TOP BIOLOGY NATIONAL SCHOOLS AND JOINT MOCKS 2021

KAPSABET HIGH SCHOOL

231/1 **(Kenya Certificate of Secondary Education)** Paper 1

INTERNAL MOCK EXAM

BIOLOGY

Dec. 2020– 2 Hours

Name…… Index No. ……

Adm No…… Date:……

Signature …… Stream :……

Instructions to candidates

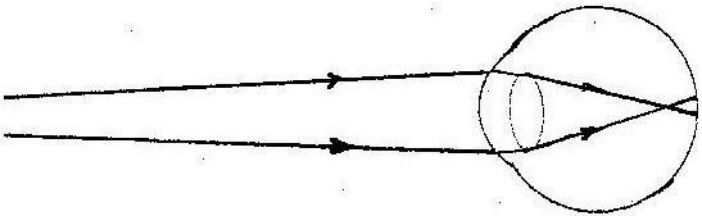
a) *Write your Name, Index, Admission number and stream in the spaces provided above.*
b) *Sign and write the examination date on the spaces provided above.*
c) *Answer **all** questions in the spaces provided in the question paper.*
d) *All workings must be clearly shown where necessary.*
e) ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
f) ***Candidates must answer the questions in English.***

QUESTIONS	MAXIMUM SCORE	CANDIDATE SCORE
1-27	80	

For Examiners use

1. Explain why malaria cannot be transmitted through blood transfusion. (2 marks)
2. A boy held a locust upside down and attempted to drown it in water by immersing the head in water. Was he successful? (1 mark)
   Explain. (2 marks)

3. The diagram below shows the position of an image formed in a defective eye.



   (a) Name the defect: (1 mark)
   (b) Explain how the defect named in (a) above can be corrected. (2 marks)
   (b) Using a sketch, draw to demonstrate how the above condition is corrected. (1 mark)

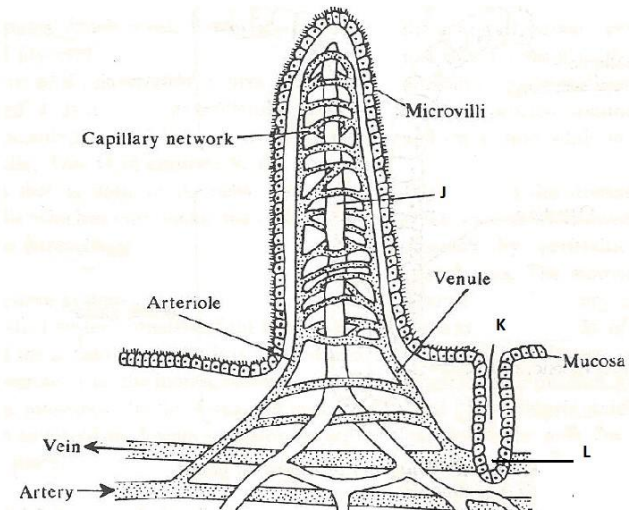
4. State **two** ways in which scales are adapted to their function. (2 marks)
5. (a) What is the name given to two protrusions on the posterior end of the skull, that articulate to the atlas. (1 mark)
   (b) Give the name of the joint formed in (i) above, and state its functions. (1 mark)

   Joint: .....

   Function: .....

6. (i) What is emulsification? (1 mark)
   (ii) Name **two** emulsifying agents found in the human bile. (2 marks)

7. The diagram below represents part of alimentary canal. Study it and use it to answer the questions that follow.

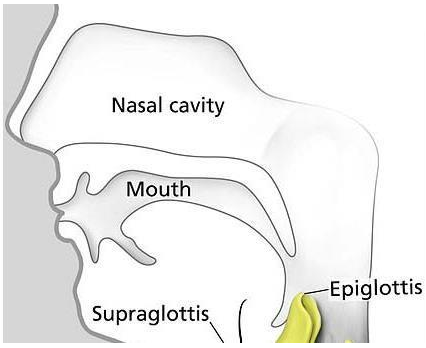


(i) Identify the diagram shown above. (1 mark)

(ii) Name the parts labelled **J** and **L**. 2MKS

(iii) What are the components of the substance produced by part labeled **K**. (1 mark)

8. Describe the events that costitutes the crossing over . (3 marks)
9. The diagram below shows the part of gaseous exchange structures in human.



State **three** roles of the nasal cavity in human. (3 marks)

10. (a) Distinguish between complete dominance and incomplete dominance. (2 marks)

(b) Give an example of a characteristic trait that is inherited under incomplete dominance.

(1 mark)

12. (a) In 1953, **S.L Miller** carried out an experiment to explain which theory in evolution? (1 mark)

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

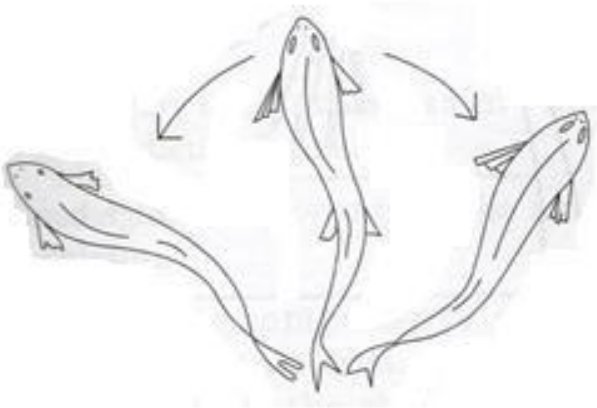
(c) Give an example of a vestigial structure in human. (1 mark)

13. (a) What do you understand by the term exoskeleton. (1 mark)

(b) State the name of **two** tissues that constitutes the endoskeleton. (2 marks)

(c) State the name of the phylum where the exoskeleton is found. (1 mark)

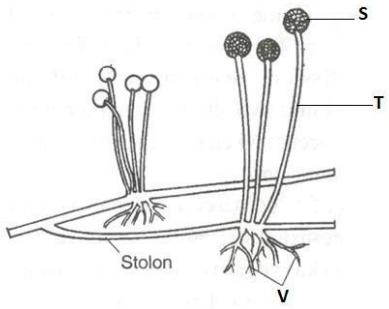
14. (a) Observe the diagram below to answer the questions that follows.



(a) State the name of the condition shown in the diagram above. (1 mark)

(b) Name the type of fins that prevents the condition named in **14 (a)** above. (2 marks)

15. The diagram below represents a sketch of certain organism found in a store room of food stuff in most homes.



(a) State the branch of biology that deals with the study of the above organisms. (1 mark)

(b) Name the type of cell division that takes place at part labelled **S**. (1 mark)

(c) Identify part labeled **V** and state their function.

V ..... (1 mark)

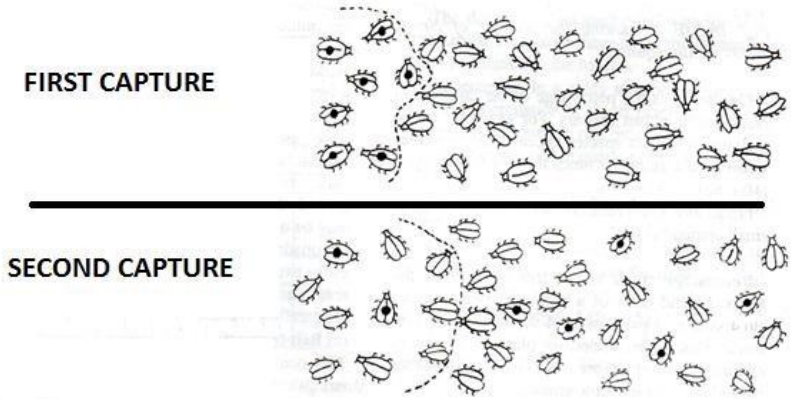
Functions ..... (1 mark)

16. Distinguish between obligate anaerobes and facultative anaerobes. (2 marks)

17. Giving examples, state **two** ways in which biological nitrogen fixation is carried out. (4 mark)

18. (a) State **one** sample counting method which is not suitable in a densely forested habitat. (1 mark)

(b) The information below shows how a student took information in order to estimate the population of beetles in a field. Estimate the population. (2 marks)



19. State **three** aspects of growth that can be estimated in living organisms. (3 marks)

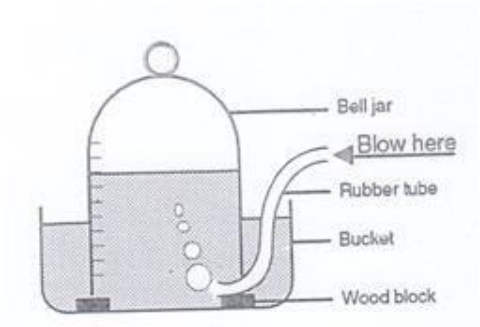
20. Giving examples, explain what you understand by cranial nerves. (3 marks)

21. Give **two** external features of members of class Aves. (2 marks)

22. (a) What do you understand by the term Lichen with reference to ecology? (2 marks)

(b) Name the other equivalent association that involved roots of higher plants and Fungi.
(1 mark)

23. A student filled the bell jar shown below with water and inverted it in a bucket also full of water. Through the rubber tube attached, he took a very deep breath and blew as much air as possible through the tubing.



(a) It is possible to have deepest possible exhalation. What name do we give to such volume of air.
(1 mark)

(b) How much air leaves the lungs each time you breath out during normal quiet breathing?
(1 mark)

(c) State the changes in the external intercostal muscles during above activity. (1 mark)

(d) Name the part of the brain that controls breathing movements. (1 mark)

24. State **thre**e ways in which root hairs are adapted to their function. (3 marks)

25. (a) Mammals have a constant body temperature. What name is given to this condition?
(1 mark)

(c) List **three** behavioral adaptations in animals in an attempt to remain warm. (3 marks)

26. State **three** structural differences between phloem and xylem tissues. (3marks)

Phloem	Xylem

27. (a) Define the term osmosis. (1 mark)

(b) Describe the role of diffusion in plants reproduction. (2 marks)

231/2 (Kenya Certificate of Secondary Education) Paper 2

INTERNAL MOCK EXAM

BIOLOGY

Dec. 2020– 2 Hours

Name…… Index No. ……

Adm No……Date:……

Signature ……Stream :……

Instructions to candidates

a) *Write your Name, Index, Admission number and stream in the spaces provided above.*
b) *Sign and write the examination date on the spaces provided above.*
c) *Answer **all** questions in the spaces provided in the question paper.*
d) *All workings must be clearly shown where necessary.*
e) ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
f) ***Candidates must answer the questions in English.***

For Examiners use only

QUESTIONS	MAXIMUM SCORE	CANDIDATE SCORE
1-8	80	

SECTION A (40 MARKS)

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

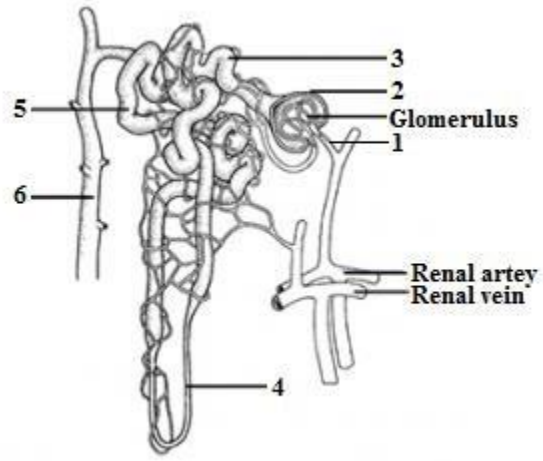
1. (a) The skin, respiratory surfaces, and alimentary canal are possible sites through which microorganisms may gain entry to the human body. For each of these sites, describe the mechanisms that prevent the entry of micro-organisms.

   (a) The skin. (3 marks)

   (b) The respiratory system. (3 marks)

   (c) The alimentary canal. (2 marks)

2. In an experiment to investigate the functioning of the mammalian kidney, samples were taken by micropipette from different regions. The diagram below shows the sample sites, labeled 1 to 6.



Each sample was analyzed to determine the concentration of glucose, protein, urea and sodium ions. The flow rate was also measured at each of the sample sites. The results are shown in the table below.

Samples sites within the kidney	Concentration (g dm^{-3})				Flow rate (cm^3 min^{-1})
	Protein	Glucose	Sodium ions	Urea	
1. Plasma in afferent arteriole	80	1.5	34	0.3	600.0
2. Filtrate in Bowman's capsule	0	1.2	34	0.3	125.0
3. End of proximal convoluted tubule	0	0	34	1.6	25.0
4. Bottom of loop of Henle	0	0	70	1.8	1.5
5. Beginning of distal convoluted tubule	0	0	30	1.8	1.5
6. Beginning of collecting duct	0	0	2.2	2.2	1.3

Use the information in this table and your own understanding to answer the following questions. **(a)** Explain the changes in the composition of proteins and glucose between the plasma in the afferent arteriole (sample site **1**) and the end of the proximal convoluted tubule (sample site **3**).

(2 marks)

● Protein

……

……

● Glucose

……

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(b) Comment on the changes in sodium ion concentration in the different sample regions. (2 marks)

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(c) Explain the changes in urea concentration as it moves along the nephron. (2 marks)

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(d) Suggest an explanation for the fall in the flow rate as fluid moves from the plasma into and then along the nephron. (1mark)

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(e) The experiment was carried out at 37 °C. When the experiment was repeated at 30 °C, the glucose concentration at the end of the proximal convoluted tubule was 0.15 g dm^{-3}. Suggest an explanation for this result. (1mark)

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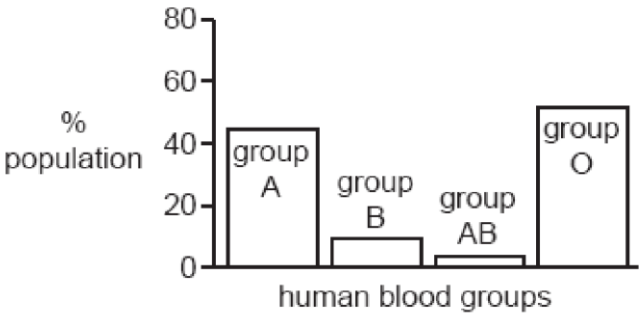
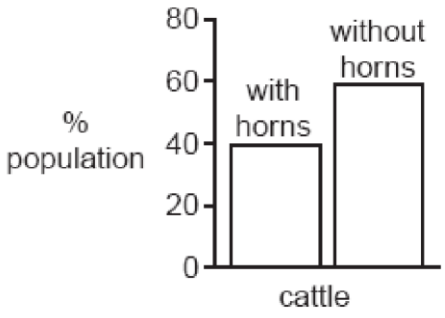
3. (a) The bar charts show the percentages of a human population with each type of blood group and the percentages of a cattle population with and without horns.





Which type of variation is shown in each population? (1mark) Human:

……

Cattle:

……

(b) Albinism (lack of skin pigmentation) in humans is caused by two recessive alleles. A phenotypically normal (non-albino) couple have three children; the first two are non albino, the third is an albino. In your answer, use "A" for the dominant allele and "*a*" for the recessive allele.

(i) What are the genotypes of the parents? (1mark)

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(ii) Is there a possibility that their next child will be an albino? Explain your answer (2 marks)

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(iii) The albino child eventually marries a non-albino whose father was an albino.
What is the probability that their first child will be an albino? Show all working. (4marks)

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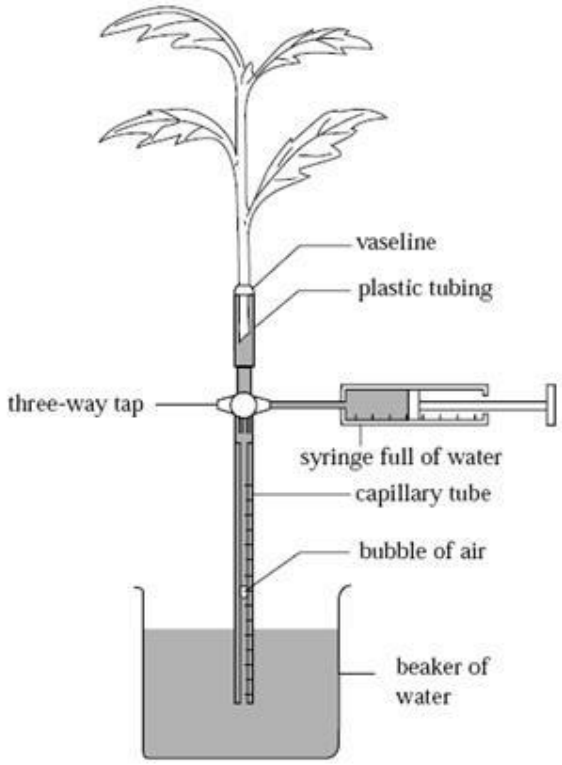
4. A potometer is a device for investigating the rate of transpiration. Prior to setting up, the potometer and the stem of a leafy shoot are immersed in water. Under water, the bottom centimetre of the stem is cut off and the cut end inserted into the plastic tubing. The apparatus is removed from the water, a bubble of air allowed to enter the open end of the capillary tube and that end then inserted into a beaker of water. The completed set-up for a simple potometer is shown below.



(a) What assumption is made when this apparatus is used to investigate the rate of transpiration? (1mark)

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(b) Explain each of the following.

(i) Why it is necessary to cut the leafy shoot and fit it into the photometer under water (1mark)

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(ii) How the bubble of air is introduced into the capillary tube. (1mark)

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(iii) Why a syringe is attached. (1mark)

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(iv) Why the set-up is left for 15 minutes before taking readings. (1mark)

……

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(c) The table below shows some results recorded using the apparatus.

Time	Distance travelled by bubble (mm)

(minutes)	"Normal" room conditions	Covered with clear plastic bag	Covered with black plastic bag
0	0	0	0
2	18	10	4
4	36	19	8
6	55	29	11
8	74	38	15
10	90	48	18

(i) Account for the results shown in the table. (2 marks)

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(ii) In 'normal' room conditions, the distance moved by the bubble was 90 mm during 10 minutes. The capillary tube has a cross sectional area of $0.8mm^2$. Calculate the rate of movement in mm^3 $minute^{-1}$. (Show your working in the space below.) (1mark)

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5. (a) Describe how each of the following structures adapt a bony fish to locomotion in water.
(i) Scales. (2 marks)

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(ii) Myotomes (2 marks)

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(b) State **two** adaptations of the synovial joints in man. (4 marks)

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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. It was suspected that a pollution incident involving slurry had occurred in a local river. Oxygen content of the water in the river was measured, both upstream and downstream from the suspected slurry (raw sewage) leak. Samples were taken at seven points along the river and the results are shown in the graph below.

Distance along the stream (m)	0	20	40	60	80	100	120
Oxygen concentration (arbitrary units)	7.0	7.0	1.6	2.0	3.4	5.0	7.0

(a) Plot a graph of this data. (7 marks)

(b) From the graph determine:

(i) the distance along the stream where the slurry leak occurred. (1mark)

……

……

(ii) the least oxygen concentration and the distance when it occurred. (2 marks)

……

……

(c) Account for the shape of the graph between:

(i) 20m – 40m along the stream. (3 marks)

(ii) 60m – 120m along the stream. (3 marks)

(d) Waterways can also be polluted by fertilizer run- off.

The effects of fertilizer run-off and pollution by slurry are different in some ways.

State and explain **two** of these differences. (3 marks)

7. (a) Describe the adaptations of the essential parts of entomophillous flowers to pollination. (6 marks)

(b) Using a named example, describe the events from pollination to double fertilization. (14 marks)

8. (a) Describe how the mammalian eye is adapted for accommodation. (6 marks)

(b) Describe the mechanism of hearing in man. (14 marks)

KAPSABET HIGH SCHOOL

231/3 Paper 3

(Kenya Certificate of Secondary Education)

Paper 3

INTERNAL MOCK EXAM

BIOLOGY

Dec. 2020– 1 ¾ Hours

Name…… Index No. ……..……

Adm No…… Date:……

Signature …… Stream :……

Instructions to candidates

a) Write your Name, Index, Admission number and stream in the spaces provided above.
b) Sign and write the examination date on the spaces provided above.
c) Answer all questions in the spaces provided in the question paper.
d) All workings must be clearly shown where necessary.
e) You are required to spend the first 15 minutes of 1 ¾ hours allowed for this paper reading the whole paper before commencing your work.
f) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
g) Candidates must answer the questions in English.

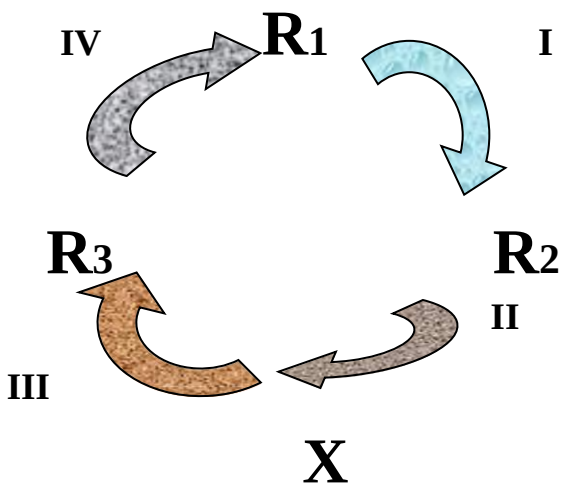
For Examiners use only

Question	Maximum Score	Candidate's Score
1	13	
2	17	

3	**10**	
Total Score	**40**	

1. You are provided with specimens **R_1, R_2** and **R_3** representing different stages of plant development. Study the specimen carefully and answer questions relating to them.

a). The chart below shows relationship between the specimens.



i) Identify the process labeled **I** **(1 Mark)**

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……..……..

ii) State one **internal** and one **external** conditions necessary for the process identified in i) above. **(2Marks)**

……...……..……

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iii) Name the

Stage of development **R_2** **(1Mark)**

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……..…..

Process immediately before **R_3** in process III **(1 Mark)**

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b). Dissect specimen R3 longitudinally and open it out.

i) Make a drawing of the section and label it **(5Marks)**

ii) Describe two adaptations of the specimen to is functions **(4Marks)**

2. Specimens **U** and **W** have been obtained from different plants.

a). i) Observe the leaves and differentiate them in reference to the following characteristics;

(2 Marks) a) **M**

a	U	W
r k i) Shape		
s) ii) Texture		

ii) Using apparatus and materials provided, determine the average surface area of each leaf.

(4Marks)

Leaf **U** | Leaf **W**

iii) c). i) Draw **two** 1cm^2 squares across the midribs of each the four leaves, two of each **U** and **W.**

ii) Add some warm water to fill two thirds of a boiling tube. ii) Insert one of leaves U, rolled, with the lower surface facing outward.

iii) Immediately begin counting the bubbles released on lower surface, within the two squares for 1 minute.

iv) Repeat the procedures i) – iii) for the second leaf **U** v) Repeat the procedure for the two leaves **W**

vi). Record your results in the table below **(4Marks)**

Leaf	Number of bubbles on Lower surface	Average for the marked area.
U 1		
2		
W 1		
2		

vii) Comment on the observation made on the upper surfaces of the two types of leaves **(1 Mark)**

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d) Calculate the average number of bubbles per cm^2 for each leaf type. **(4Marks)** i) Leaf type U

ii) Leaf type W

e) i)Deduce a suitable habitat for plant type W **(1Mark)**

……

…… ii) Give a reason for your answer **(1Mark)**

……

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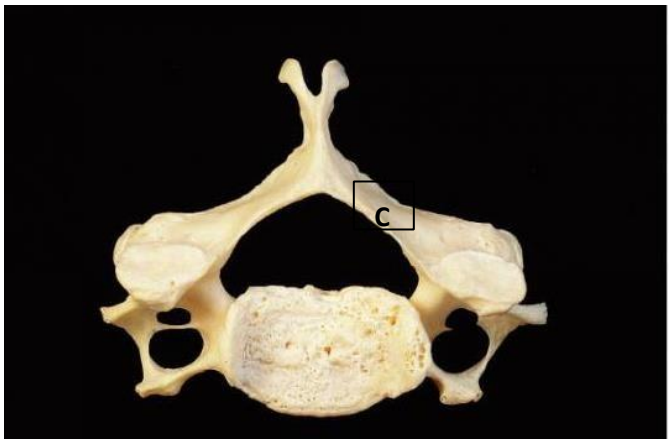
3. The photos provided for this question are of bones **P** and **S** from the same mammal. **P_1** and **P_2** are photos of the same bone from different views. Study the photographs and answer the questions that follow.

P_1

P_2



S

a) Identify the bones in the photos. Give a reason for each your answers. **(4 Marks)**

i) P

ii) S

b) Name the parts labeled A, B and C **(3 Marks)**

c) What view of the bone is presented in photo **P_2?** **(1 Mark)**

……

d) Identify one **similarity** and one **difference** between bones P and S **(2 Marks)**

i) Similarity

ii) Difference

NAME ……. **INDEX NO** **……..**

SCHOOL…… **SIGNATURE** **……..……**

DATE ……..……...

231/1
BIOLOGY
PAPER 1
(THEORY)
2 HOURS

KENYA HIGH SCHOOL

POST MOCK EXAMINATIONS

FORM 4

2021

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided.
- All workings **MUST** be clearly shown where necessary.

FOR EXAMINERS USE ONLY.

Question	Maximum Score	Candidates Score
1 – 28	80	

This paper consists of 7 Printed pages.Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing

1. Name the reagent used for testing presence of (3 **marks**)

   (a) Starch

   ……

   (b) Reducing sugars

   ……

   (c) Vitamin c

   ……

2. State the processes which occur in each of the following organelles. (2 **marks**)

   (a) Chloroplast

   ……

   (b) Mitochondrion

   ……

   (c) Ribosomes

   ……

3. A student observed a specimen through a light microscope. He used the objective lens marked X40.If he indicated the magnification of the image as x 400, what was the eye - piece magnification? (Show your working). (3 **marks**)

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4. State the function of the following in mammalian trachea. (3 **marks**)

   (a) Rings of cartilage

   ……..

   (b) Mucus

   ……..……

   (c) Cilia

   ……

5. (a) What do you understand by the term biological control? (1 **mark**)

   ….……..……

   ……...

   (b) Explain why all the energy produced by producers does not flow to the tertiary consumers. (2**marks**)

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6. Name any three forces that maintain the transpiration stream (3 **marks**)

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7. Give the form in which the following gases are transported in blood. (3 **marks**)

(a) Oxygen

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(b) Carbon (IV) oxide

……

(c) Carbon (II) oxide

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8. (a) Name the main group of organisms which comprise the Kingdom Monera. (1**mark**)

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(b) State any three ways in which the organisms named in 8 (a) above affect human lives. (3**marks)**

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(d) State the main characteristics of Monera which distinguish it from all other kingdoms. (1 **mark)**

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9. State ways in which the xylem tissue is adapted to carry out its function. (3**marks**)

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10. Why is it necessary for an athlete to breathe heavily after running? (2 **marks**)

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11. State ways in which the following diseases can be prevented

(a) Typhoid and amoebic dysentery (2 **marks)**

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(b) Malaria (2 **marks**)

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12. What are the three distinguishing features of phylum Arthropoda? (3**marks**)

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13. (a) Name the main product of the dark stage of photosynthesis. (1**mark**)

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(b) What is the role of chlorophyll during photosynthesis (2**mark**)

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14. Name three mechanisms that prevent self-pollination in flowers that have both male and female parts.

(3 **marks**)

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15. State three applications of anaerobic respiration. (3 **marks**)

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16. What is the significance of highly folded inner membrane of a mitochondrion? (2 **marks**)

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17. Why is it necessary for blood from the gut to pass through the liver before joining general circulation? (2 **marks**)

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18. A person's urine tested positive for reducing sugars.

(a) Name the type of sugar present in the urine. (1**mark**)

……

(b) Name the gland and the hormone which failed to control the above condition. (2**marks**)

Gland

……

Hormone

……

(c) Which disease was the person suffering from? (1**mark**)

……..

19. State two roles played by the process of reproduction. (2**marks**)

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20. What is the habitat of the following plants? (3**marks**)

(i) Xerophytes

……

(ii) Hydrophytes

……...

(iii) Halophytes

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21. (a) State ways in which molars are adapted to their functions. (2**marks**)

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(b) Name any two dental diseases. (2 **marks**)

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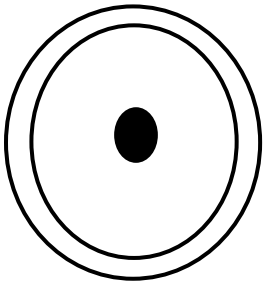
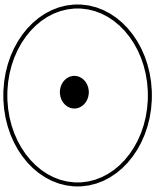
22. How is the sperm cell adapted to carry out its function? (3 **marks**)

23. The following are diagrams of two pollen grains.



K



L

(a) State one observable difference between K and L. (1 **mark**)

……

……

(b) State the agent of pollination for each of them. (2 **marks**)

K

L

24. How do sunken stomata reduce transpiration? (2**marks**)

25. Give the classes to which the following animals belong. (3**marks**)

(a) Human being

(b) House fly

(c) Spider

26. (a) State one event that occurs in prophase of meiosis I which does not occur in prophase of mitosis.

(1 **mark**)

(b) What are the results of the above phenomena? (2 **marks**)

27. Explain why growing grass die a few days when salt is sprinkled on it. (3**marks**)

NAME …… **INDEX NO** ……..……..

SCHOOL …… **SIGNATURE** ……...……...…….

DATE ……..……..

231/2
BIOLOGY
PAPER 2
(THEORY)
2 HOURS

KENYA HIGH SCHOOL

POST MOCK EXAMINATIONS

FORM 4

2021

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

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

For Examiners use only.

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

	8	**20**	
	Total score	**80**	

This paper consists of 10 Printed pages.
Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missin

1. (a) What is meant by the following terms?

(i) Protandry (1**mark**)

……

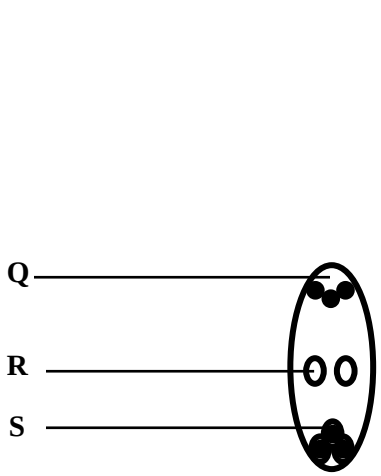
……

(ii) Self sterility (1**mark**)

……

……

(b) The diagram below shows a stage during fertilization in a plant.



(i) Name the parts labelled Q,R and S (3 **marks**)

Q

……..

R

…….……

S

……..

(ii) State two functions of the pollen tube (2 **marks**)

……

……

……

(c) On the diagram label the microphyle. (**1mark**)

2. Explain what happens to excess amino acids in the liver of humans. (3**marks**)

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(b) Which portions of the human nephron are only found in the cortex? (3 **marks**)

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(c) (i) What would happen if a person produced less antidiuretic hormone? (1 **mark**)

……

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

……

……

3. (a) (i) What is meant by the term biological control? (1**mark**)

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(ii) Give an example of biological control. (1**mark**)

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(b) (i) What is eutrophication? (3**marks**)

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(ii) What are the effects of eutrophication? (3 **marks**)

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(c) Name a substance that is responsible for acid rain. (1**mark**)

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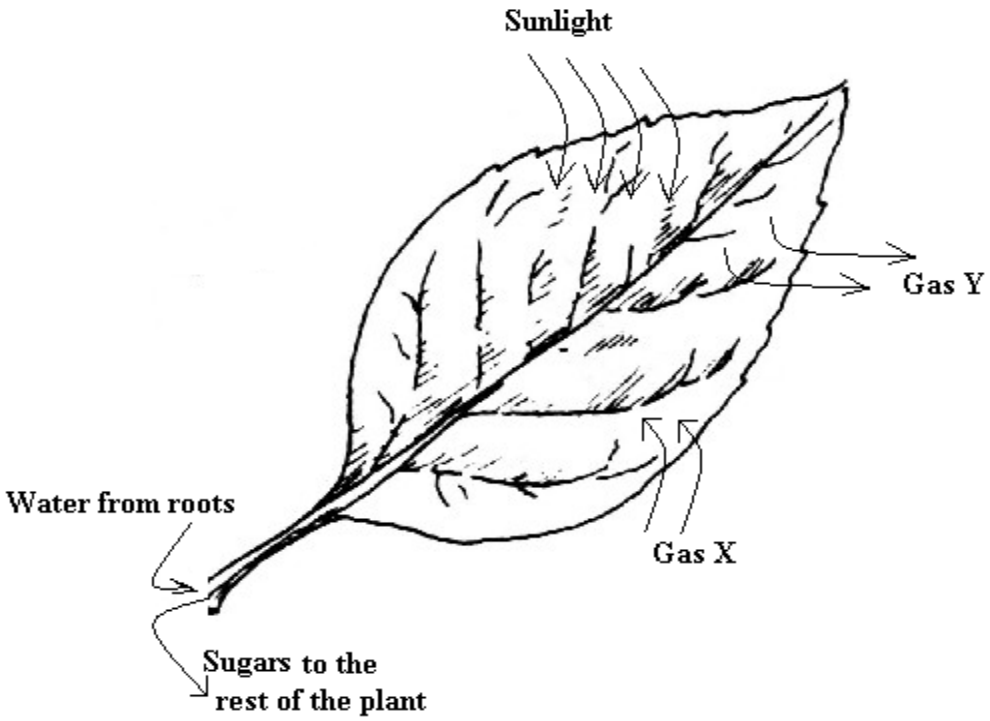
4. Leaves are the organs of photosynthesis. The following diagram shows what happens in a plant leaf during photosynthesis.



(a) Give two ways in which leaves are adapted to absorb light. (2 **marks**)

……

……

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……

(b) Name the gases labelled X and Y. (2**marks**)

X

……

Y

……

(c) Name the tissue which transport:

(i) Water in to the leaf. (1 **mark**)

……..

(ii) Sugars out of the leaf. (1 **mark**)

……..

(d) Explain why it is an advantage for the plant to store carbohydrates as starch rather than as sugars. (2**marks**)

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5. Some millet seeds were socked in water for two days. They were then broken into small pieces and placed on the surface of agar containing starch. After two days it was found that the agar no longer contained starch.

(a) Suggest how the test for starch in the agar was carried out. (1 **mark**)

……

……

(b) Explain why there was no starch in the agar after two days. (2**marks**)

……

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(c) Why was it necessary to soak the seeds? (1**mark**)

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(d) Why were the millet seeds broken into small pieces? (1**mark**)

……

……

(e) State the observation that would be made if the seeds had been soaked in boiling water? (1**mark**)

……

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(f) Suggest a control experiment that would have been suitable. (2**marks**)

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SECTION B:

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

6. A research was carried to determine the trend of growth of some boys and girls.Their average mass in kilograms was taken separately for a period of 20 years and tabulated as shown in the table below.

Age	Average mass of boys (kg)	Average mass of girls (kg)
0	2.5	2.5
2	11.5	11.5
4	15.0	16.0
6	18.5	19.3
8	22.1	27.1
10	25.1	27.1
12	27.5	30.5
14	37.0	35.5
16	44.0	44.0
18	46.9	52.0
20	48.5	55

(a) On the same axis draw a graph of the average mass of the girls and boys against age. (7**marks**)

(b) From the graph , determine the;-

(i) Mass of boys at the age of 11 years. (1 **mark**)

……

……

……

(ii) Growth rate of girls between ages 13 and 15. (3 **marks**)

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(c) Account for the change in the mass of girls during the age stated in (ii) above. (2 **marks**)

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(d) Explain the trend observed in the curves for both boys and girls. (2 **marks**)

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(e) Why do girls above 10 years require in take of food that is richer in iron than boys of the same age? (2 **marks**)

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……

(f) Part from using average mass to estimate growth in human beings, name two other parameters that can be used. (2 **marks**)

……

……

7. Describe how the various parts of the human digestive system are adapted to their functions. (20 **marks**)
8. (a) State the causes of air pollution. (5 **marks**)

(b) State how air pollutants affect organisms hence state how air pollution should be controlled. (15 **marks**)

NAME …… **INDEX NO** ……..

SCHOOL …… **SIGNATURE** ……..……

DATE ……..……...

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
$1^{3}/_{4}$ HOURS

KENYA HIGH SCHOOL

POST MOCK EXAMINATIONS

FORM 4

2021

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided in the question paper.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $1^{3}/_{4}$ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

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

This paper consists of 5 Printed pages.
Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing

1. (a) You are provided with a solution L. Using the reagents provided; determine the food compounds in L.
Fill in the table below.

FOOD COMPOUND	PROCEDURE	OBSERVATION	CONCLUSION

(b) Place 10mls of solution L in a visking tubing. Tie both ends and place it in 50mls of distilled water contained in a beaker.leave the set up for 20 minutes and make observations.

(i) Observations. (1**mark**)

……

……

(ii) Account for the observation in b (i) above. (2**marks**)

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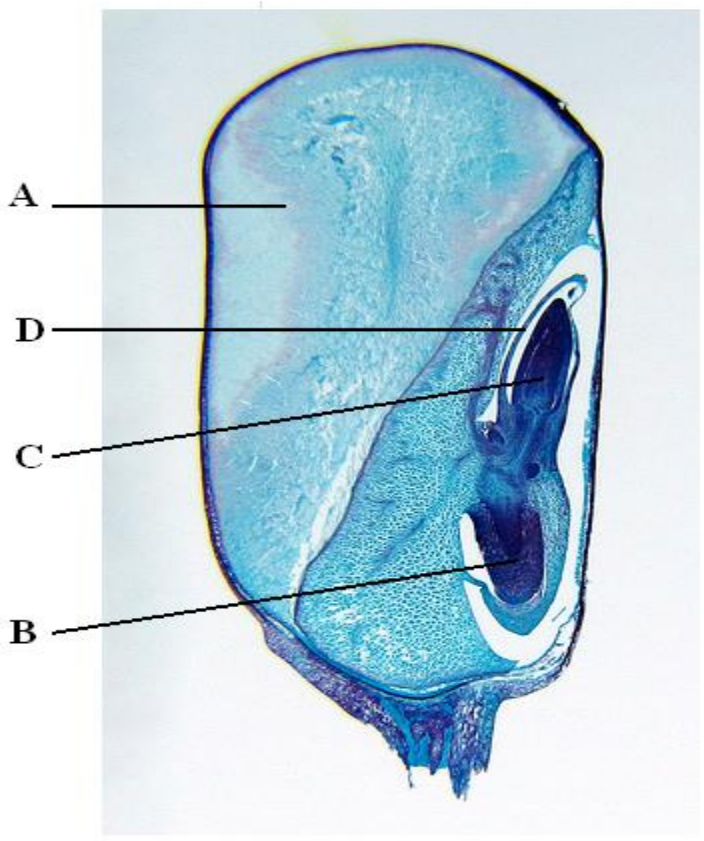
……

(iii)Give the equivalent of a visking in the bodies of living organisms. (1mark)

……

……

2. Study the photomicrograph of the longitudinal section of a maize fruit below and answer the questions that follow.



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

A

…….

B

…….

C

…….

D

…….

(ii) Give the role played by A and D. (2 **mark**)

A

……

……..….

D

……

……

(b) (i) Name the type of germination exhibited by maize grain. (1 **mark**)

……

……

(ii) Place the organisms from where the photomicrograph was obtained into its

Kingdom

Division

Class (3**marks**)

(iii) State three characteristics of members of the class identified in b (ii) above (3**marks**)

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(c) Give one reason why the maize grain is classified as a fruit. (1**mark**)

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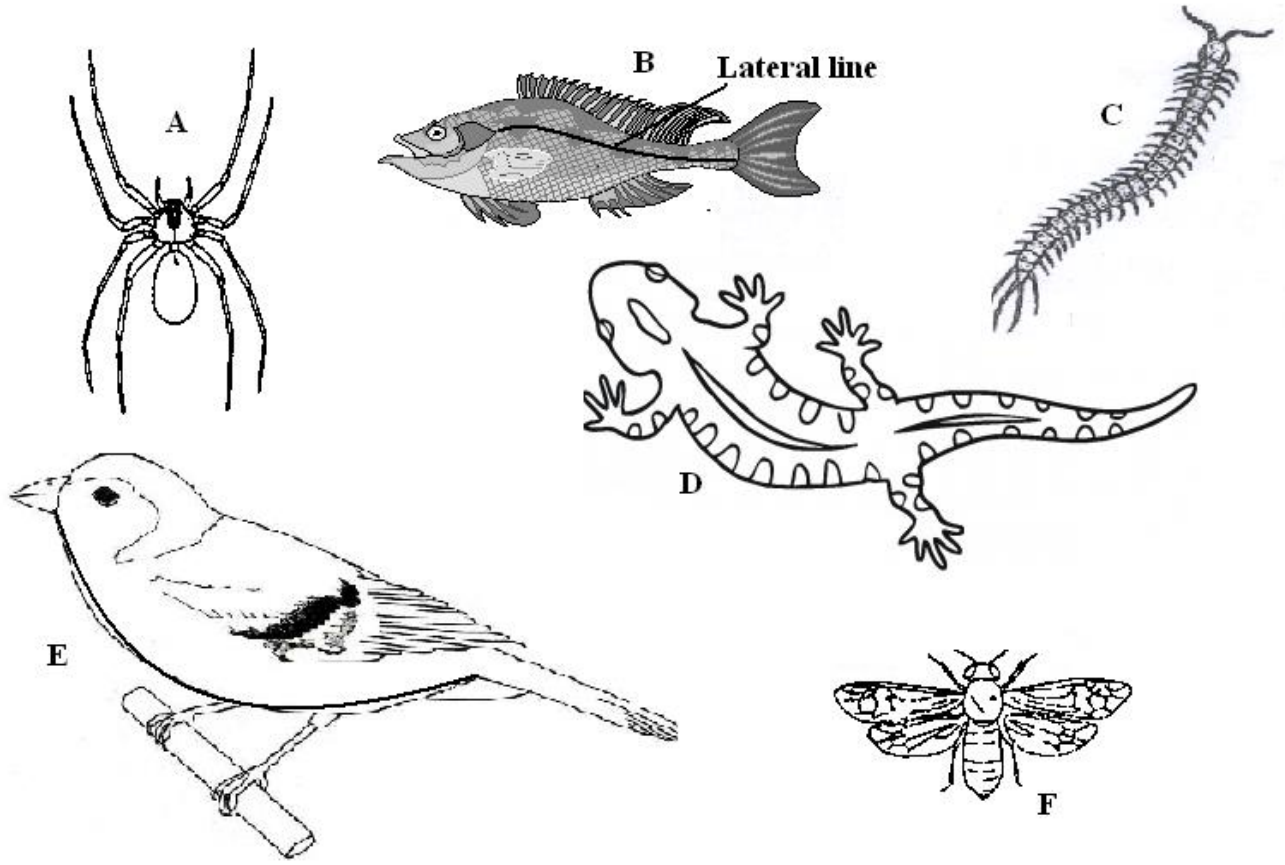
3. Study the organisms drawn below and answer the questions that follow.



(a) Use the dichotomous key below to identify the class the organisms belong to. (12 **marks**)

1. (a) Phylum Chordata …… go to 2
   (b) Phylum arthropoda …… go to 3
2. (a) Has scales on the body …… go to 4
   (b) Has no scales on the body ……..… Mammalia
3. (a) Has cephalothorax ……..…… Arachnida
   (b) Has no cephalothorax …… go to 5
4. (a) Has fins …… Pisces
   (b) Has no fins ……... go to 7
5. (a) Has three pairs of legs …… Insecta
   (b) Has more than three pairs of legs …… go to 6
6. (a) Two pairs of legs per segment …… Diplopoda
   (b) One pairs of legs per segment …… Chilopoda
7. (a) Has feathers ……Aves
   (b) Has no feathers …… go to 8
8. (a) Has a tail …….. Reptilia
   (b) Has no tail …….. Amphibia

Specimen	Step followed	Identity
A		
B		
C		
D		
E		
F		

(b) If the actual length from the tip of the mouth to the tip of the tail of the specimen B is 100mm, calculate the magnification. (2**marks**)

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PEAK EVALUATION EXAMINATIONS
TERM 3 – JANUARY 2021
FORM 4 – BIOLOGY PAPER 1

231/1
FORM 4 BIOLOGY
PAPER 1
JAN-2021

Time: 2 HOURS

NAME _____

CLASS _____**ADM NO** _____**SIGNATURE**_____

INSTRUCTIONS TO CANDIDATES

1. Write your name, admission number and class in the spaces provided above.
2. Answer all the questions in this paper.
3. Answers must be written in the spaces provided.
4. Additional pages must not be inserted.
5. This paper consists of **9** printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and that no questions are missing.

FOR EXAMINERS USE ONLY

Questions	Maximum Score	Candidate Score
1-30		

1(a) State **two** external features found in class Mammalia only. (2mks)

.....

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.....

(b) Name the taxonomic unit that comes immediately after Family in classification. (1mk)

.....

.....

2 (a) Name the basic functional unit of the skeletal muscle. (1mk)

.....

.....

(b) Distinguish between a tendon and a ligament. (1mk)

.....

.....

3. (a) State **two** advantages of using a coverslip when preparing a specimen for observation under the light microscope. (2mks)

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.....

(b) How is the low power objective lens manipulated to focus a specimen for observation under a light miscroscope? (2mks)

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4. Explain the significance of the following in the feeding of a mammal

(a) Long tongue in herbivores. (1mk)

.....

.....

(b) Canine in carnivores. (1mk)

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.....

5. Name the part of maize seed that elongates to bring about hypogeal germination. (1mk)

.....

.....

6. (a) State **two** characteristics of living organisms that are specific to plants. (2mks)

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.....

.....

(b) State the name given to the study of;

i) The cell (1mk)

.....

.....

ii) Microorganisms (1mk)

.....

.....

7.What is the function of the following structures in the human reproductive organs;

(a) Fallopian tubes (1mk)

.....

.....

(b) Epididymis (1mk)

.....

.....

(c) Scrotal sac (1mk)

.....

.....

8. Under what conditions do animals use the following food for respiration;

(a) Carbohydrates (1mk)

.....

.....

(b) Fats (1mk)

.....

.....

(c) Tissue proteins (1mk)

.....

.....

9. Distinguish between convergent and divergent evolution (1mk)

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10. Fingerlings of fish were introduced to two different ponds. Those fingerlings in pond one all died within four days but the fingerlings in pond two survived. Suggest the likely reasons why the fingerlings in one pond died. (3mks)

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.....

11. (a) State the functions of the following parts of a light microscope

i) Objective lens (1mk)

.....

.....

ii) Fine adjustment knob (1mk)

.....

.....

(b) Using a microscope a student counted 66 cells across the field of view whose diameter was 6000m. Calculate the average length of cells. Show your working.

.....

.....

12. Why is a change in dry mass of an organism the best indicator of growth? (2mks)

.....
.....

13. Other than the visceral organs in the body name two other parts of the body where smooth muscles are found. (2mks)

.....

.....

14. State the role of each of the following components of skin

a) Melanin (1mk)

.....

.....

b) Sebum (1mk)

.....

.....

c) Adipose tissue. (1mk)

.....

.....

15 How does a sunken stomata help a plant avoid excessive water during gaseous exchange? (3mks)

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.....

16. Name the substances produced as a result of anaerobic respiration in

i) Yeast (1mk)

.....

.....

ii) Human muscles (1mk)

.....

.....

17. Why is Lamarck's theory of evolution not accepted by biologist today? (2mks)

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18. Give **two** reasons why animals have specialised organs for excretion as compared to plants. (2mks)

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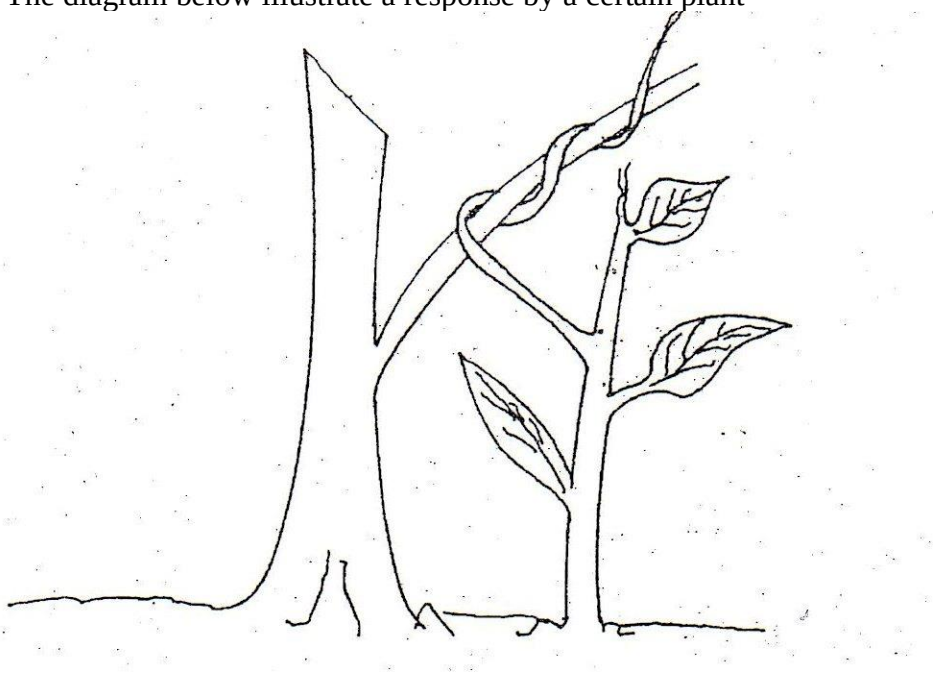
19. The diagram below illustrate a response by a certain plant



(a) Name the type of response (1mk)

.....

.....

(b) Explain how the response illustrated above occurs (3mks)

.....

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20. (a) What is meant by the term wilting. (1mk)

.....

.....

(b) Explain how an increase in temperature affects the rate of active transport. (2mks)

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21. Explain **four** adaptive characteristics features of respiratory surfaces. (4mks)

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22. (a) State **two** advantages of complete metamorphosis to the life cycle of an insect. (2mks)

.....

.....

(b) Distinguish between primary and secondary growth in plants (2mks)

23. The table below shows the level of two gases X and Y, in blood entering and leaving the lungs during the process of gas exchange.

Gas	Level of gas in cm^3 per/100cm of blood	
	Blood entering lungs	Blood leaving lungs
X	10.6	19.0
Y	58.0	50.0

(a) Name gases X and Y. (2mks)

X.....Y.....

.....

(b) How much gas X enters $100cm^3$ of blood, before the blood leaves the lungs. (2mks)

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.....

.....

24. In a flower name the parts that make up;
    i) Gynoecium (1mk)

.....

.....

    ii) Androecium (1mk)

.....

.....

25. State **two** sites for gaseous exchange in submerged aquatic plants. (2mks)

.....

.....

26. Viability of a seed is a necessary internal condition for germination. State two factors that may lead to low viability. (2mks)

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.....

27. Name two disorders in human caused by chromosomal mutation. (2mks)

.....

.....

28. State two characteristics that researchers select in breeding programme. (2mks)

29. A man and his wife are able to roll their tongues but their children cannot. Rolling tongue is controlled by a dominate gene. What are the genotypes of the parents. (Use letter T to represent the gene for tongue rolling) (2mks)

30. State the economic importance of the following plants excretory products.
    i) Papain (1mk)
    ii) Colchicine (1mk)
    iii) Tannin (1mk)

(b) State **two** advantages of homiotherms over poikilotherms. (2mks)

PEAK EVALUATION EXAMINATIONS
TERM 3 – JANUARY 2021
FORM 4 – BIOLOGY PAPER 2

231/2
FORM 4 BIOLOGY
PAPER 2
JAN- 2021

TIME: 2 HOURS

NAME _____

CLASS _____**ADM NO** _____

SIGNATURE_____ **DATE**_____

INSTRUCTIONS TO CANDIDATES

6. Write your name, admission number and class in the spaces provided above.
7. Answer all the questions in Section A in the spaces provided.
8. In section B answer question 6 Compulsory and Either Question 7 or 8
9. This paper consists of **11** printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and that no questions are missing.

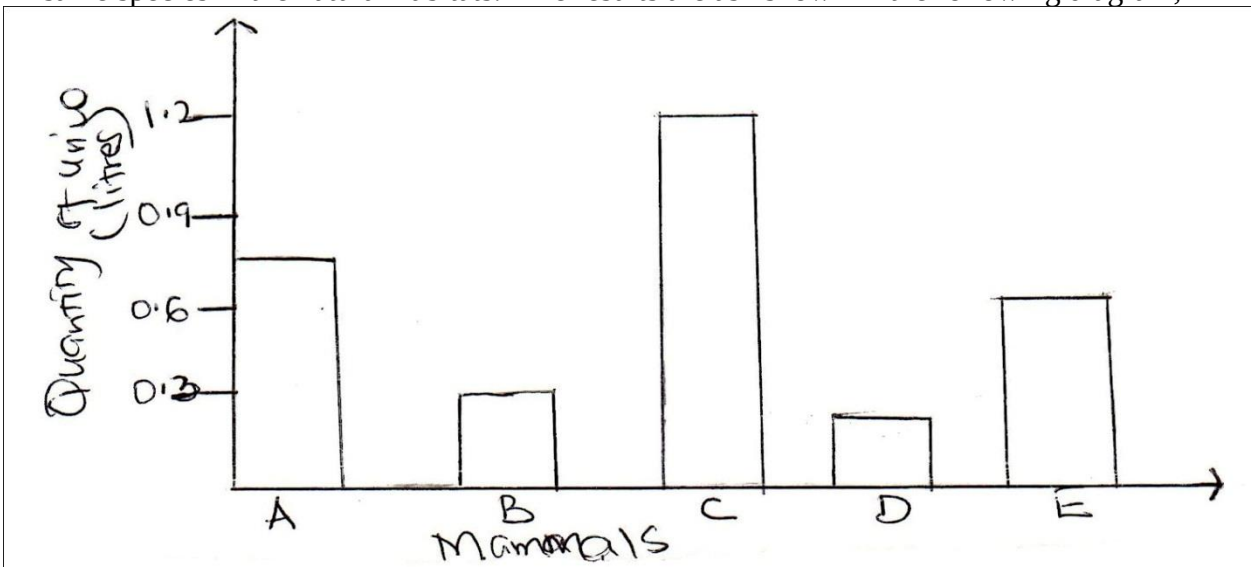
FOR EXAMINERS USE ONLY

Questions	Questions	Maximum Score	Candidate Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	

	7	20	
	8	20	
TOTAL		**80**	

SECTION A

1. The quantity of urine passed per day was established in five mammals A, B, C, D, and E of the same species in the natural habitats. The results are ash shown in the following diagram;



(a) Which of the above mammals is likely to be excreting urine very high in ammonia? Explain (2mks)

.....

.....

.....

(b) Which of the five mammals was likely to be living in a desert? Explain (2mks)

.....

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.....

(c) State two structural differences expected in the nephron of mammals A and D. (2mks)

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.....

(d) Name two physiological mechanisms used in mammal D to regulate its salt and water balance in the body. (2mks)

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.....

2. (a) State the function of the following parts of mammalian ear;

i) Tympanic membrane (1mk)

.....

.....

ii) Pinna (1mk)

.....

.....

iii) Ear ossicles (1mk)

.....

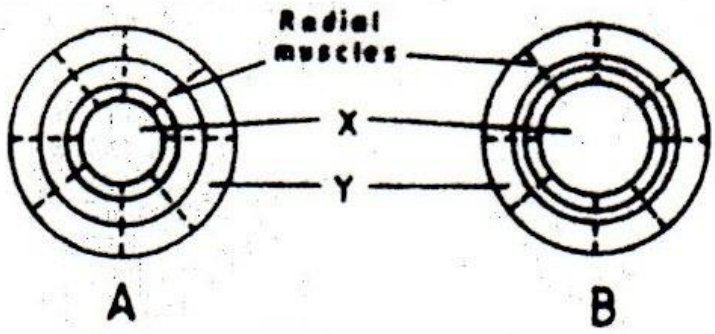
.....

(b) Give **two** defects of mammalian eye (2mks)

.....

.....

(c) The diagram below show how the iris and pupil of a human eye appear under different Condition



i) Name the structures labeled X and Y (2mks)

X.....

Y.....

ii) State the condition that lead to the change in appearance shown in the diagram labeled B

.....

.....

3. A biologists carried out a study to investigate the growth of a certain species of herbivorous fish and the factors influencing plant and animal life in four lakes A,B,C and D. The lakes were located in the same geographical area.

Two of the lakes A and B were found to contain hard water due to the presence of high content of calcium salts. The mean body length of 2 year old fish, amount of plant use and invertebrates biomass in each lake were determined. The data was shown in the table below;

Lakes	Means of fish body length (m)	Type of water	Amount of plant life	Invertebrate biomass g/cm3			
				insects	snails	crabs	worms
A	31.2	Hard	1050	11	300	10	180
B	38.6	Hard	950	72	100	9	90
C	18.4	Soft	1.2	79	0	2	20
D	16.3	soft	0.5	99	0	1	10

(a) Describe the procedure that may have been used to determine the mean body length of the fish. (4mks)

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(b)What are the likely reasons for the difference in mean body length of the fish living in lakes A and D (2mks)

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(c) Explain why primary producers have a higher biomass than primary consumers. (2mks)

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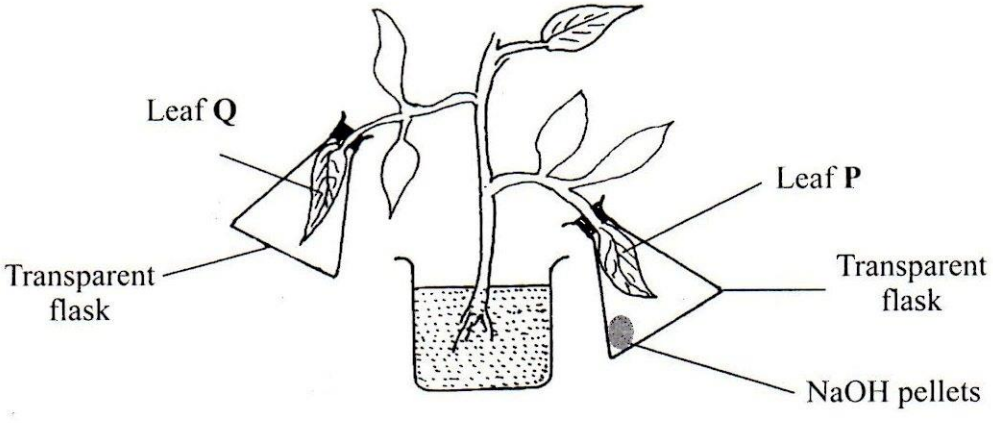
4. In an experiment to investigate a factor affecting photosynthesis a potted plant which had been kept in the dark overnight was treated as shown in the diagram below and exposed to light.



(a) why was the potted plant kept in the dark overnight? (1mk)

.....

.....

(b) Which factor was being investigated in the experiment? (1mk)

.....

.....

(c) (i) Which test did the students perform to confirm photosynthesis in the leaves labeled P and Q

.....

.....

(ii) State the results obtained in the leaves labeled P and Q.

P (1mk)

.....

.....

Q (1mk)

.....

.....

(iii) Explain the results obtained in the leaves labelled P and Q

P (1mk)

.....

.....

Q (1mk)

.....

.....

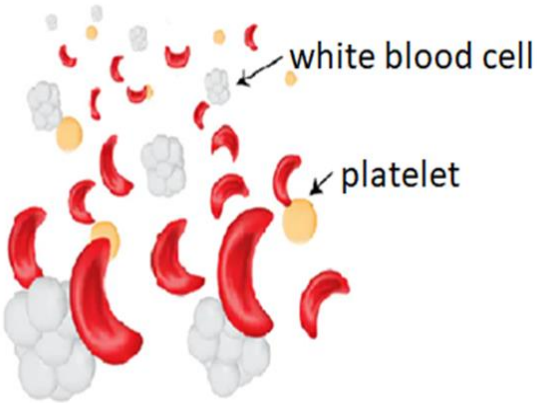
(iv) What was the purpose of the leaf Q in the experiment? (1mk)

.....

.....

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

PERSON A



PERSON B

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

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

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

SECTION B

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

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

Day	Progesterone hormone concentration in arbitrary units
1	6
2	5
3	3
4	2
5	1
6	1
8	1
10	2
12	4
14	7
16	8
20	9

22	10
24	10
26	10
28	10
30	11
32	11
34	11

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

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

i) Day 1 - day 5 (2mks)

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.....

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ii) Day 14 – day 20 (2mks)

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.....

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iii) Day 28 – day 35 (2mks)

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

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

.....

.....

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

7. Describe how water moves from the soil to the leaves in a tree. (20mks)

8. (a) Describe the process of carbohydrates digestion in human beings. (12mks)

(b) Describe the flow of energy from the sun through the different trophic levels in an Ecosystem (8mks)

PEAK EVALUATION EXAMINATIONS
TERM 3 – JANUARY 2021
FORM 4 – BIOLOGY PAPER 3

231/3
FORM 4
BIOLOGY PAPER 3
(PRACTICALS)

TIME: 1 ¾ HOURS

NAME _____

CLASS _____ ADM NO _____

DATE _____ SIGN_____

INSTRUCTIONS TO CANDIDATES

10. Write your name, class and admission number in the spaces provided above.

11. Sign and write the date of the examination in the spaces provided.

12. Answer all questions in the spaces provided.

13. You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully before commencing your work.

14. Additional pages must not be inserted.

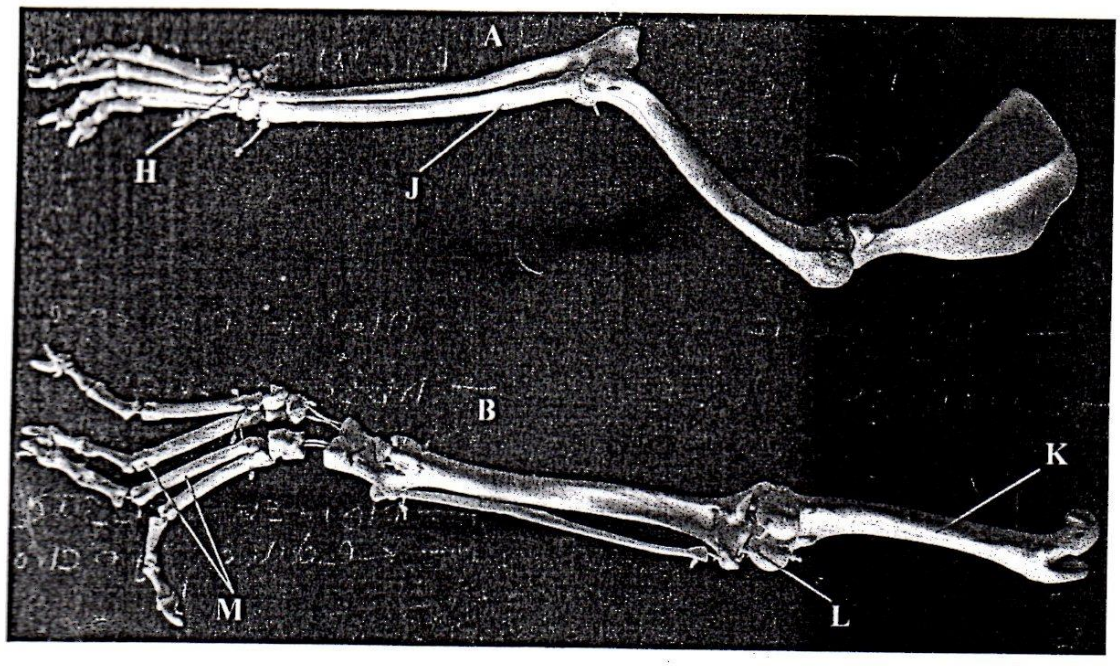
15. This paper contains 6 printed pages

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

FOR EXAMINERS USE ONLY

Section	Maximum Marks	Candidate Score
1	13	
2	16	
3	11	
TOTAL SCORE	**40**	

1. The photograph below shows two (A and B) skeletal limbs of a certain mammal



(a) (i) Which of the two (A and B) skeletons represents a forelimb? (1mk)

.....

.....

(ii) State two features observable on the Skeleton to confirm your answer in (a) (i) (2mks)

.....

.....

.....

.....

(b) Name the bones labeled J, K and M

J (1mk)

.....

.....

K (1mk)

.....

.....

M (1mk)

.....

.....

(c) Which bone forms the joint with the bone labeled K of the anterior end? (1mk)

.....

.....

(d) Name the type of joint formed at the part labeled H and L (1mk)

H

.....

.....

L

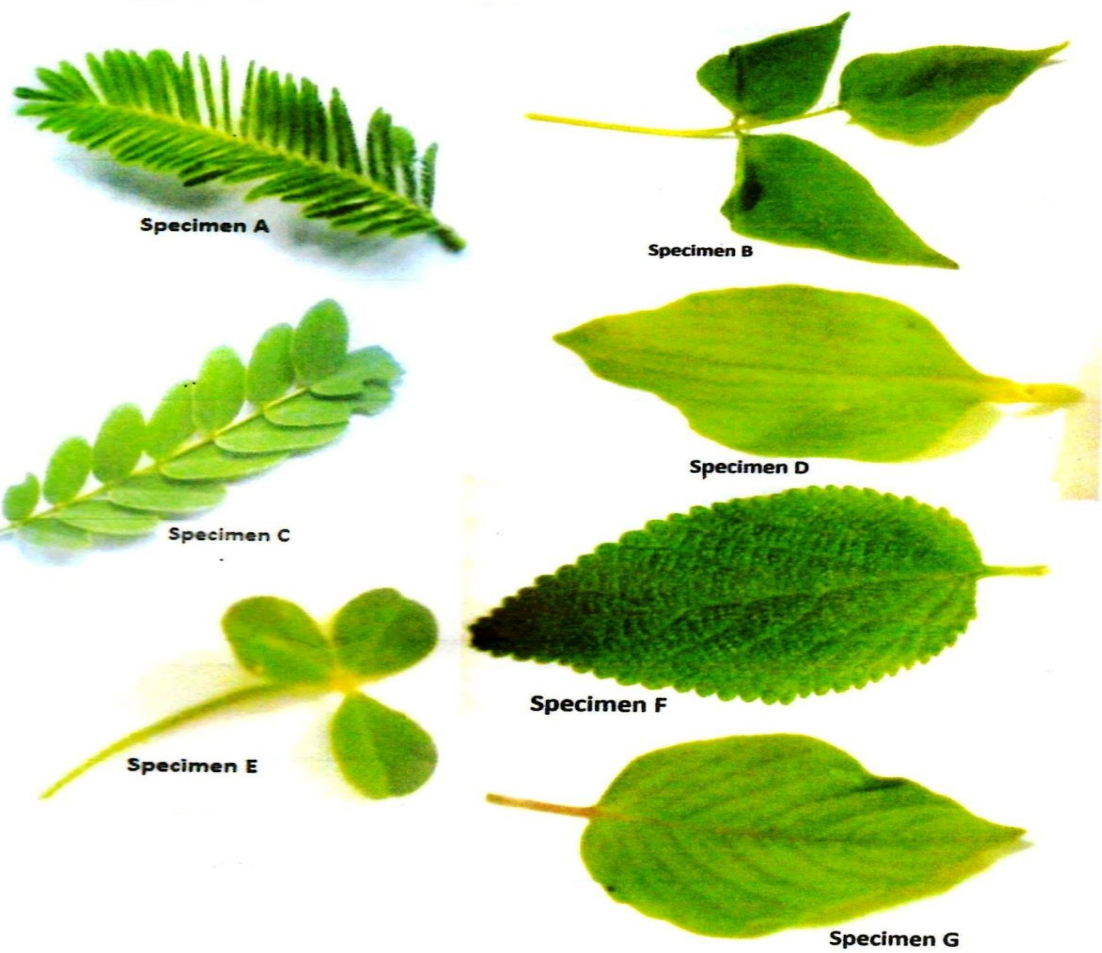
.....

.....

(e) Apart from bones, state the function of any two other components of a joint. (4mks)

Component Function

2. The diagrams below represent leaves of certain plants



(a) Use the above specimen to complete the dichotomous key below (2mks)

1. (a) Leaf simple..... go to 2
   (b) Leaf compound.....go to 4

2. (a) leaf with parallel veins.....wandering jew
   (b) Leaf with net veins..... go to 3

3. (a) leaf with smooth margin.....Devils horse whip
   (b) Leaf with _____.....Tick berry
4. (a) Leaf trifoliate.....go to 5
   (b) Leaf with more than three leaflets..... go to 6

5. (a) Leaf with sharp tips.....Bean
   (b) Leaf with rounded tips.....Oxalis

6. (a) Leaf pinnate.....Cassia
   (b)Leaf _____.....Accacia

(b) Use the dichotomous key above to fill the table below (14mks)

Specimen	Steps	Identity

A		
B		
C		
D		
E		
F		
G		

3. You are provided with a specimen labeled K and solution labeled P and Q. Cut the specimen into two halves.

(a) (i) Name the type of reproduction exhibited by specimen K (1mk)

.....

.....

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

.....

.....

Using specimen K, remove some of the inner leaves. Cut the leaves along their lengths into nine strips equal length. Each strip should be about 2mm wide. Place three strips into the solution labeled P, place another three strips into the solution labeled Q and leave the last three strips in a petri dish labeled R. Allow the experiment setup to stand for 10 minutes.

(b) Use your fingers to feel the texture of the strips. Record your observations (2mks)

i) Strips in solution P

.....

.....

.....

.....

ii) Strips in solution Q

.....

.....

(c) Account for the texture of the strips in the solution Q (4mks)

.....

.....

.....

(d) Suggest the concentration of solution P in relation to the cell sap in the strips of the specimen.

Give a reason for your answer (1mk)

.

(e) State the aim of the setup R (1mk)

Name…….Index Number……..Class……..…Candidate'sSignature……Date…… ……

BIOLOGY

PAPER 1

231/1

TIME; 2 HOURS.

KASSU JOINT EVALUATION TEST – January, 2021

(Kenya Certificate of Secondary Education)

BIOLOGY THEORY

For examiner's use only

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1 - 29	80	

This paper consist of 11 printed pages. Candidates should check the questions to ascertain that all the pages are printed as indicated and no questions are missing.

1. The table below shows concentration of some minerals inside the cells of a water plant and in the surrounding water.

Mineral	Sodium	Magnesium	Calcium
Cell sap	631	202	318
Surrounding water	28	293	47

a) Name the process by which magnesium is taken up by the plant. (1mrk)
……
……

b) Explain why maize plant take up calcium minerals quicker in well aerated soils than in water logged soil. (3mrks)
……
……
……
……
……

2. Give a reason why a mature plant cell does not lose its shape even after losing water. (1mrk)

……

3. i) State the function for co-factors in cell metabolism. (1mrk)

……

ii) Give one example of a metallic co – factor. (1mrk)

……

4. Name the features that increase the surface area of the small intestines. (2mrks)

……

……

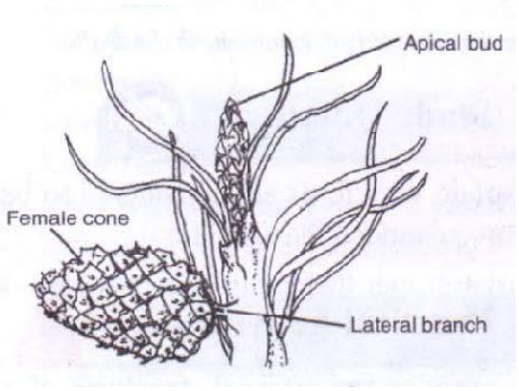
5. a) Name three characteristics that are used to divide the members of phylum Arthropoda into classes. (3mrks)

……

……

……

b) The diagram below represents a certain plant species.



i) State the class to which the plant belongs. (1mrk)

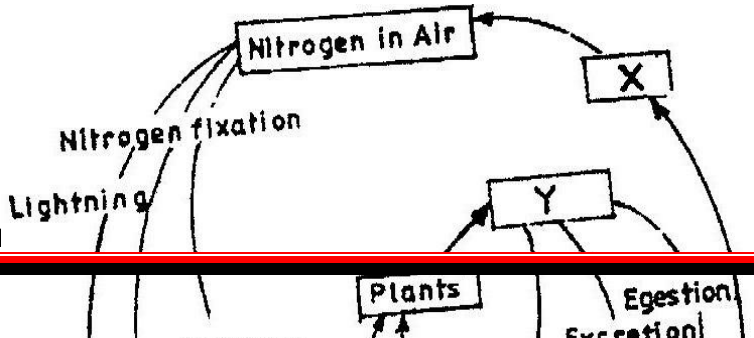
……

ii) State one observable xerophytic characteristic seen in the diagram above?. (1mrk)

……

……

6. The chart below represents a simplified nitrogen cycle.



What is represented by X, Y and Z. (3mrks)

X……

Y……

Z…….

7. People can die when they inhale gases from a burning charcoal stove in a poorly ventilated room. What compound is formed in the human body that lead to such deaths?. (1mrk)

……

……

8. Explain why blood from a donor whose blood group is A cannot be transfused into a recipient whose blood group is B. (2mrks)

……

……

……

……

9. In an experiment, a student covered one of the leaves of a potted plant on both upper and lower surfaces with blue cobalt chloride paper. The plant was exposed outside for 45 minutes.

Observation: The cobalt chloride on the undersurface of the leave changed into pink in the first 20 minutes only as the upper surface remained blue. However at the end of the experiment, after 45 minutes, the upper surface also turned pink.

i) State the aim of the experiment. (1mrk)

……

……

……....

ii) Give one significance of the results obtained. (1mrk)

……

……

10. When transplanting seedlings, it is advisable to remove some leaves. Explain (1mrk)

……

……

11. a) Describe the path taken by carbon (IV) oxide released from the tissue of an insect to the atmosphere. (3mrks)

……

……

……

……

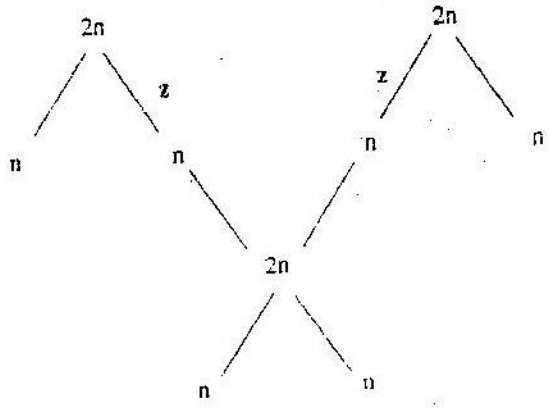
b) Name two structures for gaseous exchange in plants. (2mrks)

……
……
……

c) What is the effect of contraction of the diaphragm muscles during breathing in mammals?. (2mrks)

……
……
……
……

12. The chart below shows the number of chromosomes before and after cell division and fertilization in a mammal.



a). What type of cell division takes place at Z. (1mrk)

……
……

b) Where in the female body of humans does process Z occur?. (1mrk)

……
……

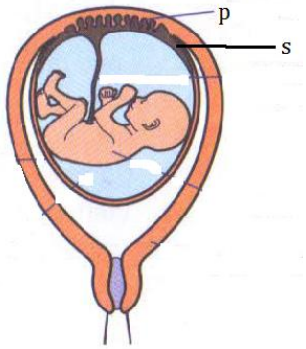
c) Name the process that leads to addition or loss of one or more chromosomes. (1mrk)

……
……

13. State three benefits of polyploidy in plants to a farmer. (3mrks)

……
……
……
……

14. The diagram below represents human foetus.



a) Name the part labelled S (1mrk)

……

……

b) Give the roles of structure P in; (2mrks)

i) Nutrition.

……

……

……

ii) Protection.

……

……

……

d) What is the function of the following in the human male reproductive system?. (2mrks)

i) Epididymis.

……

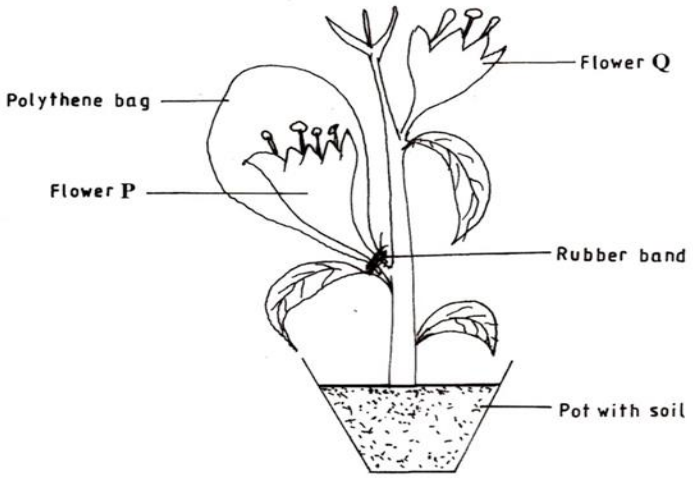
……

ii) Scrotal sac.

……

……

15. The diagram represents an experimental set up used by students to investigate a certain process.



Flower Q produced seeds, while P did not. Account for the results (3mrks)

……
……
……
……
……

16. Name any two branches of microbiology. (2mrks)

……
……

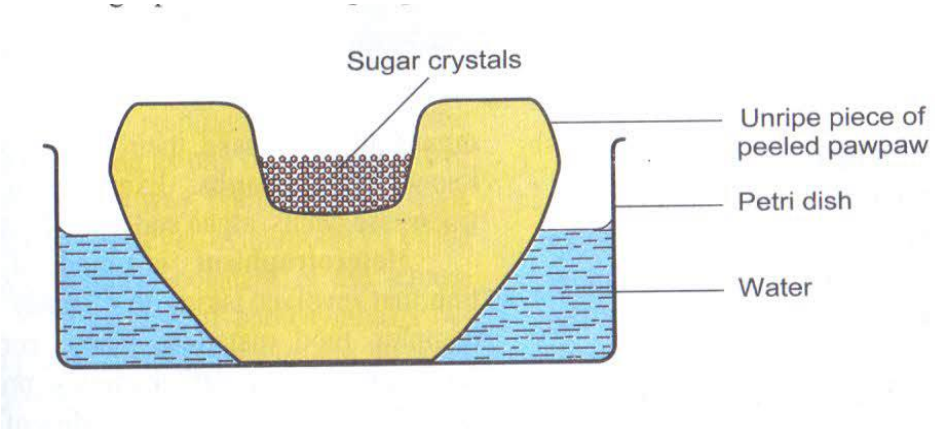
17. Which biological tool would a scientist require to collect rats to be used for study? (1mrk)

……
……

18. Distinguish between magnification and resolution as used in microscopy. (1mrk)

……
……
……

19. A group of students set up an experiment to investigate a certain physiological process. The set up was as shown below.



a) Name the physiological process being investigated. (1mrk)

.....
.....

b) Account for the formation and rise in the level of sugar solution at the end of the experiment. (3mrks)

……
……
……
……
……
……

20. The scientific name of a blackjack is bidens pilosa. Identify two mistakes in the written name. (2mrks)

……
……
……

21. State two advantages of natural selection to organisms. (2mrks)

……
……
……

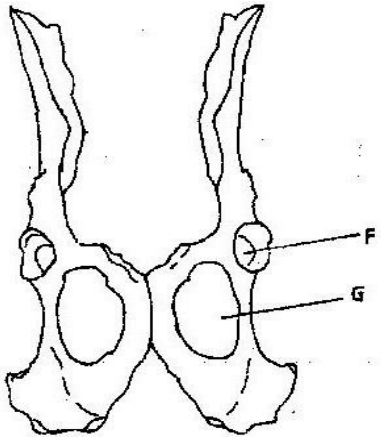
22. a) Give two ways in which sexual reproduction is important in the evolution of plants and animals. (2mrks)

……
……
……
……

b) Explain why it is only mutations in genes of gametes that influence evolution (1mrk)

……
……

23. The diagram below shows two fused bones of a mammal.



(a) Identify the fused bone. (1 mark)

……
……

(b) Name the

(i) Bone that articulates at the point labelled F. (1 mark)

……
……....

(ii) The hole labelled G. (1 mark)

……
……

24. The chart below represents the result of successive crosses, staring with red- flowered plants and white flowed plants and in which both plants are pure breeding.

Parental genotypes: Red flowers x white flowers

↓

First filial generation

↓ Selfed

Second filial generation

3 red flowers: 1 white flower

Phenotypic ratio 3: 1

(a) What were the parental genotypes? Use letter R to represent the gene for red colour and r for white colour. (1mrk)

……

(b) (i) What was the colour of the flowers in the first filial generation?. (1mrk)

……

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

…….....

(c) What is a test- cross?. (1 mark)

……

……

25. a) Name two tissues in plants which are thickened with lignin. (2 marks)

……

……..

b) How is support attained in herbaceous plants? (1 mark)

……

……

26. Name the type of response exhibited by; (2mrks)

(a) Euglena when it swims towards the source of light.

……..……

(b) Sperms when they swim towards the ovum.

……..……

27. A person was able to read a book clearly at arm's length but not at normal reading distance. (3mrks)

a) State the defect the person suffered from?.

……

b) Why was he unable to read book clearly at normal distance.

……

……...……

c) How can the defect be corrected?.

……

……

28. The photograph below shows the effects of certain pollutant in Nairobi dam. Study it carefully and use to answer the questions that follow.

i) Suggest the main pollutant in the dam (1mark)

……

……...

ii) What are the possible effects of pollution illustrated in the photograph (2mrks)

……

……

……

iii) Suggest one possible pollution control measure that can be put in place to save aquatic organisms in the dam. (1mark)

.....

.....

29. State one structural and one functional difference between motor and sensory neurones. (2mrks)

……

……

……

……

Name…….Index no……

Admission No…… Candidate's signature……

School …….....Date….....

231/2

BIOLOGY

PAPER 2

TIME: 2 HOURS

KASSU JET EXAMINATION

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

2021

INSTRUCTIONS TO CANDIDATE:

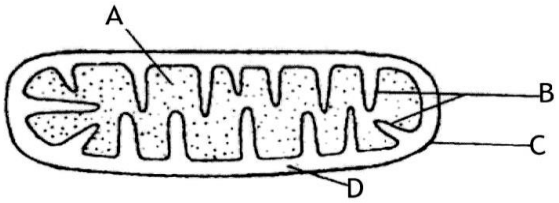
- Write **your name** and **index number** in space provided.
- Answer **all** questions in section **A** in the spaces provided
- In section **B** answer questions **6** (compulsory) and either question **7** or **8** in the spaces provided

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**	

1. a) Study the diagram of a cell organelle shown below and answer the questions that follow



i. Identify the organelle (1mark)

……

……..

ii. State the function (1mark)

……

……

iii. Name the parts labelled A and B (2marks)

……

……

……

b) When preparing plant sections to be observed under the microscope:

Water is used to mount the tissue

Very thin sections of plant should be cut

Give a reason why each of the steps are carried out (2marks)

……

……

……

……

c) Naomi observed an object using a microscope with eye piece lens of magnification X5 and an objective lens of magnification X20.What was the magnification of the object? (2marks)

……

……

……..

2. During an experiment a group of students took equal volumes of blood from the same person containing 50 red blood cells and were suspended salt solutions A, B and C.

After an hour the cells in each solution were counted and their sizes determined and results tabulated as shown below. Study the table and answer the questions that follow

Solution	A	B	C
SIZE	Large	Normal	Small
NUMBER	20	50	50

a) State the nature of solutions

B (1mark)

……

C (1mark)

…….

b) Account for the number of red blood cells in solution A after one hour (3marks)

……

……

……

……

c) Explain how the above physiological process facilitates the following actions in living organisms

i. Gaseous exchange (1mark)

……

……

……

ii. Osmoregulation (2marks)

……

……

……

……

……...

3. A cross between a red flowered and a white flowered Mirabilis plant produced pink flowered F1 plants

a) Suggest a reason to explain why there were no red or white flowered F1 plants (1mark)

……

……

……..

b) The F1 offsprings were selved to get F2 generation. Using appropriate letter symbols work out the following for the generation: (4marks)

i. The genotypic ratio

……

……

……

……

……

……

ii. The phenotypic ratio

……

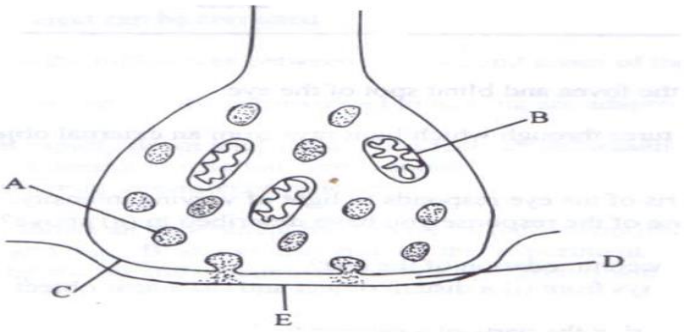
……

……

……

c) What would be the result of crossing one of the F1 offspring producing pink flowers with a true breeding plant producing white flowers? (3marks)

4. Examine the diagram of a synapse below and answer the questions that follow



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

……

……

……

b) Name the enzyme that exerts its effects on the structure above (1mark)

……

……

c) Name the neurotransmitter substance in impulse transmission (1mark)

……

……...

d) State the function of B (1mark)

……

……

e) Identify the two synaptic inhibitors that may poison to interfere with a transmission of an impulse across the synapse (2marks)

……

……

……

f) State the possible causes of hypermetropia (1mark)

……

……

……

5. a) Define natural selection (2marks)

……

……

……..

b) Explain the following

Survival for the fittest (3marks)

……

……

……

……

……

……

Struggle for existence (3mark

SECTION B

Answer question 6 and either question 7or 8

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

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

a. Using suitable scale draw the graphs of the mean lengths in set A and B against time on the grid provided (8marks)

b. From the graph state the mean shoot length of each of seedling at the 66^{th} hour (2marks)

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

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

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

7. Describe the role of the following parts in human reproduction

i. Testes (4marks)

ii. Ovary (6marks)

iii. Sperm and ovum (6marks)

iv. Uterus wall/endometrium (4marks)

8.State the adaptations of the following tissues for support in plants

i. Parenchyma tissues (4marks)

ii. Collenchyma tissues (4marks)

iii. Sclerenchyma tissues (2marks)

iv. Tracheids (6marks)

v. Xylem vessels (4marks)

NAME…… STRM……ADM…….. DATE…….

…… SIGN…….……

231/3

BIOLOGY PRACTICAL

PAPER 3

JAN 2021

Time: 1 ¾ Hours

KASSU JET EXAMINATION 2021

(Kenya Certificate of Secondary Education)

INSTRUCTIONS TO CANDIDATES

- Answer all the questions in the spaces provided.
- You are required to spend the first **15** minutes of **1** ¾ hours allowed for this paper reading the whole paper carefully before commencing your work.
- Candidates may be penalized for recording irrelevant information and for incorrect spelling especially of technical terms.

FOR EXAMINER'S USE ONLY

Question	Max Score	Candidate's Score
1	13	
2	13	
3	14	
TOTAL	40	

This paper consists of 7 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.

1. You are provided with an unknown mixture labelled J

   You are also provided with Benedict's solution, dilute hydrochloric acid solution, iodine solution, Dichlorophenol-Indophenol (DCPIP) solution. Sodium hydrogen-carbonate solution, means of heating, test tubes, test tube holder and a test tube rack.

   a) Using the reagent provided only, test for the food substances in mixture J. Record in the table below the chemical test, the procedure of the test, your observations and conclusions.

   8mks

Chemical test	**Procedure**	**Observations**	**Conclusions**

b) Which of the components of mixture J does not undergo digestion in the mammalian digestive system? 1mk

……

c) i)Name a deficiency disease that may result from a deficiency of the component identified in (b) above. 1mk

……

d) Name a common carbohydrate that could be present in mixture J. 1mk

……

e) State the role of hydrochloric acid and sodium hydrogen carbonate in the experiment. 2mks

Hydrochloric Acid

……

……

……..

Sodium Hydrogen Carbonate

2. The photographs below show a flower specimen. Study it carefully and use to answer the questions that follow.

a) On the photograph, label the following parts 3mks

i. Stigma

ii. Style

iii. Staminal tube

b) i) Classify the plant from which the flower was picked into the taxonomic groups listed below.

4mks

Kingdom

……

Division

……

Sub division

……

Class

……

ii) Name three observable features from the photograph of the class you named in (a) (i) above.

3mks

……

……

…….

……..

c) Suggest the pollination agent of this flower. Give reasons for your answer.

Pollinating agent **1mk**

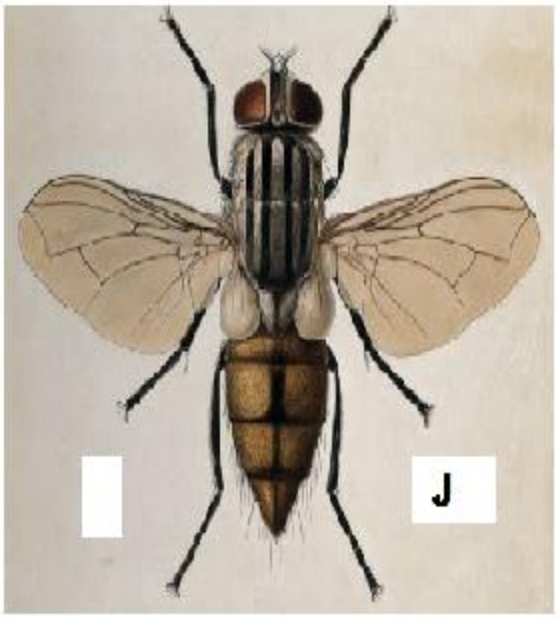
…….

Reasons **2mks**

……

……

3. Below are photographs of two specimens, **J** and **K.** Both of them belong to the same Phylum and Class. Observe them carefully before you answer the questions that follow.



a) Name the class to which **J** and **K** belong and support your answer with two reasons.

Class 1mk

……

Reasons 2mks

……

……

……

……

b. Suggest why the transport fluid in **J** and **K** has no haemoglobin. 2mks

……

……

……..

c. The actual length of specimen K is 8cm, given that both J and K are under the same magnification, determine the actual length of J 3mks

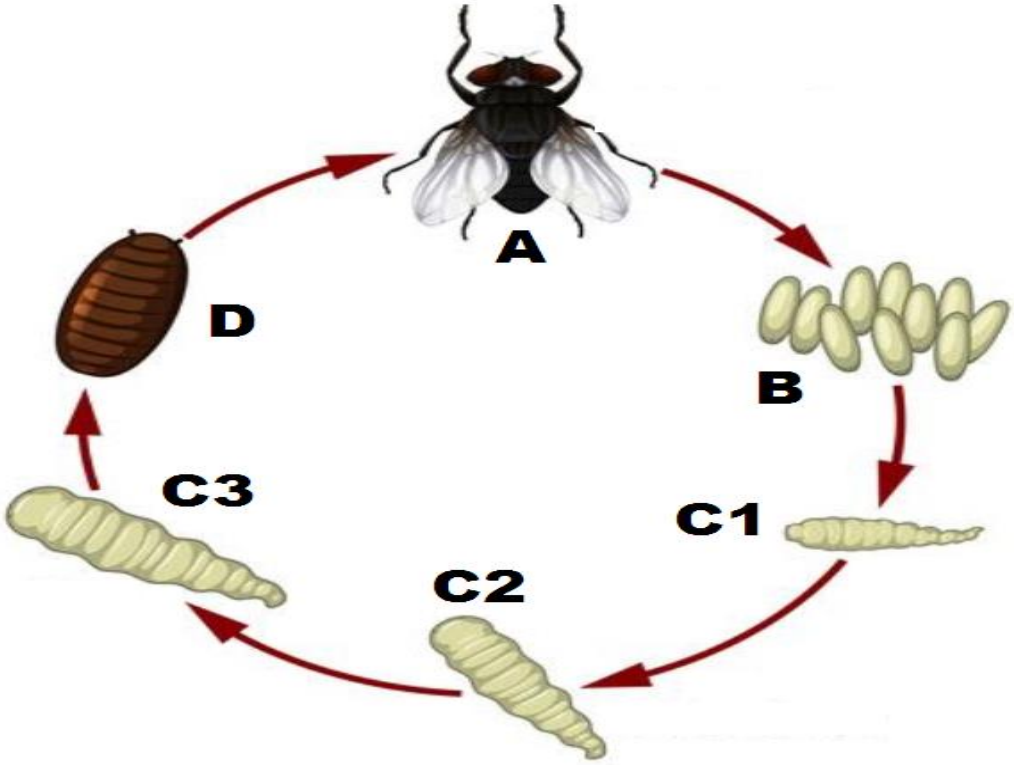
……

……

……

……..

d. Below is a diagram showing the life cycle of specimen J.



i. Identify the stage labeled **D**. 1mk

……..…….

ii. Name the hormone responsible for the change from **D** to **A**. 1mk

……...……...

iii. Explain the differences in the change from **C2** to **C3** and from **C3** to **D**. 2mks

C2 to C3

……

……..

C3 to D

……

……

iv. State the importance of the process illustrated above in the life cycle of the organism 2mks

\

MURANG'A EAST JOINT EXAM 2021

Name…… Index No……/…….

School…… Candidates Signature…… Date ……

231/1

BIOLOGY

THEORY

Paper 1

2 Hours

INSTRUCTIONS TO CANDIDATES

- Sign and write date of examination in the spaces provided above.
- Write your name and Index Number in the spaces provided above.
- Answer **ALL** questions in the spaces provided.
- All workings **MUST** be clearly shown where necessary.

For Examiners use only.

Question	Maximum Score	Candidates Score
1 – 25	80	

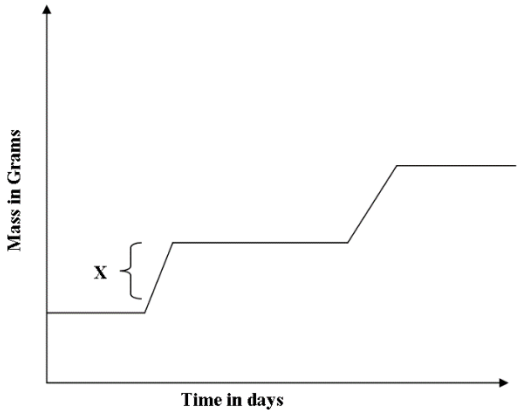
1.State three activities of the cell that are controlled by the nucleus (3mks)

……

……

……

2.The graph below represents the growth pattern of animals in a certain phylum.



a) Name the type of growth curve shown above. (1mk)

……..

b) i) Identify the process represented by **X**. (1mk)

……..

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

c) State the importance of the growth of a pollen tube to a plant. (1mk)

……..

……

3 .Name the causative agent of the following diseases in human (3mks)

i. Amoebic dysentery_____

ii. Bilhazia _____

iii. Typhoid

_____

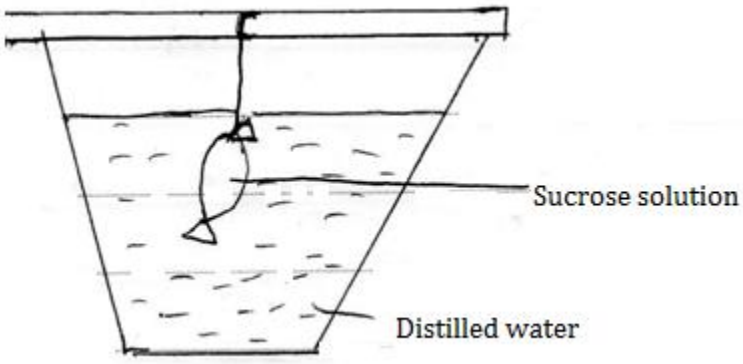
4.Give three reasons why plants do not require specialized excretory organs (3mks)

_____

_____

_____

5. An experiment was set up as shown below



The set up was left for 30 minutes.

a. State the expected results (1mk)

b. Explain your answer in (a) above (3mks)

_____

_____

_____

_____

6.a)What is the function of Sodium hydrogen Carbonate that is added to test solution of non-reducing sugar.

(1mk)

…….....

.....

b)The equation below represents a process X which is controlled by enzymes .

$$C_6H_{12}O_6 + C_6H_{12}O_6 \underset{\mathbf{R}}{\overset{\mathbf{X}}{\rightleftharpoons}} C_{12}H_{22}O_{11} + H_2O$$

Glucose + Fructose Sucrose + Water

i) Name the process **X** and enzyme **R**

Process **X** …… (1mk)

Enzyme **R** …….. (1mk)

7.a)What is the importance of the counter current flow in the exchange of gases in a fish. (2mks)

……..

……..……

……..

b)State **two** ways in which the tracheoles of an insect are adapted to their functions. (2mks)

……..

……

8.List down **four** phenotypic characteristics that have been selected for the production of strains suitable for modern agricultural purposes. (4mks)

9. State the branch of Biology that deals with: (2 marks)

(a) Study of birds

(b) Study of the chemical composition of organisms

.....

10. A certain mammal has no incisors, no canines, 6 molars and 6 premolars on the upper jaw. It has 6 incisors, 2 canines, 6 premolars and 6 molars on the lower jaw.

(a) Write its dental formula (1 mark)

(b) Suggest with reasons the possible mode of feeding of the animal. (2 marks)

.....

11. (a)Some herbaceous plants have very little strengthening tissue yet they remain firm and upright. Give a reason for this observation. (1 mark)

.....

.....

.....

.....

(b) Name the strengthening material in the following tissues. (2 marks)

(i) Collenchyma

.....

(ii) Xylem vessels

.....

12. State **two** functions of Aerenchyma tissue in plants. (2 marks)

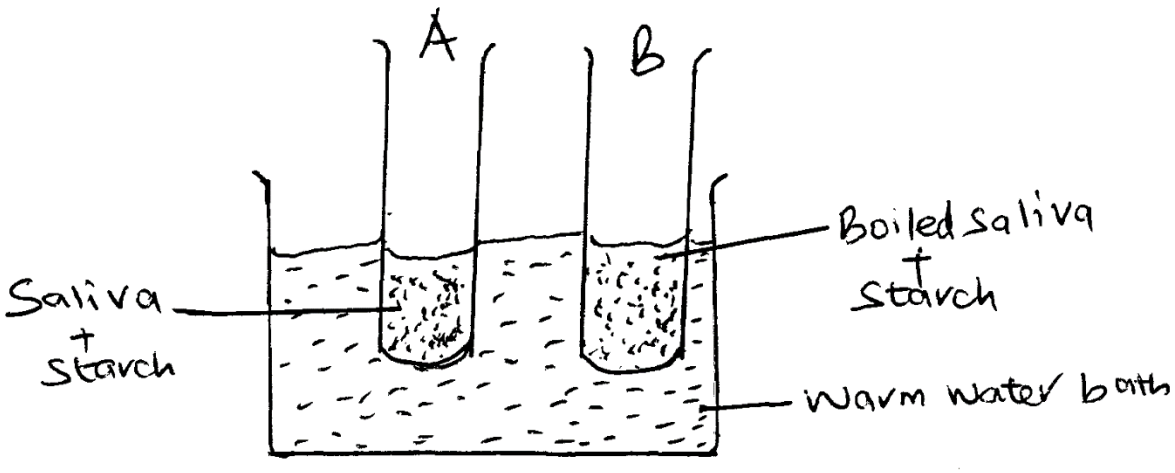
.....

.....

.....

13. A woman gave birth to a child of blood group B+ (B positive). Name two antigens that determined the child's blood group. (2 marks)

14. In an experiment to investigate an aspect of digestion, two test tubes A and B were set up as shown below.



(a) The test tubes were left in the warm water bath for 30 minutes. The contents of the test tubes were tested for starch using Iodine solution.

State the observations in: (2 marks)

Test tube A

.....

.....

Test tube B

.....

.....

(b) Account for the results in (a) above. (2 marks)

.....

.....

.....

B.....

.....

.....

15 Explain each of the following

a) Variegated plants accumulate less food than non-variegated plants under similar conditions.(1mark

b) Most leaves are thin with broad leaf surface. (1mark)

c) State **three** importances of photosynthesis in an ecosystem. (3marks)

16.Wing of an insect, wing of a bird, hand of a man, flipper of a whale, foreleg of a horse are locomotory structures in animals. Using the structures listed above state the ones considered as

a) Homologous structures (1mark)

……...

b)Identify the type of evolution that brings about homologous structures. (1mark)

……..

17. A certain plant was found to have the following features

Parallel venation of leaves

Sheath like petiole

Flower parts in multiple of three

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

……..

b) Suggest the expected arrangement of vascular bundle in the stem of the plant. (1mark)

……

18. Explain the reason for each of the following in flowering plants

i) Wind pollinated flowers produce large number of pollen grains. (1mark)

……

……

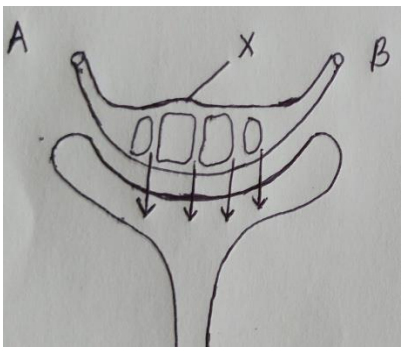
ii)Insect pollinated flowers have small sticky stigmas that an firmly attached to the style. (2marks)

……

……

……

19.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 (2mks)

……

……

……

b) Name one blood component that 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 (2mks)

……

……

20. a) what is seed dormancy (1mk).

……

……

……

b) state two ways in which seed dormancy can be broken (2mks)

……

……

……

21. Explain why several lateral buds sprout when a terminal bud in a young tree is removed. (3mks)

……

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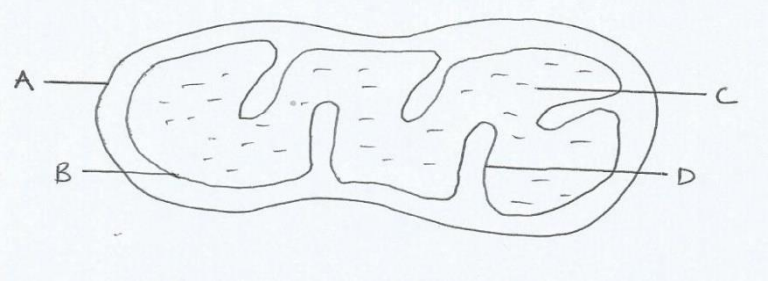
22.Below is a diagram of an organelle that is involved in aerobic respiration.



a) Name the organelle (1mark)

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……..

b) Name the parts labeled;

A…… (1mark)

B……..(1mark)

C……...(1mark)

c) What is the purpose of the in-foding labeled D? (1mark)

d) Give the mechanical compound which is formed in the organelle and forms the immediate source of energy (1mark)

22.State the function of the following parts of a light microscope

a) Clip (1mark)

……

……

b) Eye piece lens (1mark)

……

……

c) When focusing under high power objective lens the coarse adjustment knob should never be used for focusing. Explain (2marks)

……

……

……

23a) Name two defects of the circulatory system in humans. (2marks)

……

……

……

b) Explain two protective functions of mammalian blood.

(3marks)……

……

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……...

Name……. Index No……/…….

School…… Date ……..…

Candidate's Signature……

231/2

BIOLOGY

(THEORY)

Paper 2

Time: 2 Hours

MURANG'A EAST JOINT EXAMS 2021

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

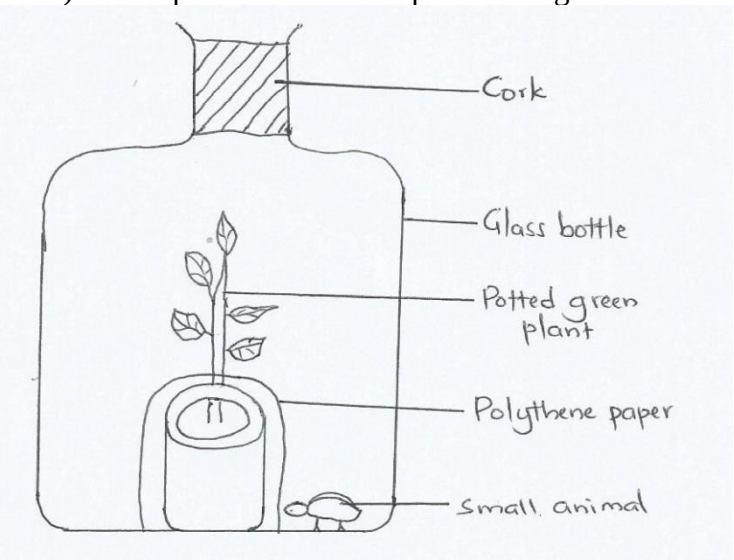
INSTRUCTIONS TO CANDIDATES

- This paper consists of two sections **A** and **B**.
- Answer **ALL** questions in section **A**
- Answer question **6** (compulsory) and either question **7** or **8** in section **B**.

SECTION A (40 marks)

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

1) 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) Explain why it was necessary to apply Vaseline. (1 mark)

……

……

b) Explain why it was necessary to cover the pot with polythene paper. (1 mark)

……

……

c) What was the purpose of including the small animal? (2marks)

……

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……

……

d)i)What would happen to the small animal if the set up was left overnight in darkness? (1mark)

……

……

ii) Account for the answer above (1 mark)

……

……

e)Explain why organisms in phylum Arthropoda die when Vaseline is applied on its thorax. (2marks)

……

……

……

2. (a) In a field study to estimate the population of grasshoppers in the school field of 0.4 km^2, 60 grasshoppers were caught using sweep nets, marked with red paint and released back to the field. The following day students went back with their sweep nets and caught 100 grasshoppers, of which 20 were found to be already marked.

(i) Calculate the population size of grasshoppers in the field. (2 marks)

(ii) Calculate the population density of the grasshoppers in the field. (2 marks)

(iii) What two factors would maintain the population of grasshoppers at the carrying capacity? (2 marks)

……

……

(b) Giving an example, state what is meant by the term symbiosis. (2 marks)

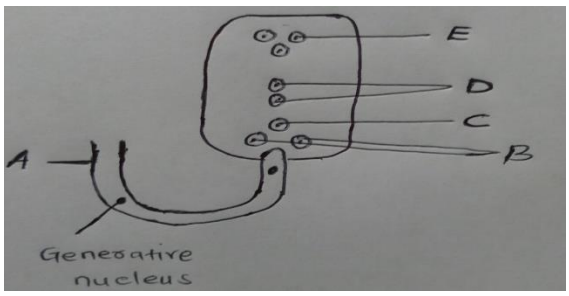
……

……

……

……

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



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

A……
……

B……
……

b) identify the structures labeled in the diagram that will develop into the following after fertilization (2mks)

(i) Embryo

……

Endosperm

……

c) State the ploidy of each of the following nuclei after fertilisation (2mks)

(i)

C……
……

(ii)D……
……

d) Briefly outline the process of double fertilisation in flowering plant (2mks)

……
……
……
……

……

4. In an experiment, a black mouse was mated with a brown mouse; all the off-springs were black. The off-springs grew and were allowed to mate with one another. The total number of (F2) generation off-springs was 96.

a) Using the letter symbols capital letter **B** for the gene of black colour and small **b** for brown colour, Work out the genotype of the F1 generation. (3mrks)

b) From the information above, work out the following for the F2 generation.

i) Genotypic ratio. (2mrks)

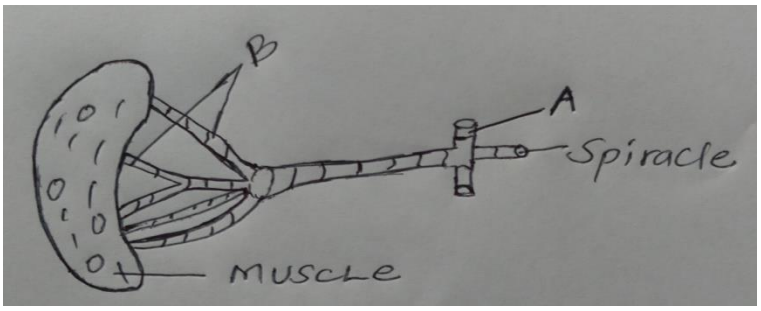
……

ii) Phenotypic ratio. (1mrk)

……

iiii) The total number of brown mice (2mrks)

5. The diagram below shows part of gaseous exchange system in an insect. Study it and answer the questions that follows.



a) What is the structural adaptations of the parts labeled A and B to their functions (2mks)
A……
……
B……
…….

b) Name the parts of the following animals that carry out the same functions as part B above (2mks)
(ii) Tilapia fish

c) Name the structures used for gaseous exchange in plant growing in waterlogged soils (1mk)
……
…….

d) (i) Give two reasons why accumulation of lactic acid during vigorous exercise leads to an increase of heart beat (2mks)

(ii) In what form is oxygen transported from lungs to the tissues (1mk)

SECTION B (40 MARKS)

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

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

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

(a) On the grid provided, plot the quantities of urine and sweat produced against external temperature (7 marks)

(b) At what temperature is the amount of sweat and urine produced equal? (1 mark)

(c) What happens to the amount of sweat produced as the temperature rises? Explain your observation (3 marks)

(d) Explain the observation made on the amount of urine produced. (3 marks)

(e) How are the following parts of the mammalian skin adapted for temperature regulation during cold weather? (6 marks)

Hair

Sweat glands

Blood vessels.....

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

b)Describe blood sugar regulation in mammals. (10marks)

8.a) Describe how urea is formed in the liver cells from excess amino acid (5mks)

b) Describe the roles of hormones in the growth and development in plants (15mks)

NAME: …… ADM NO: .....CLASS……

DATE…….... SIGN…….

231/3

BIOLOGY

PAPER 3

PRACTICAL

TIME: 1 ¾ HOURS

FORM FOUR MURANG'A EAST EXAMINATION- 2021

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

Instructions to candidate

- **Answer ALL questions**
- **You are required to spend the first 15 min of $1^{3}/_{4}$ hours allowed for this paper reading the whole paper before carefully before commencing your work.**
- **Answer must be written in the spaces provided in the question paper**
- **Don't insert additional page /paper**

QUESTIONS	MAXIMUM SCORE	CANDIDATE SCORE
1	13	
2	13	
3	14	
TOTAL	40	

1. You are provided with specimens labelled **A** and **B**. Examine the specimens and answer the questions that follow.

(a) With a reason state the type of germination in each of the specimens. (4 marks)

Specimen **A**. Type of germination: .....

Reason: .....

.....

Specimen **B**. Type of germination: .....

Reason: .....

.....

(b) Draw a well labelled diagram of specimen **B**. (5 marks)

(c) Using observable features only state the class to which each of the specimens belongs. (4 marks)

Specimen **A**. Class: .....

Reason:

Specimen **B**. Class: .....

Reason:

Q2.You are provided with a specimen labeled **T** which is a fruit. Use it to answer the questions that follow.

a) Make a **transverse** section of the specimen **T**. Draw and label at least 3 parts.
6mks

b) With reasons, state the identity of fruit **T.**
Type of fruit.....1mk
Reason 1mk

c) Suggest the possible agent of dispersal and give **two** reasons
Agent 1mk
Reason
2mk

d) What is the placentation of **T**? 1mk

e) Specimen **T** was green in colour before it was treated with a plant hormone. Suggest the plant hormone

.....1mk

3. You are provided with a specimen labeled N. Squeeze the contents of N into the test tube. Add $3cm^3$ of water and shake the contents. Reserve the piece of intestine for question (b)

a)Use the reagents provided to test for the presence of various food substances in N extract. Record your observations in the table below (6mks)

Food substance tested	Procedure	Observation	Conclusion

b)Account for the results obtained in (a) above. (2marks)

c)Cut specimen N along its length to expose the inner surface
(2marks)

i) Compare the inner and outer surface of the specimen. Record your observations.
(2marks)

ii)Account for your observation of the inner surface. (2marks)

MOI GIRLS, KABARAK AND SACHO JOINT MOCKS

MOKASA EVALUATION EXAMINATION

231/1 - BIOLOGY - Paper 1

November - 2020 - 2 Hours

Name: …… Adm. No: ……

Index No.…… Signature …… Date …….

INSTRUCTION TO CANDIDATES

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

FOR EXAMINER'S USE ONLY.

QUESTION	1	2	3	4	5	6	7	8	9
SCORE									

10	11	12	13	14	15	16	17	18	19

20	21	22	23	24	25	26

Answer all the questions in the spaces provided.

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

……
……
……

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

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

……
……
……
……

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

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

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

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

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……

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

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

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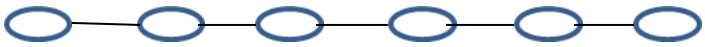
……

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



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

Circles ……

Lines ……

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

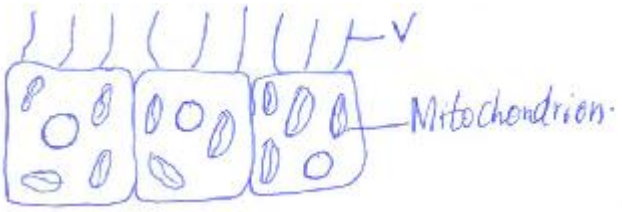
Drawing:

Products ……

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

……
……
……
……

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



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

……

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

……

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

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……

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

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……
……

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

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……

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

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

……

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

(i) Blood group A ……

(ii) Blood group AB ……

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

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……
……

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

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

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

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

……

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

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……
……

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

……

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

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……

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

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……
……

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

……
……

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

……
……

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

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……
……

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

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……
……

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

……
……

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

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

……

……

……

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

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

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

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Name:……. Index Number:….. …….……..……

Adm. No…….. Class: …….. Candidate's Signature: …….

Date: ……..

231/2
BIOLOGY
Theory
Paper 2
March/April, 2020
Time: 2 Hours

MOKASA JOINT EVALUATION EXAMS

MOKASA 1
231/2
Biology
Paper 2
March/April, 2020

Instructions To Candidates

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

FOR EXAMINER'S USE ONLY

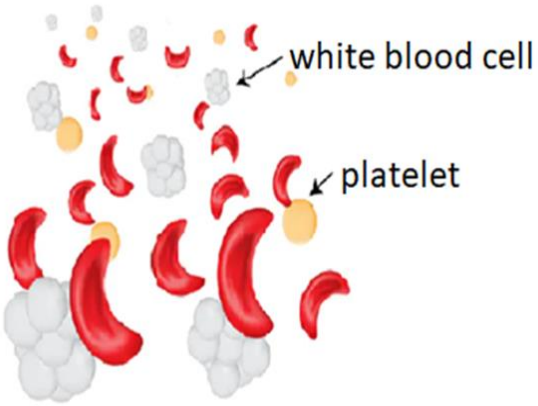
Section	Question	Maximum score	Candidate's score
A	1		
	2		
	3		
	4		
	5		
B	6		
	7	20	
	8	20	
TOTAL SCORE		**80**	

SECTION A: (40 MARKS)

Answer all questions in the spaces provided.

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

PERSON A



PERSON B

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

……

……

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

……

……

……

……

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

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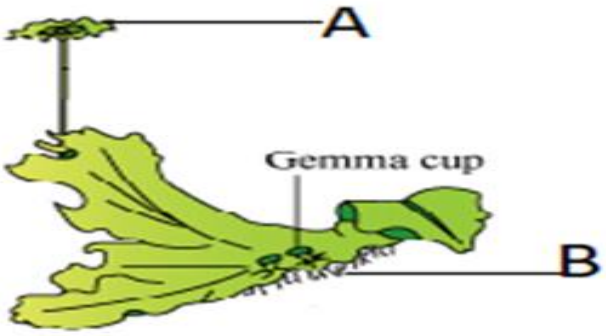
2. Study the diagram below and answer the questions that follow.



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

Division: ……

……

Reasons...……

……

b) Name the function of the parts labelled

A …… (1 mark)

B …… (1 mark)

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

……

……

……

……

……

3. A biologist carried out a study to investigate the growth of a certain species of herbivorous fish and the factors influencing plant and animal life in four lakes A, B, C and D. The lakes were located in the same geographical area.
Two of the lakes A and B were found to contain hard water due to the presence of high content of calcium salts. The mean body length of 2 year old fish, amount of plant life and invertebrates biomass in each lake were determined. The data was as shown in the table below.

Lakes	Means of body length (cm)	Type of water	Amount of plant life	Invertebrate biomas g/cm^3			
				Insects	Snails	Crabs	Worms
A	31.2	Hard	1050	11	300	10	180
B	28.6	Hard	950	72	100	9	90
C	18.4	Soft	1.2	79	0	2	20
D	16.3	Soft	0.5	99	0	1	10

a) Describe the procedure that may have been used to determine the mean body length of the fish. (4 marks)

……

……

……

……

b) What are the likely reasons for the difference in mean body length of the fish living in lakes A and D? (2 marks)

……

……

……

……

c) Explain why primary producers have a higher biomass (2 marks)

……

……

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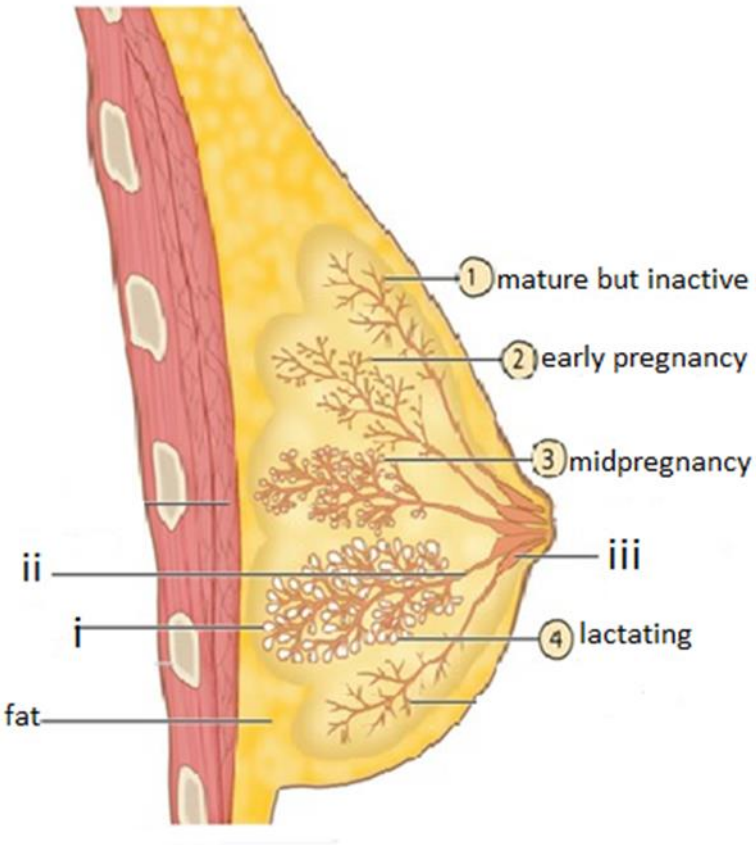
……

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



a) Name the parts labelled;

(i)…… (1 mark)

(ii)…… (1 mark)

(iii)…… (1 mark)

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

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

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

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

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

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SECTION B: (40 MARKS)

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

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

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

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

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

……

……..

b) Account for the following changes in the weight.

(i) Percentage positive change (4marks)

(ii) Percentage negative change (3 marks)

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

……

……

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

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

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

b) Explain the following evidences of organic evolution.

(i) Comparative anatomy (5 marks)

(ii) Geographical distribution (3 marks)

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

a) Digestive system

b) Circulatory system

c) Respiratory system

d) Nervous system

e) Hormonal system

NAME…… INDEX NO……/……

SCHOOL…… CANDIDATES SIGNATURE……

ADMISSION NUMBER……. CLASS……

231/3
BIOLOGY
(PRACTICALS)
Paper 3
November, 2020
$1^{3}/_{4}$ Hours

MOKASA EXAMINATIONS 2020

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

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided in the question paper.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $1^{3}/_{4}$ Hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

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

This paper consists of 7 Printed pages.
Candidates should check the question paper to ensure that all the
Papers are printed as indicated and no questions are missing

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

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

Specimen	Volume of foam
Crushed cube A	

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

……

……

……

……

……

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

FOOD SUBSTANCE	PROCEDURE	OBSERVATION	CONCLUSION

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

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

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

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

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

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

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

Test tube	PROCEDURE	OBSERVATION	CONCLUSION
F			

G			
H			
K			

(a) Account for the observation in:

(i) Test tube G. (2 marks)

……

……

……

……

……

(ii) Test tube H. (1 mark)

……

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……

(iii) Test tube K. (2 marks)

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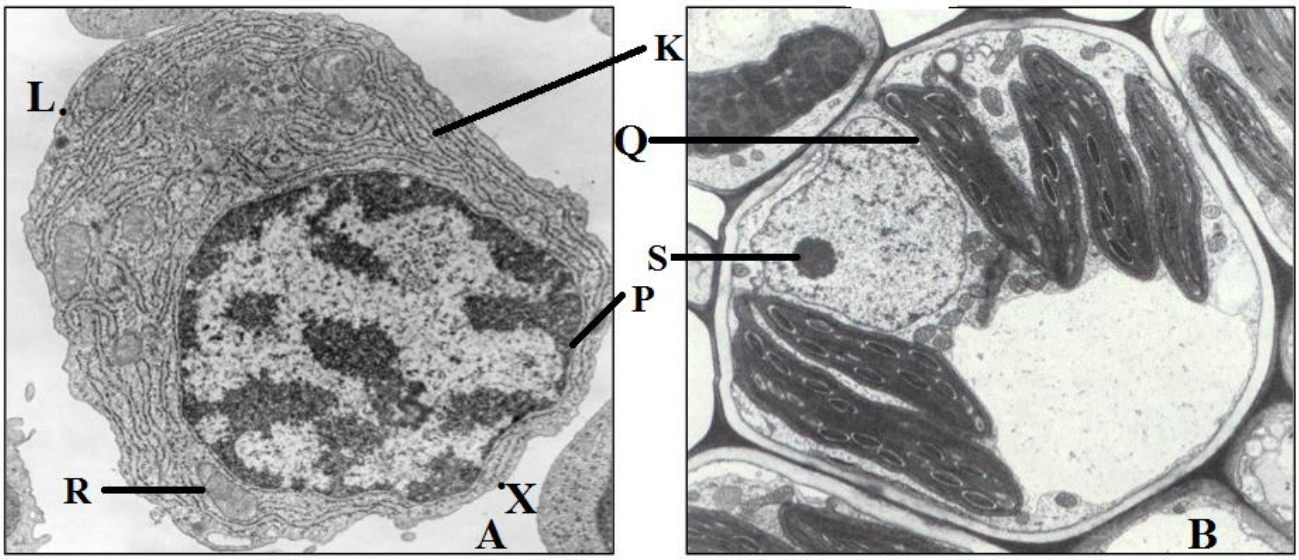
……

2. Use the illustration below to answer questions



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

(ii) B. (1 mark)

……

Reason. (1 mark)

……

(b) Give the functions of the parts labeled:

(i) R. (1 mark)

……..

(ii) S. (1 mark)

……..

(b) Name the parts labeled:

(iii) Q. (1 mark)

……..

(iii) P. (1 mark)

……..

(iv) K. (1 mark)

……..

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

……

……

……

……

……

……

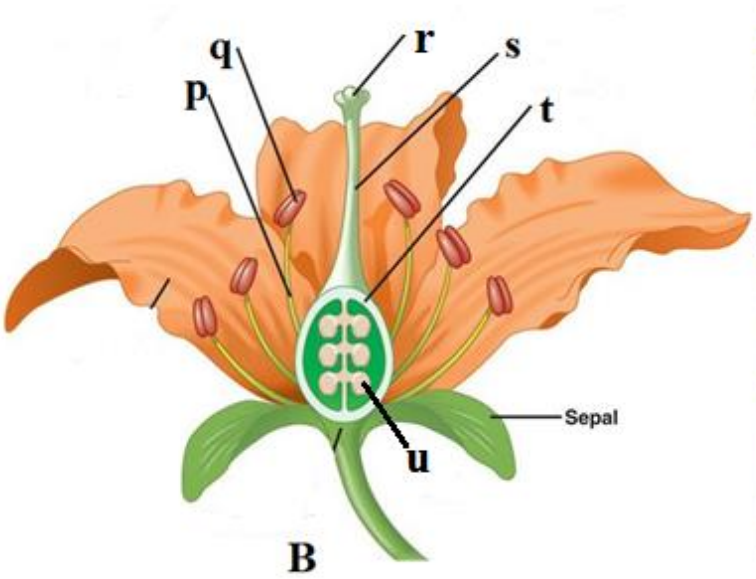
(e) Explain why cell A and B are believed to have a common ancestry. (2 marks)

……

……

……

3. Use the photographs below to answer questions



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

(i) A1. (1 mark)

……..

(ii) A2 (1 mark)

……..

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

…….

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

……

……

……

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

(i) p. (1 mark)

……..

(ii) r. (1 mark)

……..

(iii) s. (1 mark)

……

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

……

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

(ii) t. (1 mark)

……..

(iii) u. (1 mark)

……

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

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

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

Name: .....Index no: .....

School: .....Candidate's sign: .....

Date: .....Class: .....

231/1

BIOLOGY

PAPER 1

DECEMBER 2020

TIME: 2 HOURS

SUNSHINE, KENYA HIGH, LIGHT ACADEMY, LENANA SCHOOL AND MOI GIRLS JOINT MOCKS

SUKELLEMO JET

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

BIOLOGY

Paper 1 Time: 2

INSTRUCTIONS TO CANDIDATES:

- *Write your **name**, **name of your school** and **index number** in the spaces provided.*
- *Sign and write date of examination in the spaces provided above.*
- *Answer all the questions in the spaces provided.*
- *This paper consists of **12** printed pages. Candidates should check to ascertain that all the pages are printed as indicated and that no questions are missing.*

For Examiner's Use Only:

QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE

1- 22	80	

1. Name the branch of biology that deals with the of the following

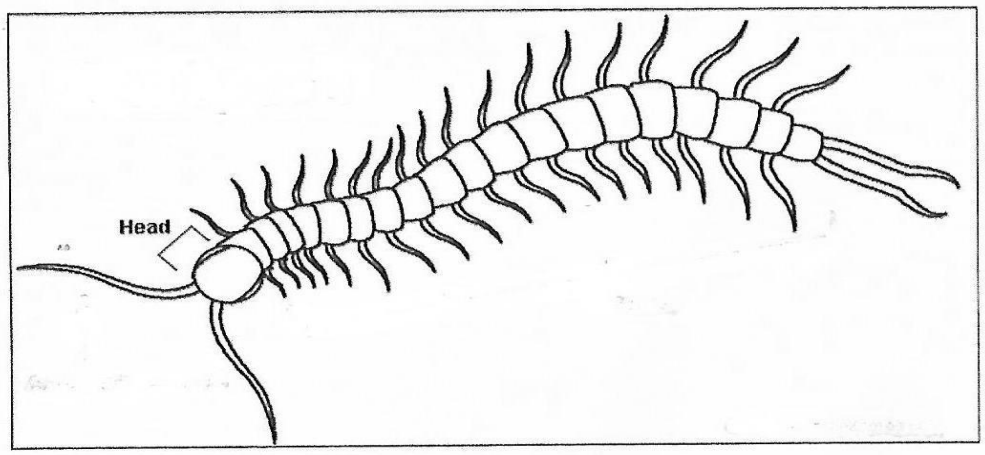
(a) Study of cockroaches, housefly and locusts. (1 mark)

.....

(b) Study of yeast, mushroom, penicillium and toadstools. (1 mark)

.....

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



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

Class.....

Reasons (2 marks)

.....

.....

3. Some sorghum seeds were soaked in water for two days. They were then broken into small pieces and placed on the surface of agar containing starch. After two days, it was found that the agar no longer contained starch.

(a) How was the test for starch in the agar carried out? (1 mark)

.....

.....

(b) Explain why there was no starch in the agar after two days. (2 marks)

.....

.....

(c) Why were the sorghum seeds broken into smaller pieces? (1 mark)

.....

.....

(d) State the observation made when the seeds were soaked in boiling water. (1 mark)

.....

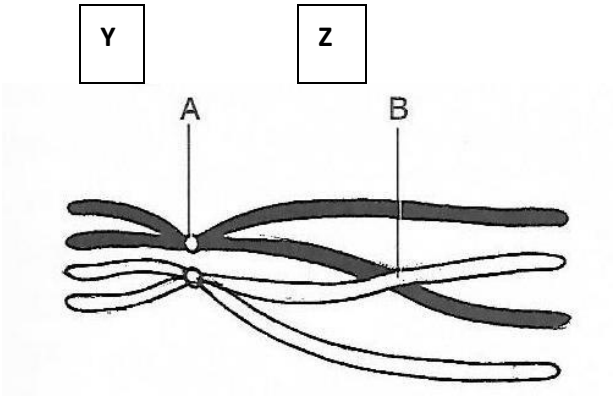
4. Under certain conditions, the carbon(IV) oxide concentration in the blood of a mammal rises above normal level. State two physiological changes that occur in the body to lower the carbon(IV) oxide back to normal. (2 marks)

.....

.....

.....

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



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

.....

.....

.....

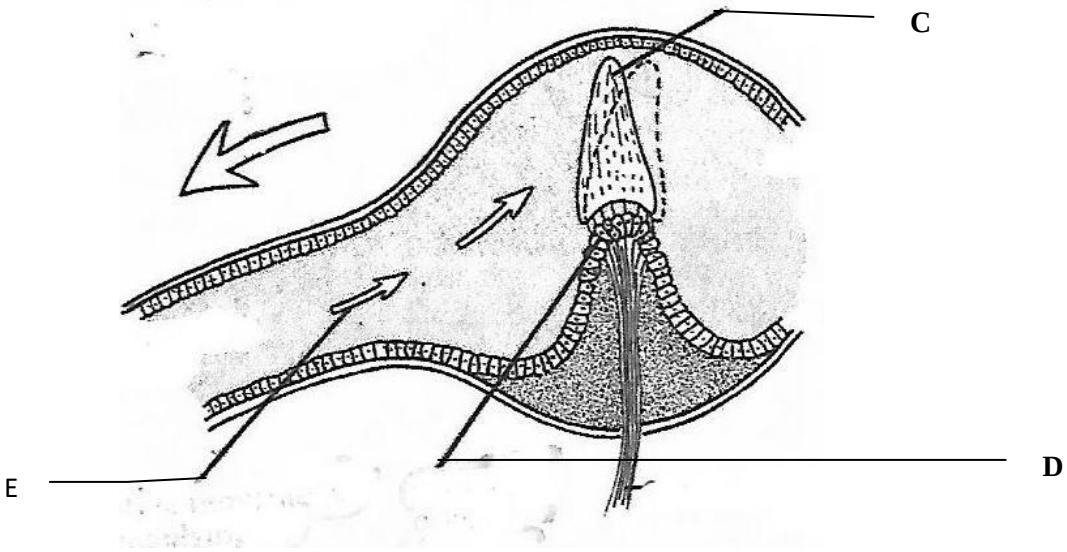
(b) Which cell division does the above phenomenon occur? (1 mark)

.....

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

.....

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



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

.....

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

.....

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

.....

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

C.....

D.....

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

.....

.....

.....

.....

8. (a) A plastic container fill of water was stoppered using a piece of stem obtained from a young maize plant whose bark had been peeled off. The next day it was noted that the stopper closed the container very tightly. Explain. (3 marks)

.....

.....

.....

.....

(b) (i) State the observation made when a similar experiment was set up but using boiled piece of maize stem obtained from a young maize plant whose bark had been peeled off. (1 mark)

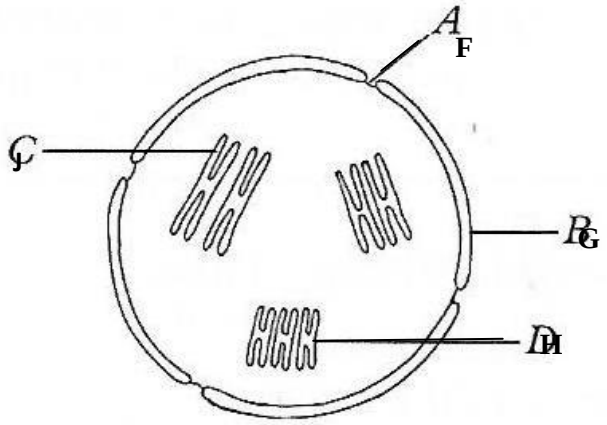
.....

(ii) Explain the observation stated in (b) (i) above. (1 mark)

.....

.....

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



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

F .....

J.....

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

.....

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

.....

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

(1 mark)

.....

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

.....

.....

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

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

.....

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

.....

.....

(c) State the significance of the algae in the pond? (2 marks)

.....

.....

.....

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

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

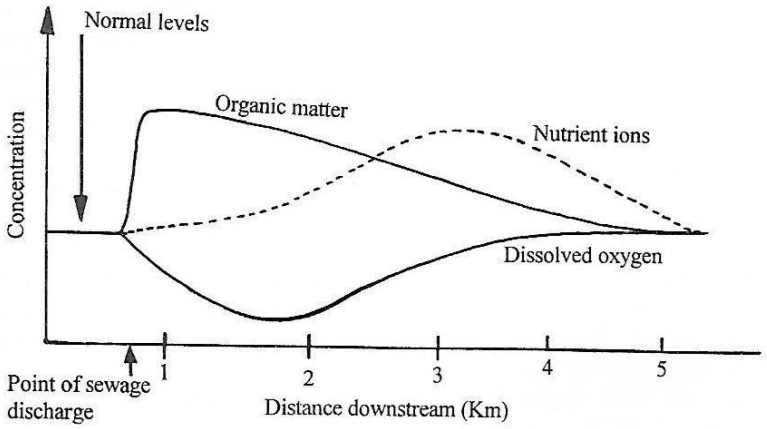
.....

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

.....

.....

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



(a) Account for the changes in concentration of:

(i) Organic matter. (1 mark)

.....

.....

(ii) Nutrient ions. (1 mark)

.....

.....

(ii) Dissolve oxygen. (1 mark)

.....

.....

(b) Describe the changes expected in:

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

.....

.....

(ii) Water plants and photosynthetic algae about one and half kilometres downstream from the point of sewage discharge. (1 mark)

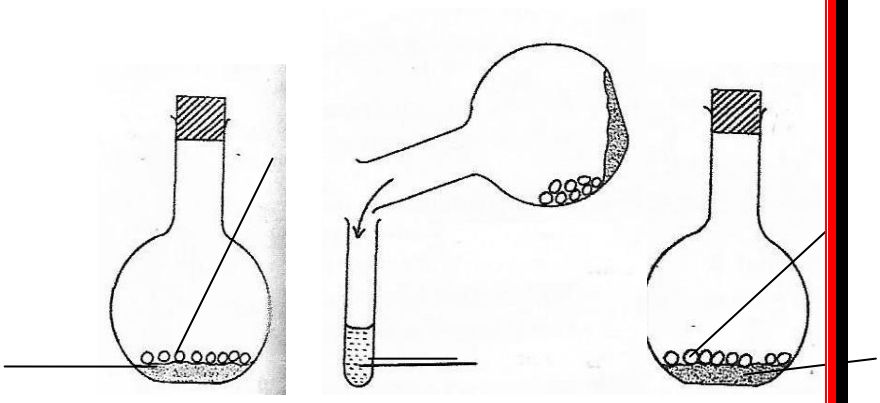
.....

.....

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

(2 marks

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



M **N** **T**

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

.....

..... (b)

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

M

.....

.....

N

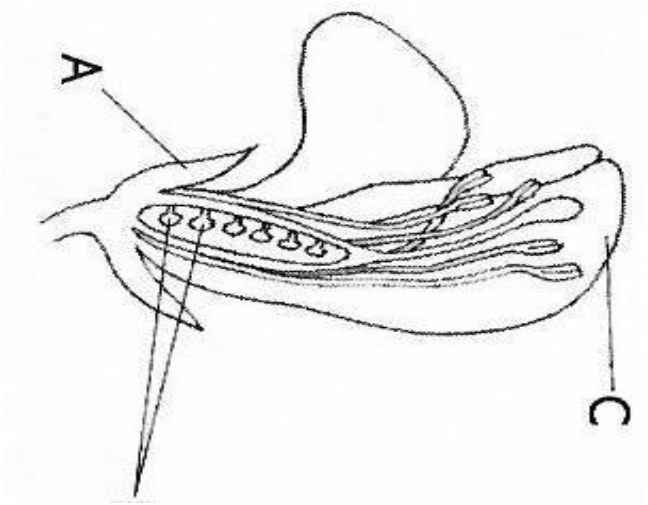
.....

.....

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

.....

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



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

.....

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

.....

(b) State the placetation. (1 mark)

.....

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

.....

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

.....

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

.....

.....

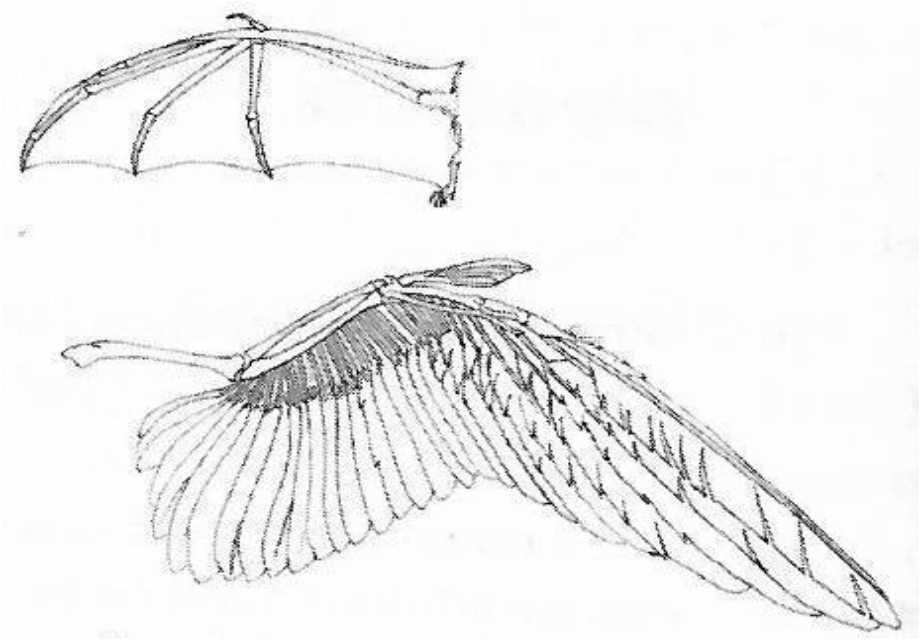
.....

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

.....

.....

19. The following diagrams represent different animal structures.



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

.....

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

.....

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

.....

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

.....

.....

.....

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

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

.....

.....

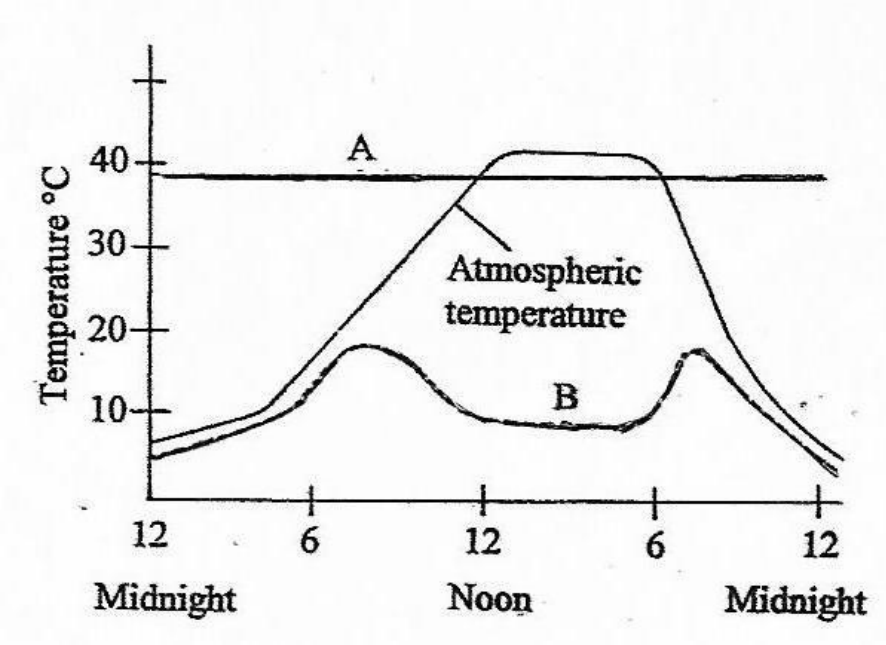
(b) What antibodies are present in the blood? (1 mark)

.....

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

.....

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



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

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

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

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

NAME …… **INDEX NO** ……..……..

SCHOOL …… **SIGNATURE** ……...……...…….

DATE …….……..

231/2
BIOLOGY
PAPER 2
(THEORY)
DECEMBER, 2020
TIME: 2 HOURS

SUKELLEMO JOINT EVALUATION TEST, 2020

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

INSTRUCTIONS TO CANDIDATES

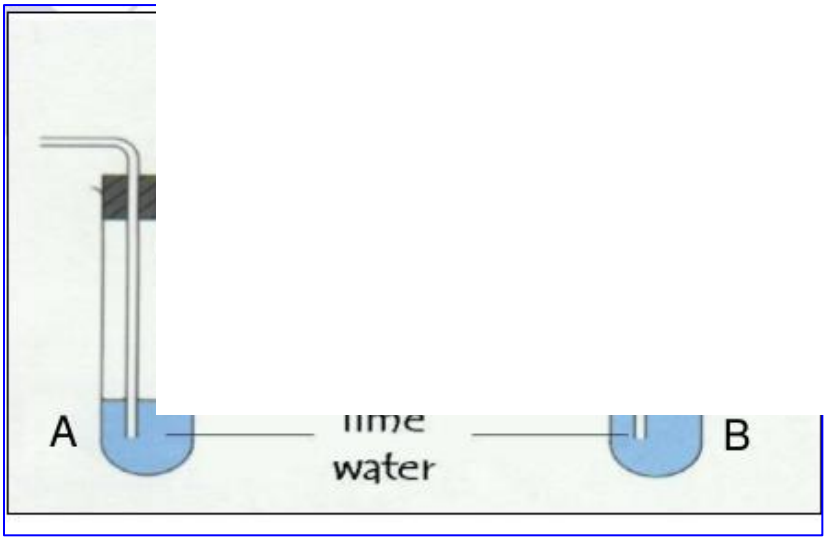
- Write your name and Index Number in the spaces provided above.
- This paper consists of **two** sections. Section **A** and section **B.**
- Answer **ALL** questions in section **A** in the spaces provided. In section **B** answer question **6** (compulsory) and either question **7** or **8** in the spaces provided after question 8.
- This paper consists of 10 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
Answer all the Questions in this section.

1. The diagram below illustrates an experimental set up to compare relative amounts of a gas in inhaled air and exhaled air.



a) On the diagram, show with arrows the direction of movement of inhaled and exhaled air into and out of the mouth. (2mks).

b) What is the name of the gas being investigated in the experiment (1mk)

……

……

c) What will happen to the lime water in. (2mks)

Boiling tube A?

……

……

Boiling tube B?

……

……

d) Explain the observations made in (c) above. (3mks).

……

……

……

……

……

2. A human gene which is Y-linked controls premature baldness. One allele leads to normal hair pattern while the other produces premature baldness

(a) What are alleles? (1mark)

……

……...

b) If a man with premature baldness marries, work-out the phenotypes of his children. (Use letter R to represent gene for premature baldness). (4 marks)

c) Explain why this trait is not observed in females (2marks)

……

……

……

……

d) Give one other trait in man that is Y—linked (1mark)

……

……

3. a) What is active transport? (1mk)

……

……

……

(b) State three factors that increase the rate of active transport. (3mks)

……

……

……

……

(c) Give two roles of osmosis in animals. (2mk)

……

……

……

……

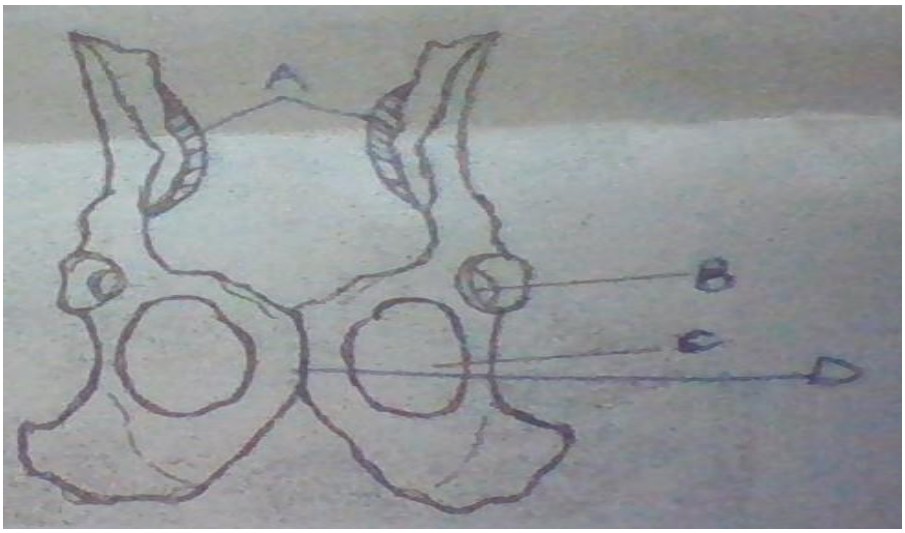
(d) What would happen if a plant cell is placed in a hypotonic solution (2mks)

……

……

……

4. The diagram below shows two fused bones of a mammal.



(a) Identify the fused bones. (1mk)

……..

(b) Name:

i) The bone that articulates at the point labelled A. (1mk)

……

……

ii) The structure labelled B. (1mk)

……

……

(c) State the type of joint formed at structure B. (1mk)

……

……

(d) (i) Name: the structure labelled C (1mk)

……..

ii) State two functions of the structure named in d(i) above (2 mks)

……

……

(e) i) Name the structure labelled D (1mk)

……

ii) State what happens to the structure during childbirth. (1mk)

……

5. Use the diagram below to answer the questions that follow;

(a) Name the class the plant belongs to. (1mk)

……

(b) Give three OBSERVABLE characteristics that place the plant to the class named in (a)above (3mks)

……

……

……

……

(c) If a cross section was done on the young stem, draw and label the section observed. (3mks)

SECTION B (40 MARKS)

Answer question 6 (compulsory) and either 7 or 8

6 .In an ecological study, a grasshopper population and that of crows was estimated in a certain grassland area over a period of one year. The results are as shown in the table below.

Months	*J*	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*0*	*N*	*D*
Number of adult grasshoppers x 10_2	*90*	*20*	*11*	*25*	*2500*	*1652*	*120*	*15*	*10*	*35*	*192*	*456*
Number of crows	*4*	*2*	*0*	*1*	*8*	*22*	*7*	*2*	*1*	*1*	*5*	*15*
Amount of rainfall	*20*	*0*	*55*	*350*	*520*	*350*	*12*	*10*	*25*	*190*	*256*	*350*

(a) (i) What is the relationship between the rainfall and grasshopper population?(1 mark)

……

……

……

……

(ii) Account for the relationship stated in a (i) above. (3 marks)

……

……

……

……

(b) Explain the relationship between the grasshopper population and that of the crows. (3 marks)

……

……

……

(c) If the data was used in the construction of pyramid of numbers, what would be the trophic of;

(3 marks)

(i) Grasshoppers ……

(ii) Crows ……

(iii) The grass in the study area ……

(d) If the area studied was one square kilometer, state:

(i) one method that could have been used to estimate the crow population. (1 mark)

……

(ii) One method that could have been used to estimate the grasshopper population.(1mark)

……

(e) Suggest what would happen f a predator for grasshoppers entered the study area.

(2 marks)

……

……

……

……

(f) What is meant by the term carrying capacity? (1 mark)

……

……

……

(g) Why would the carrying capacity of wild animals in a woodland grassland be higher than that of cattle?

(2 marks)

(h) What is an ecosystem? (3 marks)

7. Describe how water from the soil reaches the leaves of a tall tree and eventually to the atmosphere.

(20mks)

8. Explain how the human alimentary canal is adapted to perform its functions. (20mks).

NAME……CLASS……. INDEX No……

Candidates signature……

231/3

Biology

Paper 3

(Practical)

Time: 1 3/4 *HOURS*

SUKELLEMMO JOINT MOCK 2020

Instructions to Candidates

a) Answer ALL the three questions in the spaces provided.

b) Spend the first 15 minutes of the 1 hour & 45 minutes to read through the paper carefully before commencing your work.

c) One may be penalized for recording irrelevant information and for incorrect spelling, particularly of *technical* terms.

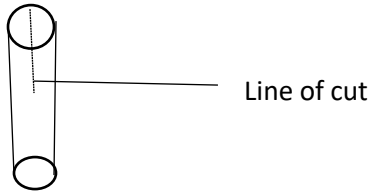
d) **Additional pages must not be inserted.**

For Examiner's Use Only

QUESTION	Maximum Score	Candidate's Score
1	12	
2	15	
3	13	

- **This paper consists of 7 printed pages.**
- **Candidates should check the question paper to ensure that all the pages are printed as indicated and no question is missing.**

1. You are provided with two pieces of plant material labelled specimen D. using a scalpel cut a longitudinal section half way through the middle of each piece as shown in the diagram below.



Place one piece in solution labelled L_1 and the other piece in the solution labelled L_2. Allow the set up to stand for 30 minutes.

(i) Record your observation (2 marks)

L_1……

L_2……....

(b) Examine the pieces.

(i) Record other observations besides those made in (a) (i) above.
(3marks)

L_1……

L_2……

(ii) Account for the observation in (a) (i) above.
(5 marks)

……

……

……

……

……

……

……

(ii) Account for the observation in (b) (i) above. (3marks)

……

……

……

2. You are provided with photographs of specimen M and N. Examine them.

M

N

a) Identify the bones. (2marks)

M ……

N……..

b) Name the parts labeled X and Y. (2marks)

X…….....

Y…….

c) State **three** significance of the part labelled Y. (3 marks) Y

(i).....……

(ii)……

(iii) ……..

d) Calculate the actual size of specimen labelled M. (Show your working).
(3marks)

……

……

……

……

……

e) Name the part of the mammalian body from where the specimens were obtained. (1mark)

……

f) State with reasons the type of joint formed at the proximal and distal end of M (4marks)

Proximal end …….

Reason…… Distal

end……..

Reason……

3. a) The photographs below are for specimen labelled P,Q and R.

P

Q

(i) State with a reason the class to which specimens P belongs. (3 marks)

P ……..

Reason ……

(ii) What type of germination is exhibited by Q? (2marks)

Q ……

Give a reason for your answer.

……

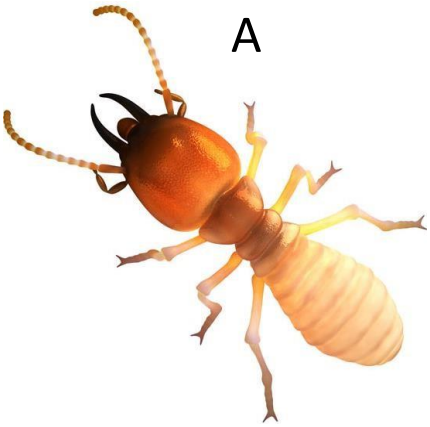
(iii) Name the parts labelled U and V on the photographs above. (2marks)

U …….

V……..

3. (b) The diagrams below shows the photographs of specimens A and B

A



B

(b) (i) Using observable features only, state the class to which the specimen in photographs A belongs. (1mark)

……

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

b) (iii) State the habitat in which the specimen in photograph B is found. (1mark)

……..

b) (IV) Identify the stage of development of the specimen in photograph B. (1mark)

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

……

MOI TEA GIRLS,MARY MOUNT, LITEIN BOYS,CHEMELIL ACADEMY

MOMALICHE

.

Name…… …… Index No:…….

Signature ……..…….

BIOLOGY Date: ……**….**

231/1
Biology
Paper 1
2 hours

INSTRUCTIONS TO CANDIDATES

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

FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidate's Score
1-31	80	

This paper consists of 7 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missi

1. What is meant by the term sex linkage. (1mk)

   ……

2. Part of one strand of DNA molecule was found to have the following sequence

   G-C-C- G – A – T- T – T – A – C – G – G

   What is the sequence

   (i) of the complimentary DNA strand? (1mk)

   ……

   (ii) On a m-RNA strand copied from this DNA portion? (1mk)

   ……

3. State two regions in a plant where the end products of photosynthesis are translocated to? (2mks

   ……

   ……

   ……

4. With reference to circulatory system only give **two** reasons why birds and mammals are more active compared to other organisms? (2mks)

   ……

   ……

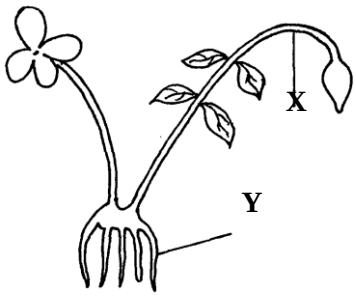
5. (a) What **three** characteristics are used to divide the phylum Arthropoda into classes? (3mks)

   ……

   ……

   ……

   (b) The diagram below shows an organisms from a division in Kingdom plantae. Study it and answer the questions that follow.



   (i) Identify the division from which the plant was obtained. (1mk)

   ……

   (ii) Name the parts labelled **X** and **Y** (2mks)

   X……..

   Y……

6. What is the relationship between a genus and a species? (1mk)

……

……

7. A drawing of 3 cm was made of a giant spider whose actual length was 7cm. calculate the magnification of the drawing? (3mks)

8. Explain why osmosis is described as a special type of diffusion? (1mk)

……

……

9. The following table shows the estimated number of organisms recorded in a dam.

Organisms	**Number**
Small fish	**3500**
Microscopic algae	**12000**
Crocodiles	**100**
Large fish	**950**
Mosquito larvae	**8900**

(a) Construct a possible food chain for the dam? (1mk)

(b) Construct a pyramid of numbers for the given data? (1mk)

(c) Explain the shape of pyramid obtained? (2mks)

……

……

10. (a) Explain why leaves of most plants are thin and broad. (2mks)

……

……

(b) State the function of the following enzymes during digestion in the stomach?

(i) Pepsin (1mk)

……

(ii)Renin (1mk)

……

11. Explain the following:

(i) Respiratory surface must be moist? (1mk)

……

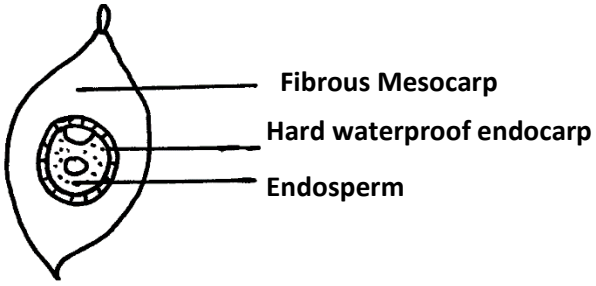
(ii) Respiratory surface must be thin (1mk)

……

(iii) Palisade cells are cylindrical shaped and arranged with long axis perpendicular to the leaf surface. (1mk)

……

12.The diagram below represents the vertical section of a fruit.



(a) Suggest the possible agent of dispersal of this fruit. (1mk)

……

……

(b) Explain **two** observable features that adapt the fruit to its mode of dispersal. (2 mks)

……

……

13.Explain why the body temperature of a healthy person rises slightly during humid days? (2mks)

……..

……

14(a) (i) Name the respiratory surface in insects. (1mk)

……

(ii)State any **one** feature that adapts the structure named in a(i) above to its function. (1mk)……

(b) Why are the fish gills highly vascularized? (1mk)

……

……

15State the function of the following organelles:

(i) Granulated Endoplasmic reticulum (1mk)

……

(ii) Nucleolus (1mk)

……

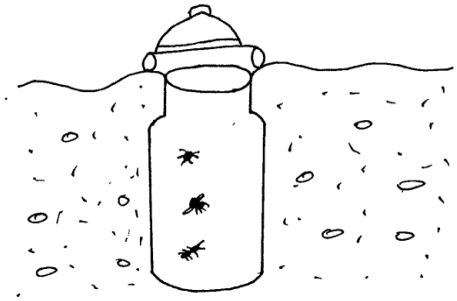
16 State **two** gaseous exchange sites in plants? (2mks)

……

……

……

17 The diagram below shows an apparatus used during collection of specimen in biological study.



(a) Identify the apparatus? (1mk)

……

(b) What is the use of the apparatus named above? (1mk)

……

18 List **three** limitations of fossil records as an evidence of organic evolution? (3mks)

……

……

……

19 Distinguish between enzyme co-factors and co-enzymes? (2mks)

……

……

20 Give **two** reasons for the rapid growth during the exponential phase of growth curve? (2mks)

……

……

……

21 Give **two** reasons why *Carolus Linneaus* preferred the use of latin language in the scientific naming of living organisms. (2mks)

……

……

22 State **three** roles played by active transport in living organisms. (3mks)

……

……

……

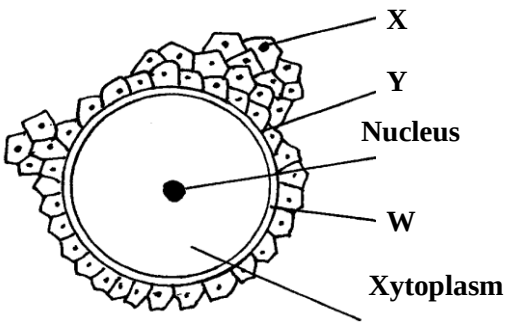
23 List **three** factors affecting the rate of respiration? (3mks)

……

……

……

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



(a) Identify the cell (1mk)

……

……

……

(b) Label the parts **X,Y** and **W** (3mks)

X……

Y……

W……

25 Explain why it is becoming more difficult to treat malaria using chloroquine? (2mks)

26 State **two** ways by which the ileum is adapted for absorption of food materials? (2mks)

27 Name **two** processes that contribute to variation during gamete formation?

(2mks)……

3. Damage to the mammalian liver may lead to indigestion of fats. Explain this observation. (2 mks)

……

……

29.Name the disease of blood characterized by

i) Abnormally large number of white blood cells. (1 mk)

……

ii) Cresent-shaped haemoglobin instead of the normal biconcave shape. (1 mk)

……

30. During a strenuous exercise the chemical process represented by the equation below takes place in the human muscle cells.

$C_6H_{12}O_6 \longrightarrow 2CH_3CH(OH)COOH+150KJ$

(Substance X)

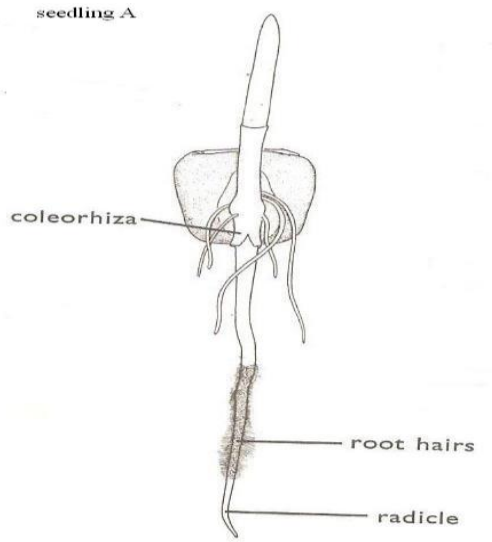
a) Name the process represented above . (1 mk)

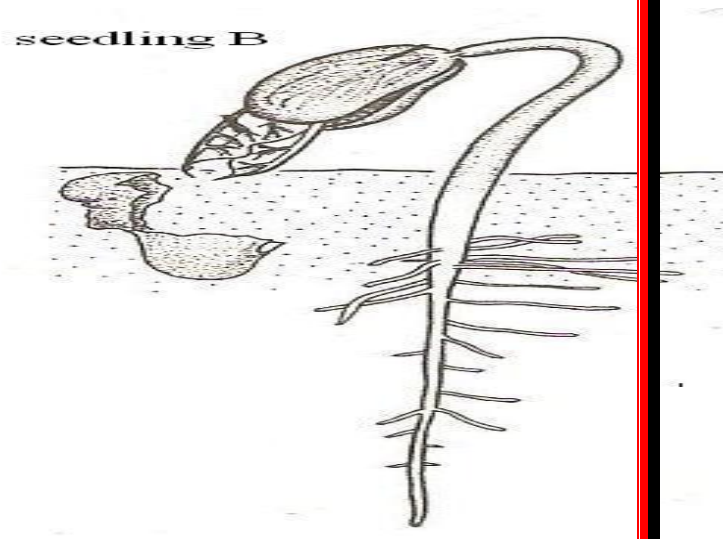
……

b)Name substance X …….....

(1mk)

31. The diagram below represents a stage of growth in two different seeds.





[a] Identify the type of germination exhibited by seedlings A and B. [2 marks]

Seedling

A……

Seedling

B……

[b] State the role of oxygen during germination. [1 mark]

……

[c] Account for the loss of weight in cotyledons in germinating seeds. [1 mark]

……

……

[d] (i) State the role of juvenile hormone during metamorphosis in insects. [1 mark]

……

……

(ii) Name the glands that secrete juvenile hormone [1mark]

MOMALICHE

BIOLOGY PAPER 2
(THEORY)
MARCH 2020
TIME: 2 HOURS

NAME: .....CLASS: .....ADM NO: .....

SIGNATURE.....DATE.....

INSTRUCTIONS TO CANDIDATES:-

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

For Examiner's Use Only:

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

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

SECTION A

1. An investigation was carried out to study the effects of the concentration of sucrose solutions on pieces of tulip stem 44mm in length. The pieces were placed in different concentrations of sucrose solutions and measured after two hours of immersion. The results are shown in the table below.

Sucrose concentration (moles per litre)	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Length after 2 hours (mm)	50	48	46	44	42	42	42

a. Explain the effect of the 0.2 moles per litre sucrose solution on the length of the pieces of the tulip stem. (3mks).

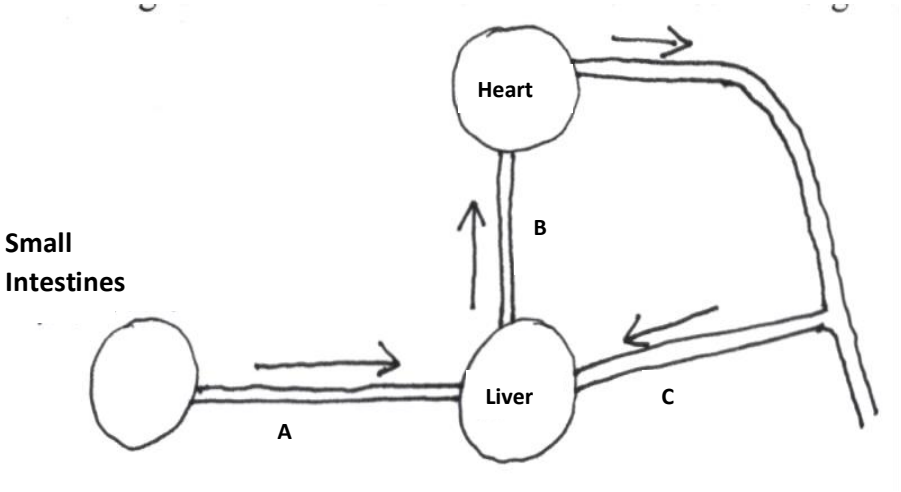
b. Use information from the table to predict the concentration of a sucrose solution isotonic to the cells in the tulip stem.
(1mk).

c. (i) Give the term which would be used to describe the cells in the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre.
(1mk)

ii. Draw the appearance of a cell from the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre.
(2mks).

d. State one role of the process being investigated in plants.
(1mk)

2. The diagram below illustrates circulation in certain organs of the mammalian body.



a) Identify the blood vessels represented by A, B and C. (3mks)

A…….

B…….

C…….

b) Explain why blood from the small intestines goes to the liver before it goes to any other organ of the body. (2mks

……

……

……

c) Compare the blood in vessels B and C. (1mk)

……

……

d) Outline how a glucose molecule in vessel A finally reaches the heart. (2mks)

……

……

……

3. Polydactyl is a genetic disorder in which people inherit an extra digit. Polydactyl is caused by a dominant allele (B). The table below describes the different genotypes for polydactyl.

a) Complete the table below by giving the correct genotype, alleles of each genotype and the expected number of fingers per hand. (4mks)

Genotype	Alleles	Expected number of digits per hand.
Homozygous dominant		Six
	bb	
Heterozygous.	Bb	

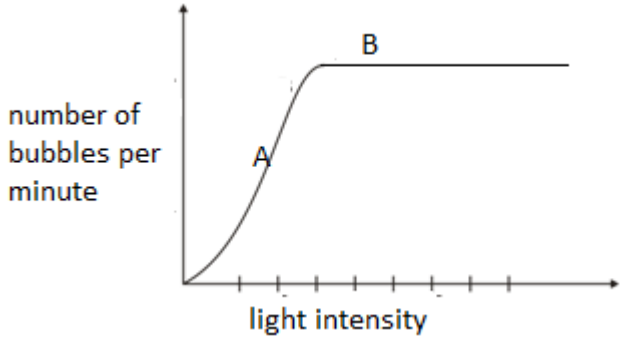
b) The table below shows results of marriages between various parents. Complete the table by writing the probability of each marriage producing a child with polydactyl. One has been done for you.

(2mks)

Parental genotypes.	Probability of child with polydactyl
Bb X BB	
Bb X bb	0.5
Bb X Bb	

c) State the two types of variation (2mks)

3. Cuban pond weed (*Elodea cubiensis*) is a common water plant that produces tiny air bubbles of oxygen during photosynthesis. The number of bubbles produced per minute indicates the rate of photosynthesis. The graph shows how the rate of photosynthesis in the pond weed relates to light intensity.



a). write the equation to account for the air bubbles. (1mk)

b). Name the factor that affects photosynthesis at point A. Explain. (2mks)

c). Explain why the rate of photosynthesis does not increase any further at high light intensity.(point B) (2mks)

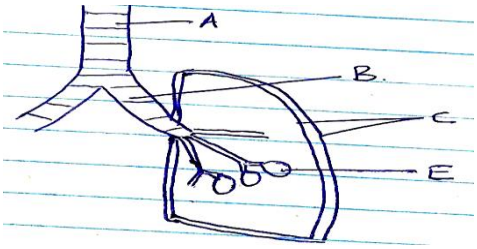
d). Explain the role of the following in photosynthesis.

i) Chlorophyll. (1mk)

ii) Water. (1mk)

e). Name one product of the light stage of photosynthesis used in the dark stage of photosynthesis. (1mk)

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



a) Name the part labeled A and B (2marks)

b) State the function of the part labeled C (2marks)

c) How is he part labeled E adapted to its function (2marks)

d) Identify the structure that perform the same function as one illustrated above in (2marks)
i) Amoeba

ii) Fish

SECTION B (40 Marks)

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

6. The pressure in the flow of blood in a mammal was determined at two different vessels; A and B. The data was taken within a period of 1 minute and was presented as follows.

Time in seconds	Blood pressure in	
	Vessel A	Vessel B
0	160	320
10	165	360
20	170	320
30	180	400
40	170	360
50	160	320
60	160	360

(a) Plot the graph of blood pressure in both vessels against time on the same axis. (7 marks)

(b) Describe the trend of each curve. (2 marks)

……

……

……

……

(c) (I) From the graph, suggest the possible identity for:

i) Blood vessel A. (1 mark)

……

ii) Blood vessel B. (1 mark)

……..

II) Give reasons for your answer in (c) i) and ii) above. (2 marks)

……

……

……

……..

(d) Explain a factor that would result to an increase in blood pressure in both the blood vessels above. (2 marks)

(e) State **two** structural differences between the two vessels mentioned in (c) above. (2 marks)

(f) i) Name **two** diseases of circulatory system in humans. (2 marks)

……

……

ii) Other than transport of substances give one other function of blood. (1 mark)

……

……7. State and explain various areas where knowledge about genetics is applied. (20mks)

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

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

Name…… Index No……/…….

School…… Candidates Signature……

Date …….

231/1

BIOLOGY

THEORY

Paper 1

2 Hours

MERU CENTRAL EXAMS

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

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.
- All workings **MUST** be clearly shown where necessary.

For Examiners use only.

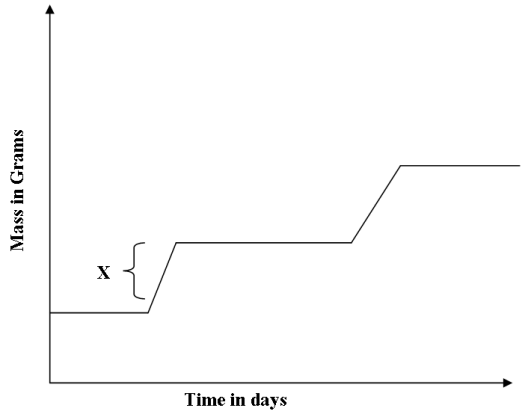
Question	**Maximum Score**	**Candidates Score**
1 – 25	80	

This paper consists of 11 Printed pages.

Candidates should check the question paper to ensure that all the

Papers are printed as indicated and no questions are missing

1. The graph below represents the growth pattern of animals in a certain phylum.



a) Name the type of growth curve shown above. (1mk)

……..

b) i) Identify the process represented by **X**. (1mk)

……..

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

……..

c) State the importance of the growth of a pollen tube to a plant. (1mk)

…….

2. a) What is the function of Sodium hydrogen Carbonate that is added to test solution of non-reducing sugar. (1mk)

……..... .....

b) The equation below represents a process X which is controlled by enzymes .

$$C_6H_{12}O_6 + C_6H_{12}O_6 \underset{\mathbf{R}}{\overset{\mathbf{X}}{\rightleftharpoons}} C_{12}H_{22}O_{11} + H_2O$$

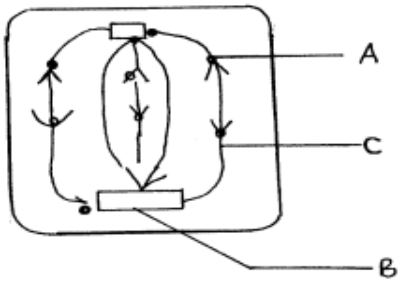
Glucose + Fructose Sucrose + Water

i) Name the process **X** and enzyme **R**

Process **X** …… (1mk)

Enzyme **R** …….. (1mk)

3. The diagram shows an epidermal cell undergoing mitotic cell division.



i) Name the stage of mitosis it represents …….(1mk)

ii) Name the structures

A ……. (1mk)

C…….. (1mk)

4. What is the effect of gibberellins on the shoots of plants? (4mks)

……

……

……

……

……

……

5. (a) **Give two** forms in which carbon (IV) oxide is transported in human blood. (2mks)

……

……

……

(b) **Name** the enzyme that enhances the loading and off – loading of carbon (IV) oxide in the human blood. (1mk)

……

……

6. a) What is the importance of the counter current flow in the exchange of gases in a fish. (2mks)

……..

……..……

……..

b) State **two** ways in which the tracheoles of an insect are adapted to their functions. (2mks)

……..

……

7. The equation below represents a reaction that occurs during respiration in a cell.

K + Phosphate ⟶ Adnenosine triphosphate

a) Identify the compound K. (1mk)

……..

b) State **two** differences between **K** and **ATP.** (2mks)

……..

……..

c) Name the organelle responsible for the production of energy in a cell muscle (1mk)

……..

8. Explain how crops grown along roads can be a source of lead poisoning to human beings. (2mks)

……

.....……

9. Explain why plants growing in low altitude areas grow faster than those in high altitudes. (3mks)

…….....

……

…….....……

…….....……

……

10. List down **four** phenotypic characteristics that have been selected for the production of strains suitable for modern agricultural purposes. (4mks)

……

……

11. Name the type of eye defects that can be corrected by;

i) Use of bifocal lens (1mk)

……

ii) Use of artificial lens (1mk)

……

iii) Use of concave lens (1mk)

……

12. a) The length from the tail tip to the anus of a certain tilapia fish is 10cm. The length from the tail tip to the mouth is 35cm. Calculate the tail power of the fish. (Show all your working). (2mks)

b) What is the significance of high tail power in fish? (1mk)

13. List down three differences between the endocrine system and nervous system. (3mks)

Endocrine system	Nervous system
i. …… ii …… iii ……	i. …… ii …… iii ……

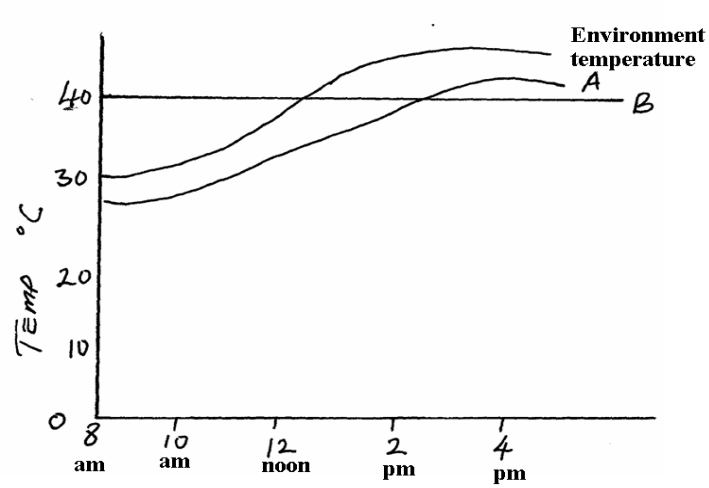
14. Distinguish between the struggle for existence and survival for the fittest as used in the theory of natural selection. (2mks)

……

……

..……

15. The body temperatures of two animals A and B varied as below with environmental Temperature



a) Which of the animals is;

i) Endothermic …….. (1mk)

ii) Ectothermic …… (1mk)

b) With a reason, state which of the animals is likely to be widely distributed (2mks)

……

……

……

16. State three roles of oestrogen during the menstrual cycle (3mks)

……

……

……

……

17. State three characteristics of cells at the zone of cell division in an apical merintem(3mks)

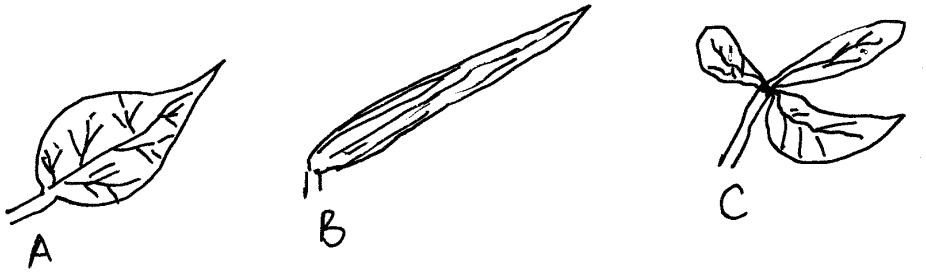
……

……

……

18. Below are diagrams of three leaves A, B and C. Construct a two step dichotomous

key which can be used to identify each of them. (4mks)



……

……

19. a) Name two mutagenic agents. 2mks)

……..

……..

b) Identify the type of gene mutations represented by the following pairs of words.

i) Shirt instead of skirt …….. (1mk)

ii) Hopping instead of shopping …….. (1mk)

20. Liver damage leads to impaired digestion of fats. Explain this statement. (2mks)

……

……

21. Explain why several lateral buds sprout when a terminal bud in a young tree is removed. (3mks)

……

22. (a) State **two** structural adaptations that make xylem vessels suitable for transport of water and mineral salts. (2mks)

(b) List any **three** adaptations of the root hair cells to their functions (3mks)

23. (a) Define the following terms:- (2mks)

(i) Species

(ii) Binomial nomenclature:-

24. What is the significance of active transport in the human body. (3mks)

25. Explain how the biceps and triceps muscles bring about the movement at the hinge joint of the elbow in man. (2mks)

Name……. Index No……/…….

School…… Date ……..…

Candidate's Signature……

231/2
BIOLOGY
(THEORY)
Paper 2
Time: 2 Hours

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

231/2
BIOLOGY
(THEORY)
Paper 2
Time: 2 Hours

INSTRUCTIONS TO CANDIDATES

- This paper consists of two sections **A** and **B**.
- Answer **ALL** questions in section **A**
- Answer question **6** (compulsory) and either question **7** or **8** in section **B**.

For Examiner's Use Only

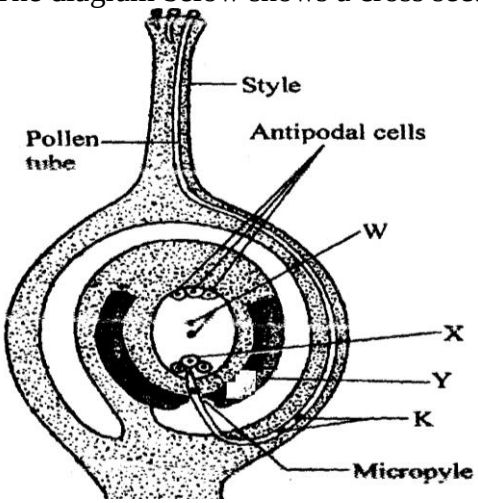
Section	*Question*	*Maximum score*	*Candidate's score*
A	*1*	*8*	
	2	*8*	
	3	*8*	
	4	*8*	
	5	*8*	
B	*6*	*20*	
	7	*20*	
	8	*20*	
Total Marks		*80*	

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

SECTION A (40 MARKS)

Answer all questions in this section.

1. The diagram below shows a cross section through the female part of a flower.



a) Name the structures labeled **W**,**X**, and **Y**. (3mks)

W .....

X .....

Y .....

b) State **two** functions of the pollen tube. (2mks)

.....

.....

.....

.....

c) What happens to antipodal cells after fertilization. (1mk)

.....

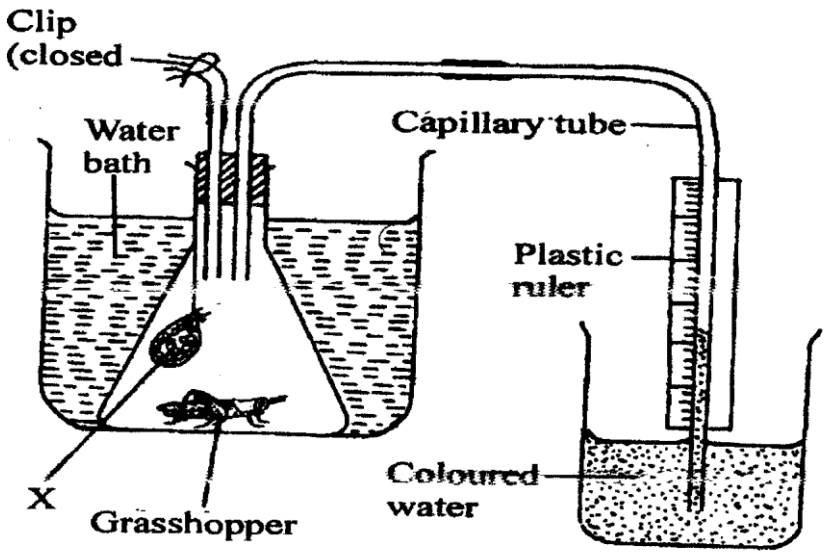
.....

d) Name the structure labeled **K** and state their role. (2mks)

.....

.....

2. The diagram below illustrates and experiment to determine the rate of respiration in a small insect.



a) Name the chemical compound labeled **X** and state its function. 2mks)

.....

b) Why is it necessary to place the flask in a water bath. 3mks)

.....

.....

.....

.....

.....

c) What changes would you expect to observe in the level of coloured water in the capillary tube after the experiment has run for five minutes. (1mk)

.....

.....

d) Explain the changes you have started in (c) above. (3mks)

.....

.....

.....

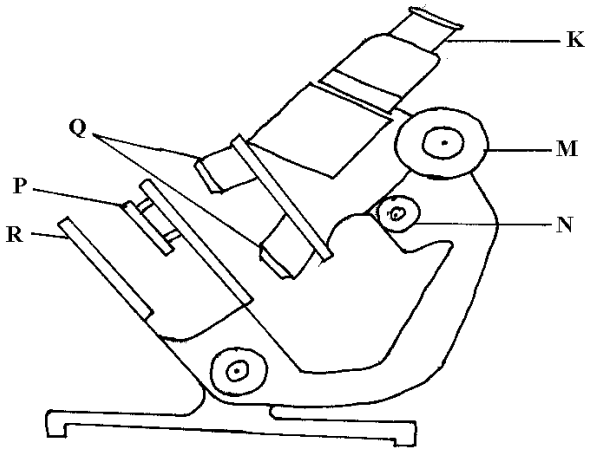
.....

e) State how you can set up a control experiment . (1mk)

.....

.....

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



a) Name the parts labeled (2mrks)

K ……

M ……

b) State the functions of (2mrks)

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:-

(i) a sharper outline of the features. (1mrk)

……

(ii) Give the formula used to calculate magnification in a light microscope. (1mrk)

……

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 (1mrk)

……
……
……

(ii)Staining the section (1mrk)

……
……
……

(iii)Putting the section in water (1mrk)

……
……
……

4. In an experiment, a black mouse was mated with a brown mouse; all the off-springs were black. The off-springs grew and were allowed to mate with one another. The total number of (F2) generation off-springs was 96.

b) Using the letter symbols capital letter **B** for the gene of black colour and small **b** for brown colour, Work out the genotype of the F1 generation. (3mrks)

b) From the information above, work out the following for the F2 generation.

i) Genotypic ratio. (2mrks)

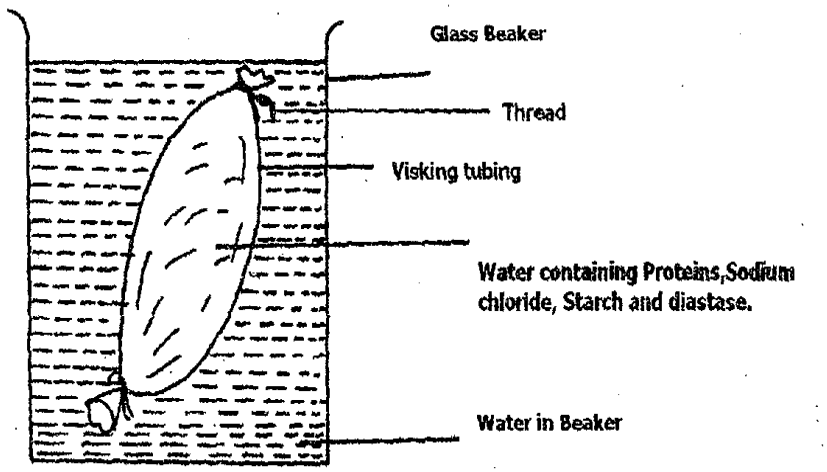
……

ii) Phenotypic ratio. (1mrk)

……

iiii) The total number of brown mice (2mrks)

5. In a physiological experiment, starch, protein, diastase and sodium chloride were added to water and put inside a visking tubing. The visking tubing was then placed in a water bath maintained at a temperature between *35* – 40°C. The set up was as shown in the diagram below.



The following observations were made after the procedures indicated.

Contents in	At the start of experiment	After 1 hour
Visking tubing	i) Solution tastes salty	Solution tastes salty
	ii) Visking tubing is not firm	Visking tubing is firm
	iii) After boiling with Benedicts solution, solution remains blue	After boiling with Benedicts solution the solution turns brown
	iv) On addition of solution hydroxide followed by copper sulphate solution to the solution, the colour changes to purple	On addition of sodium hydroxide followed by coppers sulphate to the solution, the colour changes to purple
Beaker	i) Water is tasteless	Solution tastes sweet/salty
	ii) After boiling solution with Benedicts solution, Blue colour remains	After boiling solution with Benedicts solution, colour turns to brown
	iii) On addition to sodium hydroxide followed by copper sulphate solution, colour remains blue	On addition of sodium hydroxide followed by copper sulphate solution, colour remains blue

a) Name the process by which salt moved into the water in the beaker from the visking tubing. (1mark)

……

b) i) Name the food substance responsible for the brown colour observed after 1 hour both in the beaker and visking tubing when solutions are boiled with benedicts solution. (l mark)

……

ii) Account for the observation in (b i) above. (3 marks)

……

……

……

……

c) i) Name the food substance tested with sodium hydroxide followed by copper sulphate solution(s) (1 mark)

……

ii) Account for the absence of the food substance named in (c i) above in the beaker after 1 hour. (l mark)

……

……

d) After one hour the visking tubing was firm. State the term used to describe this state. (1 mark)

……

SECTION B(40 MARKS)

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

6. An experiment was carried out whereby three healthy rats were fed on equal amounts of glucose. After half an hour, the glucose concentration per ml. of blood was measured at 15 minutes intervals for three hours. The following results were obtained.

Glucose conc. / Rats	**0 min**	**15 min**	**30 min**	**45 min**	**60 min**	**75 min**	**90 min**
A	0.800	0.774	0.715	0.680	0.650	0.595	0.555
B	0.745	0.695	0.695	0.660	0.635	0.600	0.545
C	0.795	0.695	0.665	0.635	0.590	0.550	0.495
Mean	0.780	0.720	0.691	-	0.625	-	0.532

a) i) Calculate the mean concentration of glucose in mg per ml of blood at 45 and 75 minutes. Record your answer on the table. (2mks)

ii) On the graph paper provided, plot a graph of the mean glucose concentration against time.(6mks

iii) What was the mean glucose concentration in the blood after 37.5 minutes? (1mk)

……

……

……

iv) Give a reason why it was necessary to use three rats in the experiment instead of one. (1mk)

……

……

……

v) Why was the initial concentration of glucose in the rats not the same? (2mks)

……

……

vi) Account for the difference in mean glucose concentration during the period. (3mks)

……

……

……

……

b) Give two reasons why glucose is the main respiratory substrate. (2mks)

……

……

……

c) Give three ways in which glucose is assimilated in the body. (3mks)

……

……

7. a) What assumption are made when using the captured recapture method in estimating population of animals. (5mks)

b) Describe how you would use the capture – recapture method to estimate the population of fish in the school pond. (15mks)

8. (a) Define natural selection. (2mks)

(b) Natural selection brings about adaptation of a species to the environment. Discuss. (18mks)

NAME _____ **CLASS**_____**ADM. NO.** _____

School.....

231/3
BIOLOGY
PAPER 3
NOV. 2020

MERU CENTRAL EXAMINATIONS

BIOLOGY
PAPER 3

INSTRUCTIONS TO CANDIDATES

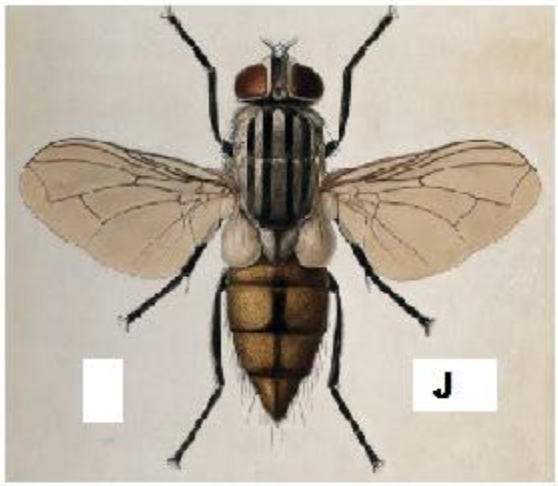
- *Write your **name** and **index number** in the spaces provided above.*
- ***Sign** and write the **date** of examination in the spaces provided above.*
- *You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully before commencing your work.*
- *Answers must be written in the spaces provided in the question paper.*

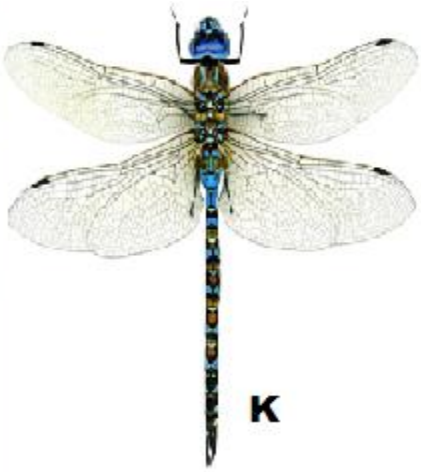
For Examiner's Use only:-

Question	Maximum Score	Candidate's Score
1	14	
2	13	
3	13	
TOTAL	40	

*This paper consists of **7** printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. Below are photographs of two specimens, **J** and **K.** Both of them belong to the same phylum and class. Observe them carefully before you answer the questions that follow.





a) Name the class to which **J** and **K** belong and support your answer with two reasons.

Class 1mk

Reasons 2mks

i) .....

ii) .....

b) Suggest why the circulatory fluid in **J** and **K** has no haemoglobin.

2mks

.....

.....

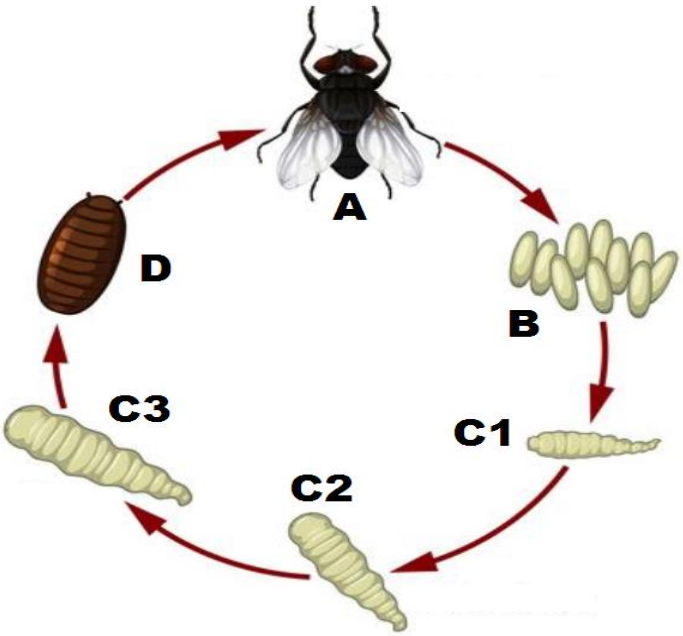
c) Observe their wings and suggest the type of evolution that could have taken place to give rise to **J** and **K**, and then give a reason for your answer.

Type of evolution 1mk

Reason .....

.....2mks

d) Below is a diagram showing the life cycle of specimen J.



i) Identify the stage labeled **D**. 1mk

ii) Name the hormone responsible for the change from **D** to **A**.

1mk

.....

iii) Explain the differences in the change from **C2** to **C3** and from **C3** to **D**.

4mks

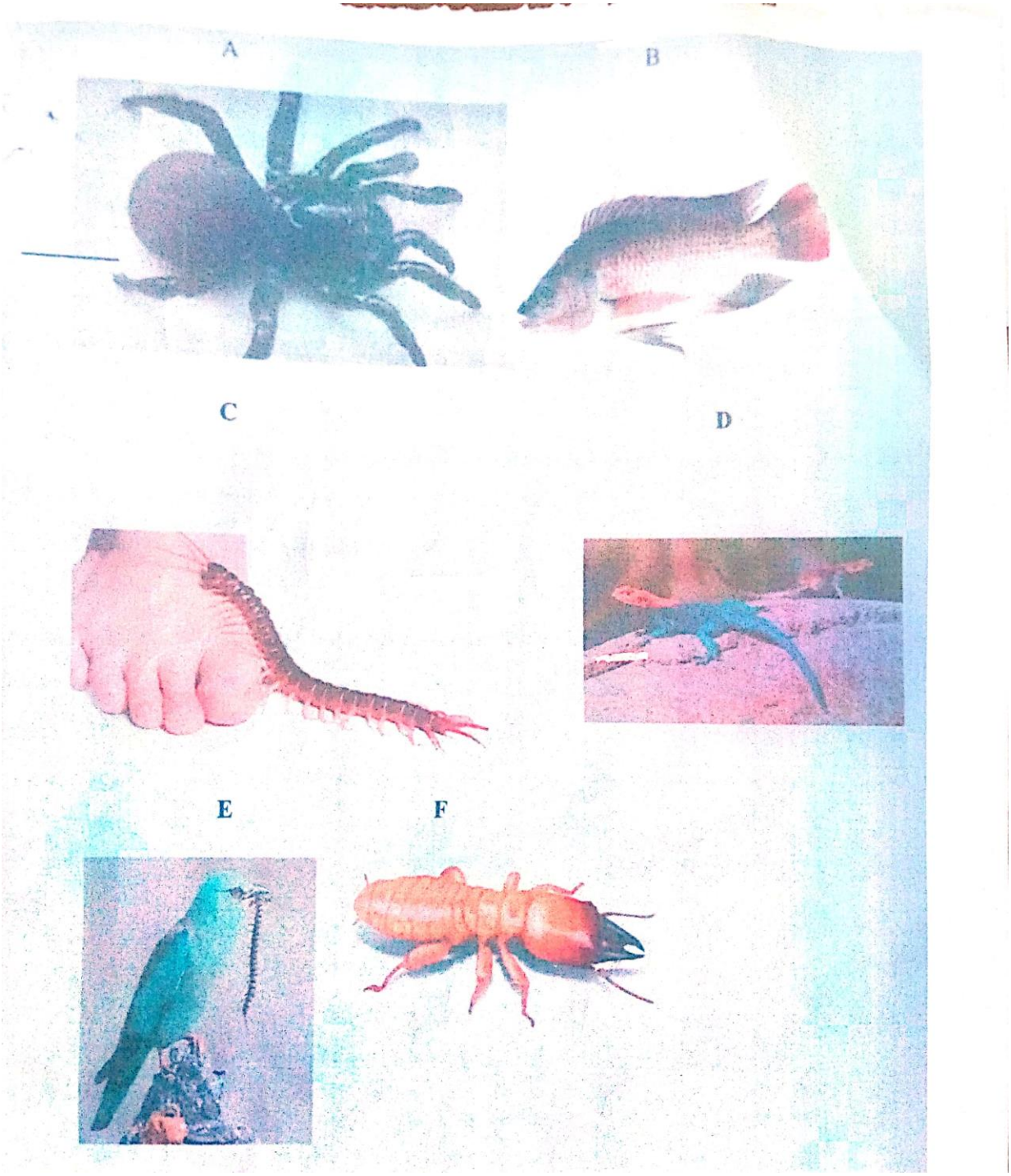
.....

.....

.....

.....

Q2. Study the organisms below and answer questions in spaces provided .



a. Complete and use the key below to identify the organism. 2mks

1a. Organism with endoskeleton ..... go to 2
1b. _____ ..... go to 3

2a. Has scales on the body..... go to 4
2b. 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 ..... Insects.
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). 3mks
.....
.....
.....
.....
.....

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

.....

Q3.You are provided with a specimen labeled **T** which is a fruit. Use it to answer the questions that follow.

f) Make a **transverse** section of the specimen **T**. Draw and label at least 3 parts.

6mks

g) With reasons, state the identity of fruit **T.**

Type of fruit.....1mk

Reason 1mk

h) Suggest the possible agent of dispersal and give **two** reasons

Agent 1mk

Reason

.....

.....

2mk

i) What is the placentation of **T**? 1mk

j) Specimen **T** was green in colour before it was treated with a plant hormone. Suggest the plant hormone.

.....1mk

END

NAME:…… INDEX NO. ……..…

SIGNATURE: ……..... DATE: .....

231/1
BIOLOGY
Theory
Paper 1
DECEMBER, 2020
Time: 2 Hours

LANJET JOINT EVALUATION EXAMINATION
Kenya Certificate of Secondary Education (K.C.S.E)
231/1
Biology
Paper 1
DECEMBER, 2020

Instructions to Candidates

- ***Write your name, admission number, class and signature in the spaces provided at the top of the page.***
- ***Answer all the questions in the spaces provided in this paper.***

FOR EXAMINER'S USE ONLY

Question	Maximum score	Candidate's score
1-29	80	

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

1. Which organelle would be numerous in the following cells? (2 mks)
   (a) Liver cells
   ……

   (b) Palisade cells
   ……...

2. State the functions of the following cell structures during cell division. (2 mks)

(i) Centriole –

……

(ii) Centromere –

……

3. In an investigation, the pancreatic duct of a mammal was blocked. It was found that the blood sugar regulation remained normal while, food digestion was impaired. Explain these observations. (2 mks)

……..……

……

……

4. State two structural differences between ribonucleic acid 9RNA) and deoxyribonucleic acid (DNA). (3 mks)

……

……..…

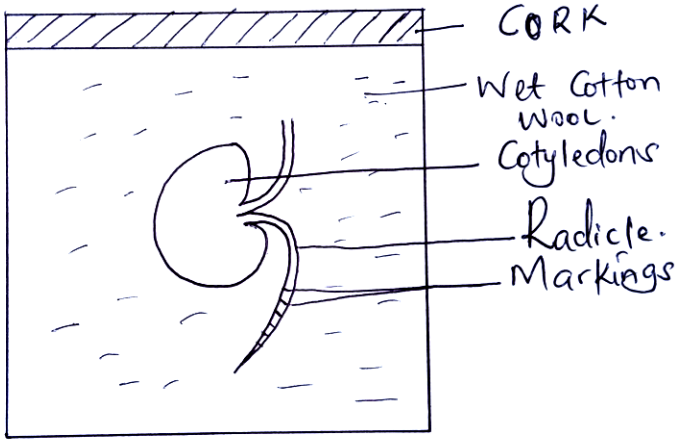
5. Explain why glucose does not appear in urine of a healthy person even though it is filtered in the Bowman's capsule of a mammal. (2 mks)

……..……

……

……

6. A student set up an experiment as shown in the diagram below .



(a) (i) What was being investigated in the experiment? (1 mk)

……

(ii) Why was it necessary to have wet cotton wool in the container? (1 mk)

……

(b) What is the role of the following in germinating seed? (2 mks)

(i) Oxygen –

……

(ii) Cotyledon –

……

7. Give a reason why it is only mutation in genes of gametes that influence evolution. (1 mk)

……

……

8. A person was able to read a book clearly at arm's length, but not at normal distance.

(a) State the eye defect the person suffered from. (1 mk)

……

(b) Why was he unable to read the book clearly at normal distance? (1 mk)

……

(c) How can the defect be corrected? (1 mk)

……

……

9. Some form three students took a germinating maize grain and placed it in a starch paste in a petri dish and put the petri dish in a water bath maintained at $30^{o}C$. After 48 hours, the starch paste was irrigated with iodine solution. The area around the maize grain changed to the colour of iodine solution while the rest turned blue-black.

(a) Account for the observation. (2 mks)

……

……

(b) Why was the petri dish put in a water bath maintained at $30^{o}C$? (1 mk)

……

10. State two functions of muscles found in the alimentary canal of a mammal? (2 mks)

……

……

11. State the stage in a cell division in which the following events occur:

(i) Replication of the genetic material. (1 mk)

……

(ii) Exchange of genetic material. (1 mk)

……

12. Explain what happens when a marine amoeba is transferred to fresh water environment.

……

……

……

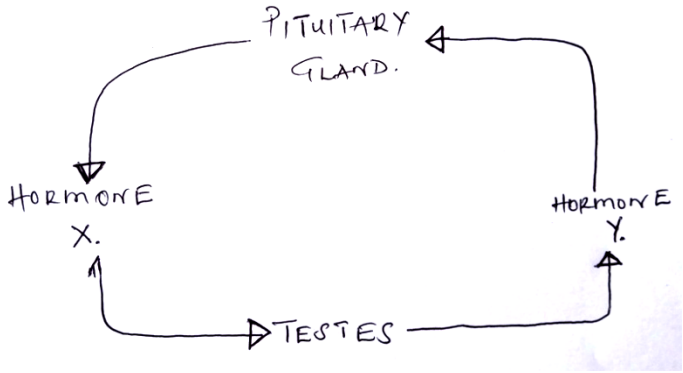
……

13. In blood test, a few drops of anti-B serum were added to two samples of blood. It was noted that agglutination occurred. What were the possible blood groups of the two blood samples? (2 mks)

……

……

14. The diagram below represents a simple endocrine feedback mechanism in a human male.



(a) Name the hormone labeled X. (1 mk)

……

(b) State two differences that may be observed between a normal male and one who is incapable of producing hormone labeled Y. (2 mks)

……

……

15. A small amount of chemical M was put on one side of maize coleoptiles. After some days, it was noted that the coleoptiles curved away from the side to which the chemical was applied .

(a) Suggest the possible identity of chemical substance M. (1 mk)

……

(b) Explain how this chemical might have caused the coleoptiles to curve. (2 mks)

……

……

16. In which part of the spinal cord is the cell body of the motor neurone found? (1 mk)

……

……

(b) Below are two features which make aneurone a specialized cell. State their role.

(i) Axion –

……

(ii) Dendrites –

……

17. (a) What is a natural selection? (1 mk)

……

……

(b) Distinguish between convergent and divergent evolution. (2 mks)

……

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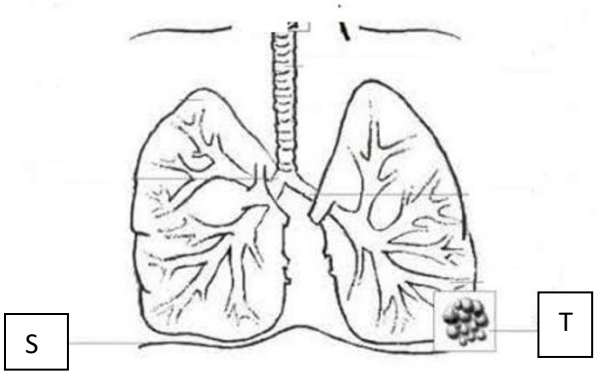
……

……

18. The diagram below shows part of a mammalian respiratory system.



(a) Explain two ways in which the part labeled T is adapted to its functions. (2 mks)

……

……

……

(b) How does the part labeled S facilitates inhalation ? (1 mk)

19. (a) Explain why the body temperature of a healthy human being must rise up to 39^{o}C on humid day. (2 mks)

……

……

……

(b) In an experiment, a piece of brain was removed from a rat. It was found that the rat had large fluctuation of body temperature. Suggest the part of the brain that had been removed. (1 mk)

……

20. Name the distinguishing features of class mammalian. (3 mks)

……

……

……

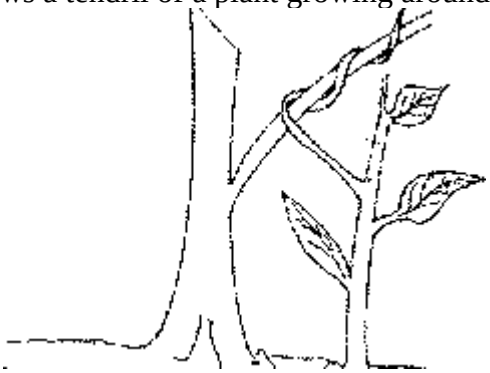
21. State three types of asexual reproduction and give its examples. (3 mks)

……

……

……

22. The figure below shows a tendril of a plant growing around a trunk.



(a) Identify the types of response which causes the twisting growth. (1 mk)

……

……

(b) Explain how the twisting process is accomplished. (3 mks)

……

24. Active yeast cells were added to a dilute sugar solution in a container. The mixture was kept in warm room. After a few hours bubbles of gas were observed escaping from the mixture.

(a) Write an equation to represent the chemical reaction above. (1 mk)

……

……

(b) What is the economic importance of this type of chemical reaction above? (1 mk)

……

……

(c) Why is that the total energy being released at the end of respiration (oxidation) being released in a small quantity. (1 mk)

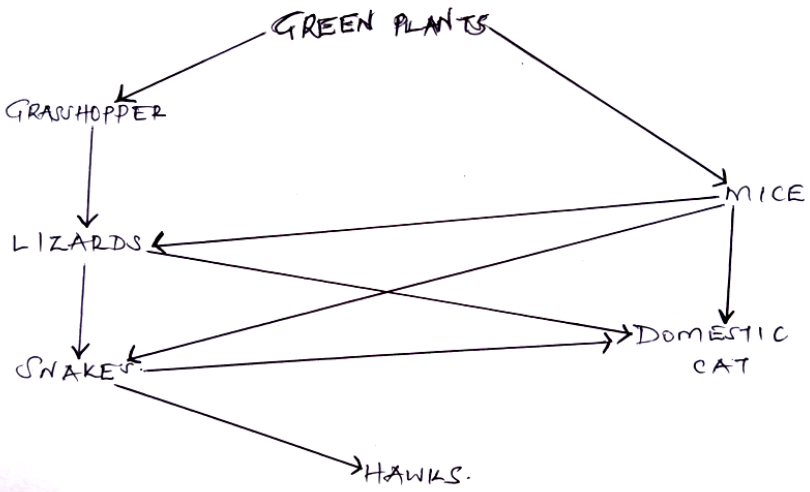
……

……

25. Describe three roles or active transport in living organisms. (3 mks)

……

26. The diagram below shows a feeding relationship in a certain ecosystem.



(a) Construct two food chains ending with a tertiary consumer in each case. (2 mks)

(b) Suggest three ways in which the ecosystem would be affected if there was prolonged drought. (3 mks)

……

……

……

27. Explain how the following parts of a mammalian reproductive system are adapted to their functions:

(i) Testis (1 mk)

……

(ii) Uterus (1 mk)

……

(b) Explain why removal of the ovary after four months of pregnancy does not terminate pregnancy. (1 mk)

……

……

……

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

(b) State two advantages of cross pollination in a flowering plant. (2mks)

29. Name the division in kingdom plantae with the following spore producing bodies

(i) Capsule

NAME……..…….…… ADM NO……..……CLASS……

231/2

BIOLOGY

PAPER 2

(THEORY)

DECEMBER, 2020

TIME: 2 HOURS

LANET JOINT EXAMINATION

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 after question 8
- This paper consists of 8 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	

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

SECTION A

1. In a certain plant species which is normally green, a recessive gene for colour (n) causes the plant to be white when present in a homozygous state. Such plants die at early age. In heterozygous state, the plants are pale green in colour but grow to maturity.

(a) Suggest a reason for the early death of plants with homozygous recessive gene. **(2 marks)**

……

……

……..

(b) If a normal green plant was crossed with a pale green plant, what would be the genotype of the F1 generation? (Show your working) **(3 marks)**

……

……

……

……

……

……

……

…….

(c) If seeds from the heterozygous plants were planted and the resulting plants allowed to self pollinate. Workout the phenotypic ratio of the plants that would grow to maturity. **(2 marks)**

……

……

……

……

……

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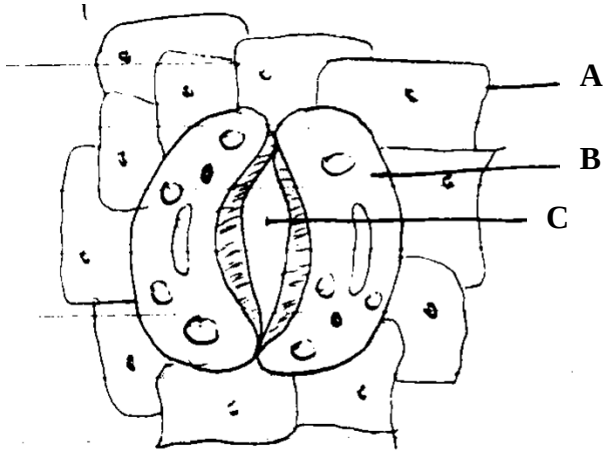
……..

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

……

……

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



a) Name the tissue where the cells drawn above are found. **(1 mark)**

……

b) Identify cells A and B. **(2 marks)**

A……..

B……..

c) Give **two** structural differences between cell A and cell B. **(2 marks)**

……

……

……

……

d) Describe how structure C opens as explained by the photosynthetic theory. **(3 marks)**

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……
……
……

3. Catalase is an enzyme present in all living tissues in both plants and animals. It breaks down toxic hydrogen peroxide produced during cellular metabolism into less toxic water and oxygen is evidenced by effervescence.

In an experiment 10 ml of hydrogen peroxide was put in different boiling tubes into which different specimens were put. The table below summarizes part of the results. Carefully analyze the table and answer the questions that follow.

	The specimen	Observation

A	Fresh liver	A lot of bubbling almost violent
B	Boiled liver	No bubbling
C	Fresh muscle tissue	Vigorous bubbling less than tube A
D	Dry bean seed	Very slow bubbling
E	Soaked bean seed	Vigorous bubbling done intensity of tube C
F	1 cm3 potato cube	Moderate bubbling
G	1 cm3 mashed potato	Vigorous bubbling since intensity as in tube E

(a) Compare & account for the rate of bubbling between

(i) Tube A and tube B. **(2 marks)**

……

……

……

(ii) Tube A and C **(2 marks)**

……

……

……

(iii) Tube D and tube E **(2 marks)**

……

……

……

(iv) Tube F and G **(1 mark)**

……

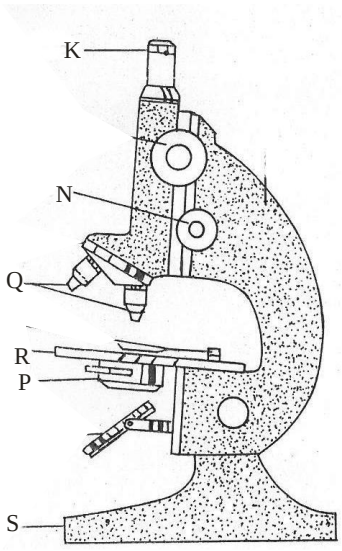
……

……

(b) Write the equation for the reaction that produces the bubbling. **(1 mark)**

……

4. The diagram below shows an instrument used in the laboratory.



(a) Name the apparatus shown above

…… **(1 mark)**

(b) Name the parts labeled Q , K and R **(3 marks)**

Q……

K……

R ……..

(c) What are the functions of parts **P, N** and **S.** **(3 marks)**

P……

N……..

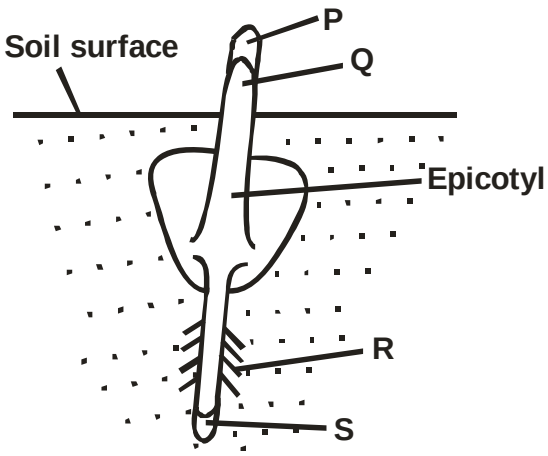
S…….

(d) What is the formula of calculating linear magnification **(1 mark)**

……

……

5. Diagram below represents a germinating seedling.



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

……

……..

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

P…….

Q…….

R…….

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

……...

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

1. Oxygen **(1 mark)**

……2.

Enzymes **(1 mark)**

……3.

Water **(1 mark)**

……

……..

SECTION B

Answer question 6 and either 7 or 8

6. Some students used a model to demonstrate the effect of sweating on human body temperature. Two boiling tubes A and B were filled with hot water. The surface of tube A was continually wiped with a piece of cotton wool soaked in methylated spirit. The temperature of water in the tubes was taken at the start of the experiment and then at 5 minutes interval. The results obtained are as shown in the table below.

Time (in minutes)	Temperature (°C) in tubes	
	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 temperature of water in the tubes against time. **(7 marks)**

(b) At what rate was the water cooling in tube A? **(2 marks)**

……

……

(c) Why was tube B included in the set up? **(1 mark)**

……

……

(d) Account for the rate of cooling in tube A **(3 marks)**

……

……

(e) State **two** processes of heat loss in tube B. **(2 marks)**

……

……

(f) What would be the expected results if tube B was insulated? **(1 mark)**

……..

(g) What would the insulation be compare to in

(i) Birds ? **(1 mark)**

……

(ii) Mammals? **(1 mark)**

Name the structures in the human body that detect

(i) External temperature changes **(1 mark)**

(ii) Internal temperature changes **(1 mark)**

(a) Differentiate between nervous system and endocrine system. **(5 marks)**

(b) Describe how hormones regulate the menstrual cycle in human being. **(15 marks)**

7. How is the mammalian intestine adapted to its functions? **(20 marks)**

NAME ……..…….. **DATE** ……

INDEX NO. …….…….……...…..… **SIGNATURE** ……...……..

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
TIME: 1¾ HOURS.

LANET JOINT EVALUATION TEST, 2020

Kenya Certificate of Secondary Education

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
NOVEMBER/DECEMBER 2020
TIME: 1¾ HOURS.

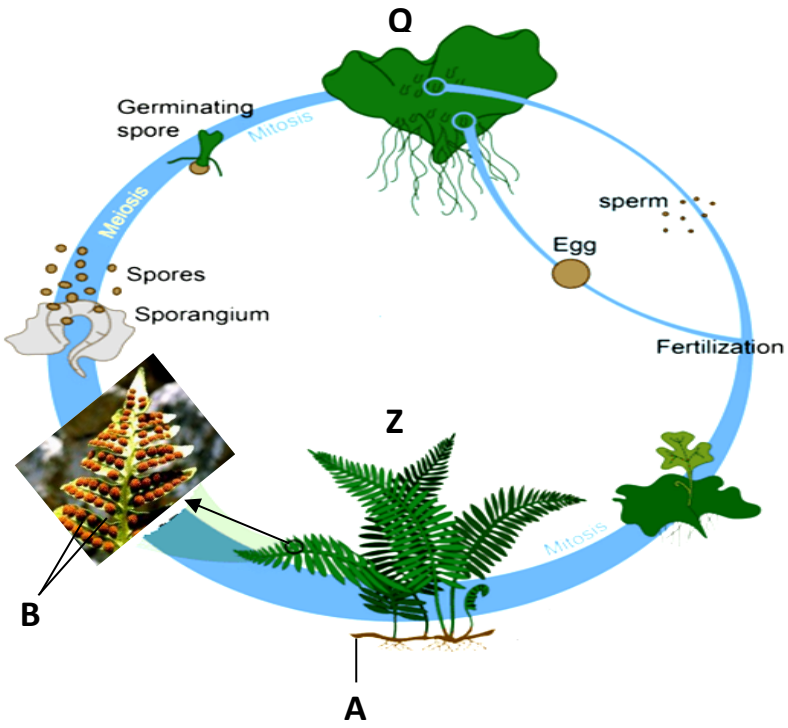
INSTRUCTIONS TO CANDIDATES

- Answer **all** the questions.
- You are required to spend the first 15 minutes of the 1¾ hours allowed for the paper reading the whole paper carefully before commencing your work.
- Answers must be written in the spaces provided in the question paper.
- Additional pages must not be inserted.
- This paper consists of 5 printed pages. Candidates should check to ensure that all pages are printed as indicated and no questions are missing

FOR EXAMINER'S USE ONLY

Questions	Maximum score	Candidate's score
Question 1	14	
Question 2	14	
Question 3	12	
Total score	**40**	

1. 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)

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

……

……

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

A ……

B ……

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

……

……

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

……

……

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

Q ……

Z ……

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

……
……

……
……

……
……

……
……

(iv) Give a reason why the plant shown in the diagram above is common in swampy areas (2marks)

……
……

……
……

2. You are provided with several specimens **N** and indicator **D**, which is Bromolthymol blue. Study them and answer the questions that follow:

(a) (i) Identify the part of plant represented by specimen **N**. (1mark)

……

……

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

.....

.....

(b) i) Name the physiological process which is taking place in specimen **N**. (1mark)

.....

.....

ii) Describe the **two** changes which occurred to specimen **N** during the process named in b) i) above. (2marks)

.....

.....

.....

.....

(c) i) State **two** internal factors which would promote the physiological process exhibited by specimen **N**,
(2marks)

.....

.....

.....

ii) State **two** external conditions which would inhibit the process demonstrated by specimen **N.**(2marks)

.....

.....

.....

(d) Add 1ml of indicator marked **D** into a test tube, add 6 pieces of specimen **N** into the test tube. Close the mouth of the test tube tightly using a tissue paper. Leave the set up to stand on the tube rack for 30 minutes after which carefully remove specimen N without pouring the indicator marked D using a wooden splint.

(i) Record your observation after 30 minutes (1mark)

.....

.....

(ii) Account the observation in d) i) above (3marks)

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.....

(iii) Suggest a control for his experiment. (1mark)

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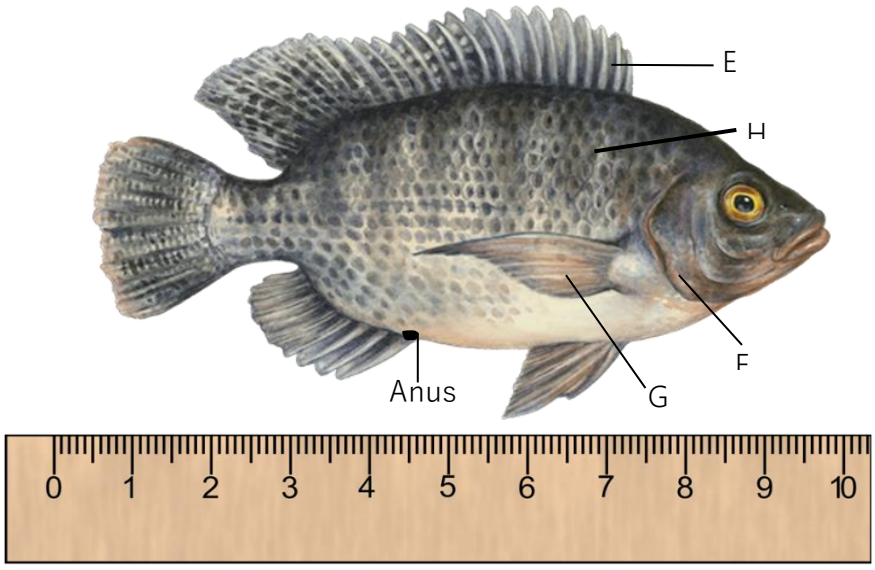
3. You are provided with photograph L, K and J. Examine them.

PHOTOGRAPH L

PHOTOGRAPH K

PHOTOGRAPH J



a) Using observable features only, state class of animals shown in the photograph L and K. (4 marks)

b)

L

Class

Reason……

K

Class

……

Reason……

c) (i) On the photograph J name the parts labeled E, F and G. (3 marks)

E.....……

F..……

G.....……

(ii) State the functions of the structures labeled H in photograph J. (2marks)

..……

……..……

……..……

d) (i) The actual length of animal J in cm is shown by a section of the ruler in the photograph.

Calculate the tail power (show your working) (2marks)

(ii) State the significance of tail power to the life of fish in water. (1mark)

……