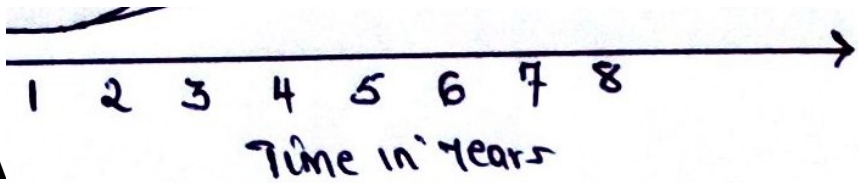
f) A natural predator for species A was introduced into the ecosystem. With a reason state how the population of each species would be affected (2mks)

……

……

……

4. A student from Abogeta secondary set up an experiment as illustrated below.



The visking tubing was left in iodine solution for 4 hours.

d) State the physiological process being investigated (1mk)

……

e) 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)

……

……

……

……

f) Mention three factors that influences the rate of active transport (3mks)

……

……

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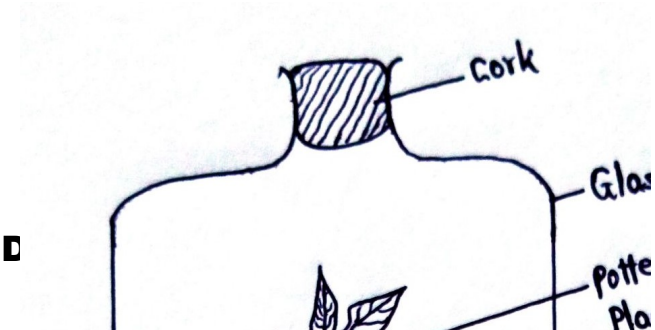
……

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.

d) Why was it necessary;

iv) To apply Vaseline (1mk)

……

v) To cover the pot with polythene paper (1mk)

……

vi) What was the purpose of including the small animals? Give two reasons. (2mks)

……

……

e) 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)

……

……

f) State the respiratory surface of the following organism (2mks)

iii) Amoeba

……

iv) 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

e) 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)

f) Account for the concentration of glucose in the hepatic portal vein from;

v) 0-1 hour (2mks)

……

……

……

……

vi) 1-2 hours (3mks)

……

……

……

……

……

vii) 2-4 hours (3mks)

……

……

……

……

……

viii) 5-7 hours

(2mks)

……

……

……

……

g) Account for the difference in the concentration of glucose in hepatic portal vein and the iliac vein between 2 and 4 hours (2mks)

……

……

……

h) Using the data provided in the table explain why the concertation of amino acids in the hepatic portal vein took longer to increase (1mk)

……

……

……

Essays

7a) Describe the opening and closing of the stomata using the photosynthetic theory (10mks)

b) Describe blood sugar regulations in mammals (10mks)

8a) Describe the adaptation of the following plants to their habitat;

iii) Xerophytes (15mks)

iv) Hydrophytes (5mks)

2019 FORM FOUR

Kenya Certificate of Secondary Education

231/3 BIOLOGY

PAPER THREE

TIME: 1¾ HRS

INSTRUCTIONS

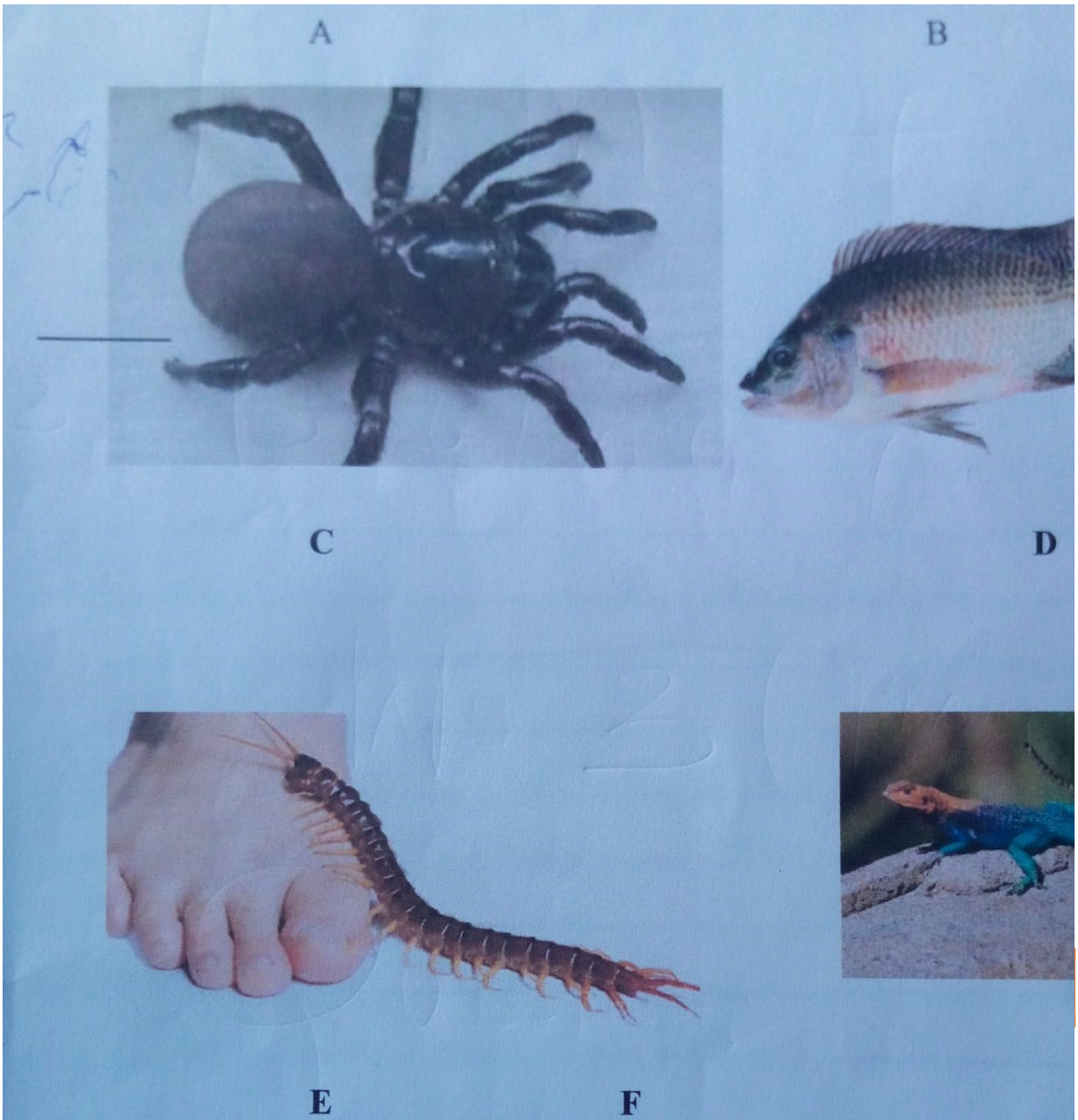
4. Answer all questions in spaces provided

Examiner's Use

QUESTIONS	MAX.MARKS	CAND.SCORE
1	9	

2	13	
3	18	
TOTAL	40	

1. Study the organisms below



f) Complete and use the key below to identify the organisms (2mks)

1.a) Organism with endoskeleton ……..go to 2

1. b) _____.....go to 4

2. a) Has scales on the body ……..go to 4

2 b) Has no scales on the body ……mammalian

3a) Has cephalothorax ……..Arachnida

3b) Has no cephalothorax ……..go to 5

4a) _____.....Pisces

4b) Has no fins ……go to 7

5a) Has three pairs of legs ……..Insect

5b) Has more than three pairs of legs ……go to 6

6a) Two pairs of legs per segment ……..Diplopoda

6b) One pair of legs per segment ……..Chilopoda

7a) Has feathers …… Aves

7b) Has no feathers ……go to 8

8a) Has a tail ……Reptilia

8b) Has no tail ……Amphibia

g) Identify the organisms above using the completed key above (6mks)

Specimen	**Steps followed**	**Identity**
A	_____	_____
B	_____	_____
C	_____	_____
D	_____	_____

E _____ _____

F _____ _____

h) Name the phylum in which specimens C, E and F belong to. (1mk)

……

i) Give three reasons for your answer in (c) above (3mks)

……

……

……

j) Name one feature that is common in organisms B, E and D (1mk)

……

c) You are provided with the following;

viii) Hydrogen peroxide

ix) Specimen K

x) Pestle and mortar

xi) 4 test tubes

xii) A scalpel

xiii) Source of heat

xiv) Test tube holder

Using a scalpel, obtain three peeled cubed from specimen K measuring about 1cm x 1cm x 1cm. For the first cube, you are required to boil it in water for five minutes. For the second cube, you are required to crush it into a paste. For the last cube, you are required to use it as it is.

Label three test tubes A, B and C and put 2ml of hydrogen peroxide in each test tube. To test tube A, add the boiled cube and record your observation.

To test tube B. add the crushed paste and record your observation.

To test tube C, add the unboiled cube remaining and record your observation.

e) Complete the table below (3mks)

Test tube	**Observation**
A	
B	
C	

f) Explain your observation in test tube A (1mk)

……

……

……

g) Between test tubes B and C, in which test tube was the volume of foam produced the highest? Explain (3mks)

……

……

……

……

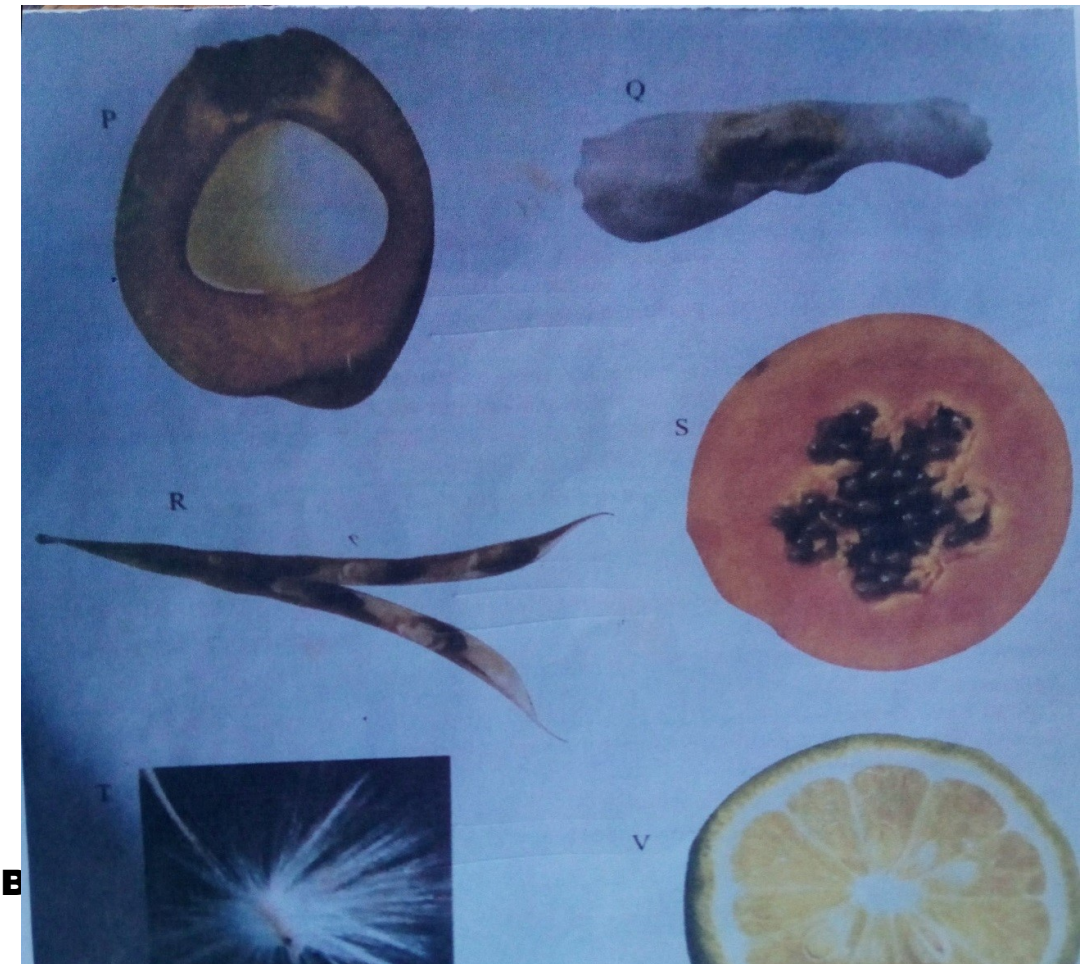
h) Apart from temperature, state two other factors that affect the rate of enzyme controlled reactions (2mks)

……

……

……

d) The photographs below shows specimen of different types of fruits. Examine them and answer the questions that follow.



e) State four differences between specimen P and R (4mks)

……

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……

……

……

……

f) State the types of gynoecium and placentation of specimen P, S and V (4mks)

iv) Specimen P Gynoecium ……..

Placentation ……..

v) Specimen S Gynoecium ……..

Placentation…….

vi) Specimen V Gynoecium ……...

Placentation ……..

g) In the table below name the mode of dispersal for each specimen and the features that adapt the specimen to its mode of dispersal. (6mks)

Specimen	**Mode of dispersal**	**Adaptive features**
P		
Q		
R		
S		
T		
V		

h) Draw and label a plan diagram of specimen V (4mks)