

Name: Index no

School: Candidate's sign

Date:

231/1
BIOLOGY
PAPER 1
SEPTEMBER 2021
TIME: 2 HOURS

KASSU JOINT EXAMINATION

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

Biology
Paper 1

INSTRUCTIONS TO CANDIDATES:

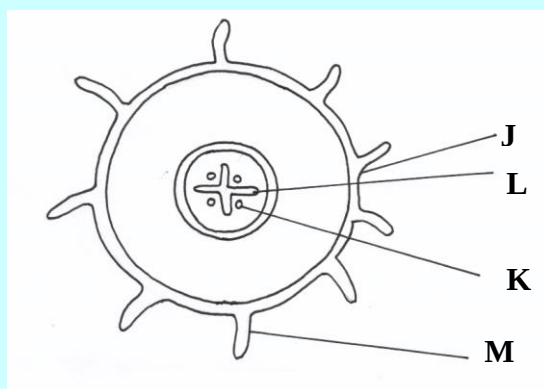
- Write your **name** and **index number** in the spaces provided.
- Sign and write **date** of examination in the spaces provided above
- Answer **all** the questions in the spaces provided;

For Examiner's Use Only:

QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
1- 30	80	

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

1. State the function(s) of the following cell structures during cell division. (2mks)
 - (i) Centriole
.....
 - (ii) Centromere
.....
2. (a) State the function of co-factors in cell metabolism. (1mk)
.....
- (b) Give **one** example of a metabolic co-factor. (1mk)
.....
3. Industrial wastes may contain metabolic pollutants. State how such pollutants may indirectly reach and accumulate in the human body if the wastes were dumped into rivers. (3mks)
.....
.....
.....
4. 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. (2mks)
.....
.....
.....
5. The diagram below represents a transverse section through a plant organ.



- (a) From which plant organ was the section obtained. (1mk)
.....
- (b) Give **two** reasons for your answer in (a) above. (2mks)
.....
.....

6. State **two** structural differences between ribonucleic acid(RNA) and deoxyribonucleic acid (DNA). (2mks)

RNA	DNA
(i)	
(ii)	

7. (a) 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. (2mks)

.....

.....

.....

- (b) In a certain person, glucose appeared in urine. State the disease the person was suffering from. (1mk)

.....

.....

8. State the stage in cell division in which the following events occurs:-

- (i) Replication of the genetic material. (1mk)

.....

- (ii) Exchange of genetic material (1mk)

.....

9. In a 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. (2mks)

.....

.....

10. Explain what would happen when a marine amoeba is transferred to a fresh water environment. (3mks)

.....

.....

.....

.....

11. 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 (1mk)

.....

(b) Explain how this chemical might have caused the coleoptiles to curve. (2mks)

.....

.....

.....

12. Name the division of the Kingdom plantae with the following spore producing bodies. (2mks)

(i) Sori

.....

(ii) Capsule

.....

13. (a) Name two fins in a bony fish which perform the following functions:-

Changing direction, control pitching. (2mks)

.....

.....

(b) State the role of the swim bladder in a fish. (1mk)

.....

14. (a) In which part of the spinal cord is the cell body of the motor neurone found. (1mk)

.....

(b) Below are two features which make a neurone a specialised cell. State their roles. (2mks)

(i) Axon.

.....

(ii) Dendrites.

.....

15. (a) What is a natural selection? (1mk)

.....

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

.....

.....

16. (a) Explain how the following parts of a mammalian reproductive system are adapted to their functions. (2mks)

(i) Testis

.....

(ii) Uterus

.....

(b) Explain why removal of the ovary after four months of pregnancy does not terminate pregnancy.

(1mk)

.....

.....

17. Active yeast cells were added to a dilute sugar solution in a container. The mixture was kept in a warm room. After a few hours bubbles of gas were observed escaping from the mixture.

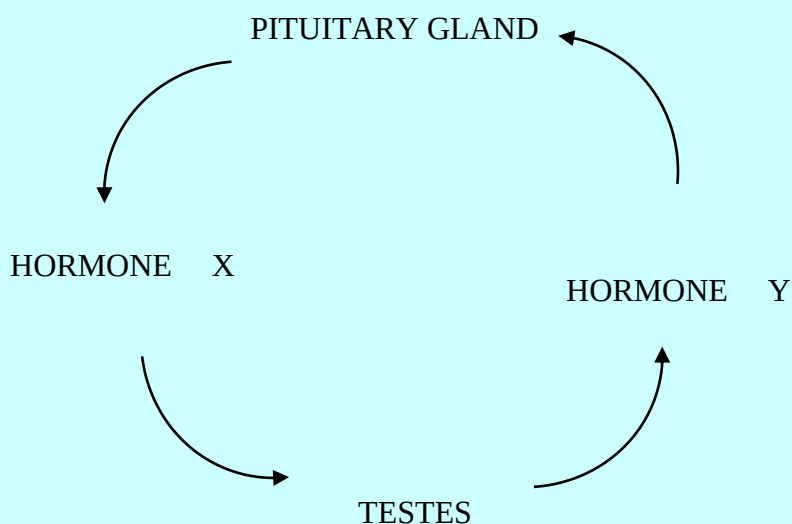
(a) Write an equation to represent the chemical reaction above. (1mk)

(b) What is the economic importance of this type of chemical reaction in industry. (1mk)

18. What are the functions of the odontoid process found on the axis bone of the cervical vertebra.

(2mks)

19. The diagram below represents a simple endocrine feedback mechanism in a human male.



(a) Name the hormone labeled **X** (1mk)

(b) State **two** differences that may be observed between a normal male and one who is incapable of producing hormone labeled **Y** (2mks)

20. (a) What is meant by double fertilization in flowering plants? (2mks)

.....

.....

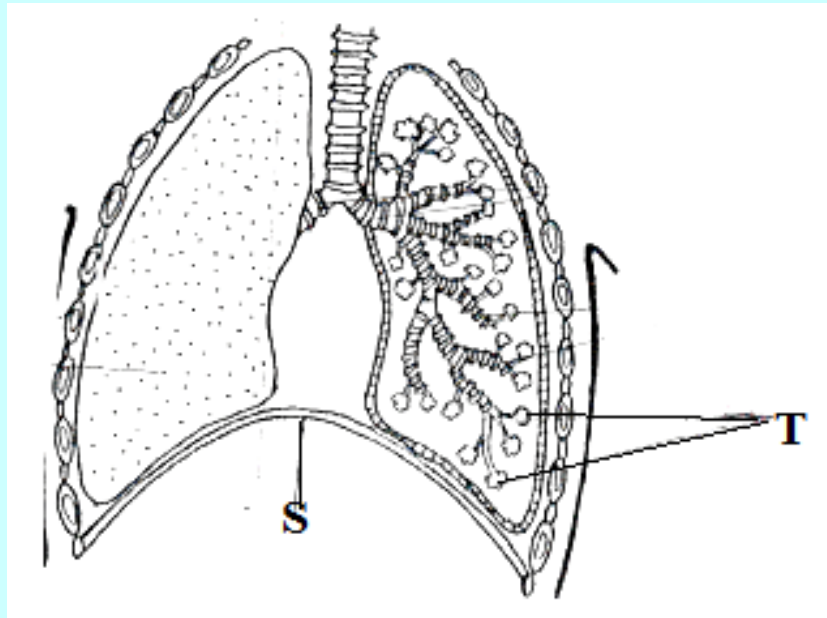
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(b) State **two** advantages of cross pollination in a flowering plant. (2mks)

.....

.....

21. 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. (2mks)

.....

.....

.....

.....

(b) How does the part labeled S facilitate breathing in? (2mks)

.....

.....

.....

22. Define the term alleles. (1mk)

.....

23. (a) Explain why the body temperature of a healthy human being must rise upto 39°C on humid day. (2mks)

.....

.....

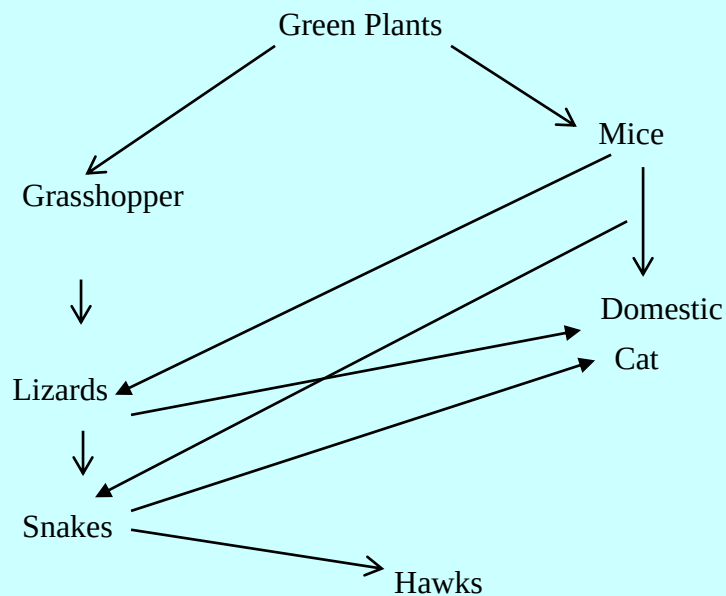
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(b) In an experiment a piece of brain was removed from a rat. It was found that the rat had large fluctuations of body temperature. Suggest the part of the brain that had been removed. (1mk)

.....

24. The chart below shows a feeding relationship in a certain ecosystem.



(a) Construct the food chains ending with a tertiary consumer in each case. (2mks)

(b) Suggest **three** ways in which the ecosystem would be affected if there was prolonged drought. (3mks)

.....

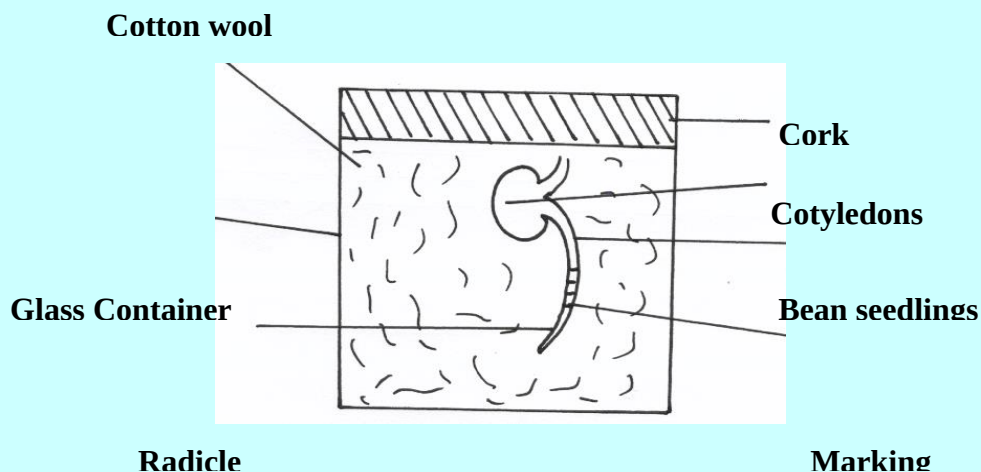
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25. A student set up an experiment as shown in the diagram below.



AT THE START

(a) (i) What was being investigated in the experiment? (1mk)

.....

(ii) Draw a diagram to indicate the expected results of the experiment after three days. (1mk)

(iii) Why was it necessary to have wet cotton wool in the container (1mk)

.....

.....

(b) What is the role of the following in a germinating seed.

(i) Oxygen (1mk)

.....

(ii) Cotyledons

(1mk)

26. Give a reason why it is only mutations in genes of gametes that influence evolution. (1mk)

27. A person was able to read a book clearly at arms length, but not at normal distance.

(a) State the eye defect the person suffered from. (1mk)

(b) Why was he unable to read the book clearly at normal distance. (1mk)

(c) How can the defect be corrected. (1mk)

28. 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°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 (2mks)

(b) Why was the Petri dish put in a water bath maintained at 30°C? (1mk)

29. State **two** functions of muscles found in the alimentary canal of mammals. (2mks)

30. Explain **two** ways in which xylem vessels are adapted to their function. (2mks)

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Name: Index no

School: Candidate's sign

Date:

231/2

BIOLOGY

PAPER 2

SEPTEMBER 2021

TIME: 2 HOURS

KASSU JET EXAMINATION

Kenya Certificate of Secondary Education (K.C.S.E.) 2016

Biology

Paper 2

INSTRUCTIONS TO CANDIDATES:

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

For Examiner's Use Only:

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

This paper consists of 10 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are missing

SECTION A (40 MARKS)

Answer all the questions in this section in the spaces provided

1. A couple has three children, the mother had **blood group A** and the father had **blood group B** while one of the children had **blood group 0**.

(a) (i) **What** were the genotypes of the parents?

(1mark)

Father

.....

Mother

.....

(ii) What was the genotype of the child with blood **group 0**?

(1mark)

.....

(b) **Work out** using a **punnet** square the genotypes of the other children.

(4 marks)

(c) **Which** child can receive blood from any member of the family?

(1mark)

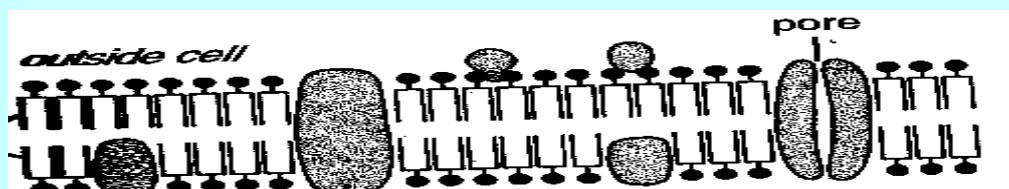
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(d) **State** the percentage of children who can donate blood to all blood groups.

(1mark)

.....

2. Below is a diagram of a structure found in Eukaryotic cells? Study it and answer the questions that follow



a) **Identify** the structure

(1 mark)

.....

b) State **two** functions of the structure

(2 marks)

i.

.....

ii.

.....

c) (i) Name **one** organelle found in animal cells but absent in plant cells

(1 mark)

.....

ii) State **one** function of the organelle you have named in(c) above

(1 mark)

.....

d) Briefly **explain** cell biology as an evidence of evolution

(3 marks)

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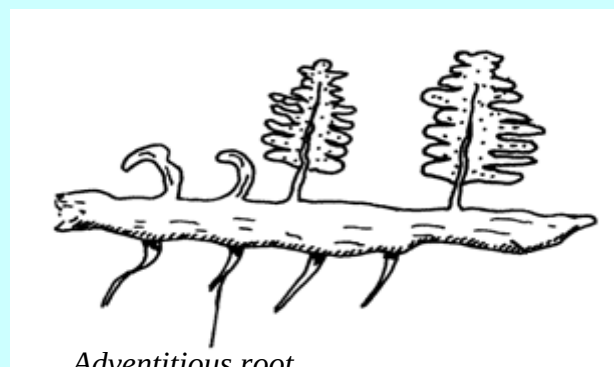
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3. Below is a diagram of a plant a form three student collected while carrying out an ecological study?



Adventitious root

(a) With reasons identify the division into which the students classified the plant.

Division

(1mark)

Reasons

(2marks)

.....
.....

b) (i) **Name** the structure that produces spores in this plant.

(1mark)

.....
.....

(ii) State **two** differences between the plant division above and that of the division *spermatophyta*.

(2 marks)

	<i>Spermatophyte</i>

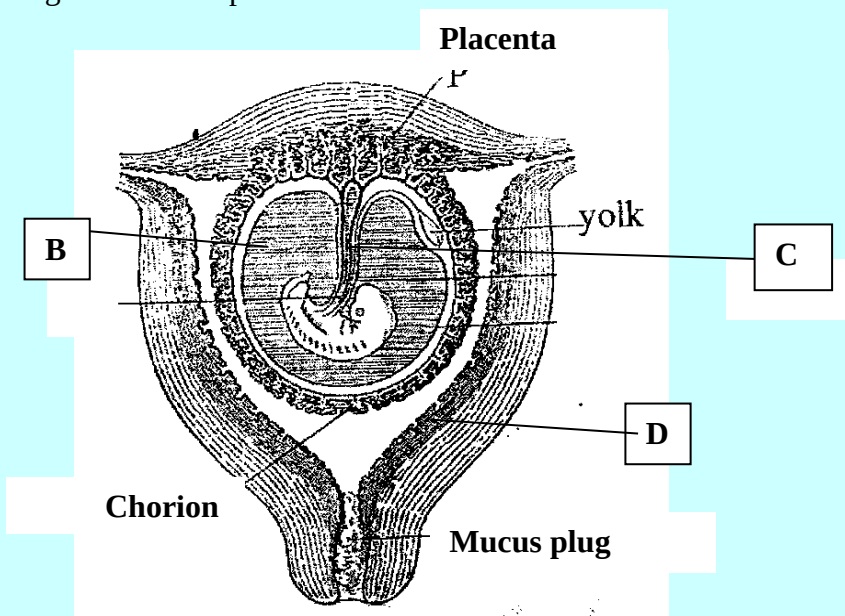
c) Give **two** distinguishing features of class *Amphibia*

(2marks)

a)

b)

4. The diagram below represents human foetus in a uterus.



a) **Name** the part labeled D.

(1 mark)

.....

b) i) **Name** the types of blood vessels found in the structure labeled C. (2 marks)

.....

ii) **State** the differences in composition of blood found in the vessels named in (b) (i) above. (2 marks)

iii) State **two** importance of the fluid found in part B (2 marks)

.....

.....

.....i

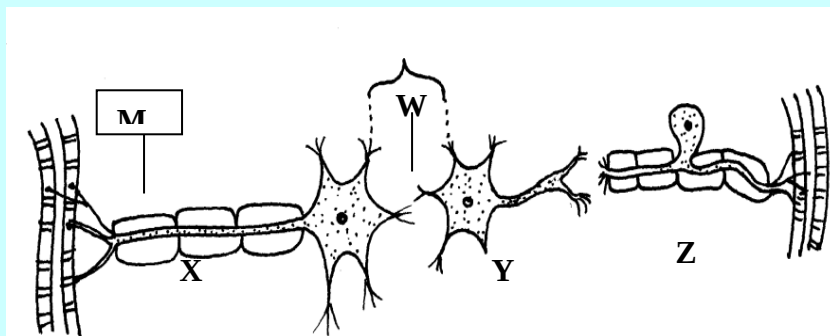
v) **State** the role of progesterone during pregnancy (1 mark)

.....

.....

.....

5. The diagram below represents three types of neurons found in a mammalian body.



(a) Name the neurons **X**, **Y** and **Z** (3marks)

X.....

Y.....

Z.....

(b) Name the chemical substance responsible for the transmission of an impulse across the gap labelled **W**. (1mark)

.....

(c) State **two** functions of the part labelled **M**. (2marks)

.....
.....

(d) In which part of the spinal cord is neurone **Y** located? (1mark)

.....

(e) Using arrows indicate on the diagrams the direction followed by nerve impulse leading to a response. (1mark)

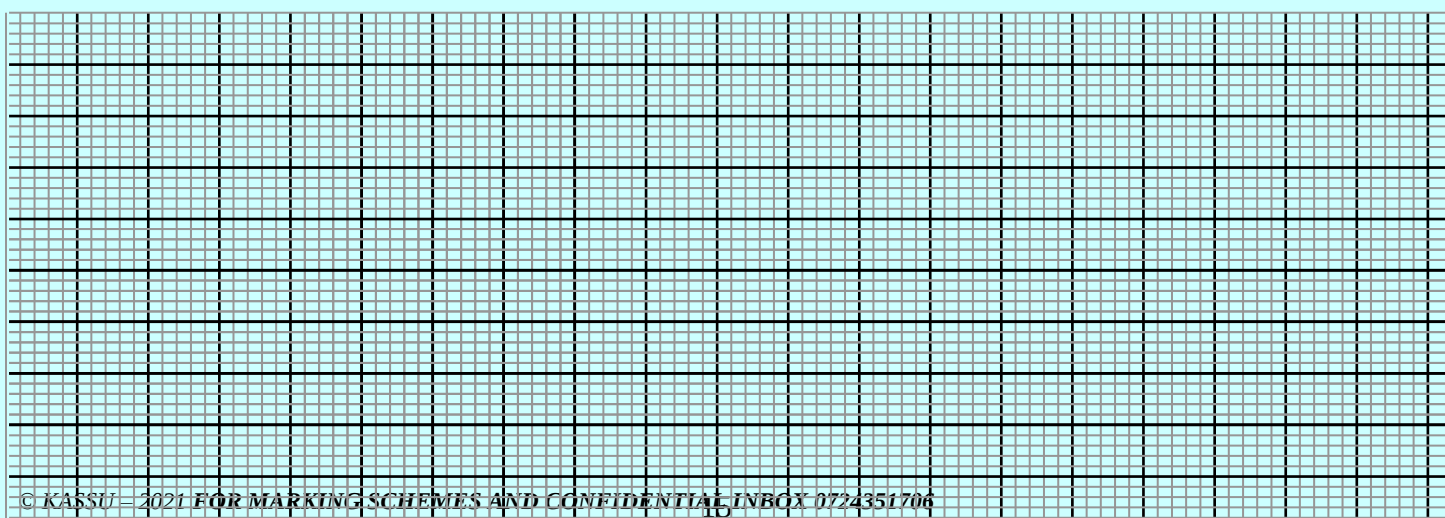
SECTION B (40MARKS)

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

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

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

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



b) **What** was the dry weight of the endosperm and embryo on the 5th day? (2marks)

Endosperm

.....

Embryo

.....

c) **Account** for:

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

.....

.....

.....

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

.....

.....

.....

iii) Decrease in total dry weight from day 0 to day 8 (2marks)

.....

.....

.....

d) **State** the role of the following in germination (2marks)

i) Glucose

.....

.....

.....

.....

.....

.....

(b) **Explain** how halophytes are adapted to their habitat (10 marks)

(b) **Describe** the structural factors affecting transpiration (8 marks)

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Name..... Index Number.....

Student's Signature.....

231/3

BIOLOGY

PAPER 3

PRACTICAL

SEPTEMBER 2021

1 ¾ HOURS

KASSU JOINT EXAMINATION
Kenya Certificate of Secondary Education
BIOLOGY
Paper 3
Practical
TIME: 1 ¾ Hours

Q1. You are provided with Four Test-tubes label as **A, B, C** and **D**. You are required to prepare the contents of test tube **A, B, C** and **D** as follows.

To test tube **A** add 2cm³ of solution **R** provided and test using the provided reagent.

To test tube **B** add 2cm³ of solution **T** provided and test using the provided reagent.

(5 marks)

(a)

Test tube	Procedure	Observation	Conclusion
A			
B			

(b) To test tube **C** and **D**, prepare them as follows:

To test tube **C** add 2cm³ of **R** and 2cm³ of solution **H** provided boil it and allow it to stand for 5 minutes.

To test tube **D** add 2cm³ of **R** and 2cm³ of solution **T** boil and allow it to stand for 30 minutes. For both **C** and **D** test using the provided reagents and tabulate your results below.

(5 marks)

Test tube	Procedure	Observation	Conclusion
C			
D			

(c) To the provided visking tubing tie one end with the provided string and add solution **R**. Tie the remaining end and immerse it in a solution of iodine solution in a beaker (50ml). After 2 minutes remove it from the beaker and observe.

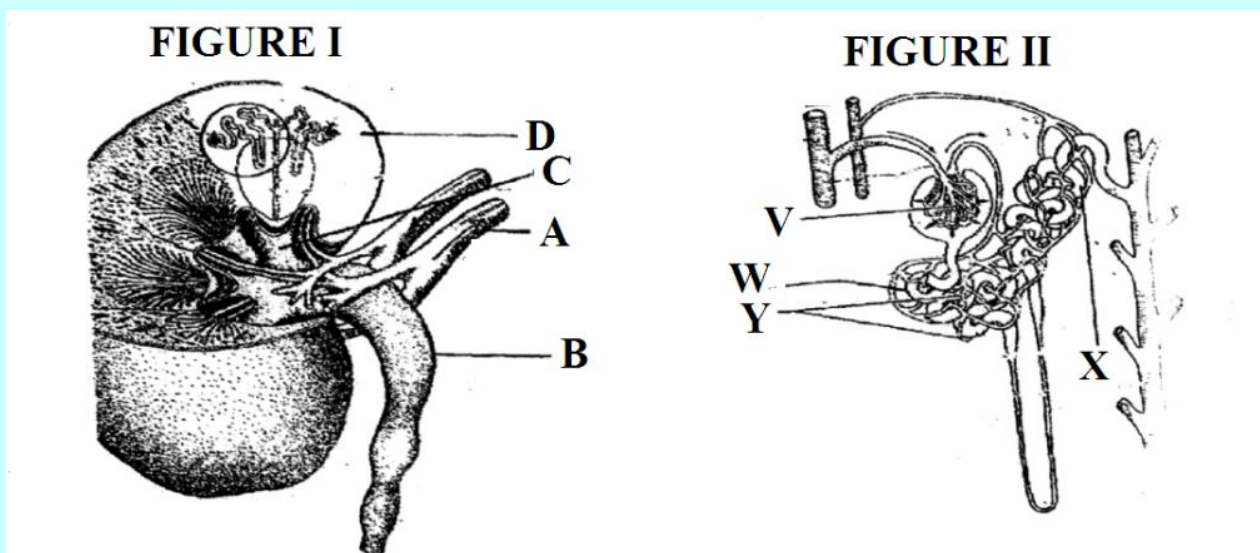
- (i) What was your observation of the contents of the visking tubing at the end of experiment? (1 mark)

.....

- (ii) Account for your results in (i) above. (3 marks)

.....

2. Study the kidney diagrams below:



- a) i) Name the part labeled A in figure 1 (1mark)

A

- ii) Name the process that takes place in the parts labeled V.

V

(1 mark)

b) State two homeostatic functions of the organ in the diagram above. (2marks)

.....

.....

c) Explain what will happen to the process of urine formation in absence of ADH. (3marks)

.....

.....

.....

.....

d) Below are photographs labeled **B** and **C** of organs obtained from different animals. The organs perform similar functions. Examine them and answer the questions that follow.



(i) Name the parts labeled B1, B2 and B3 in photographs B (3marks)

B1

B2

B3

(ii) Identify the parts labeled K1, K2 and K3 in photograph C (3marks)

K1

K2

K3

3. Study the diagrams set **A₁**, set **E₁**, set **M₁** and set **B** carefully and answer the questions below



(a) State the conditions under which each set up was grown. (3mks)

Set A₁ _____

Set E₁ _____

Set B _____

(b) (i) Name the phenomenon exhibited by seedlings in set E₁ (1mk)

(ii) Give a reason why plants exhibit the phenomenon named in (b) (i) above (1mk)

(c) (i) Name the response exhibited by the seedlings in set B. (1mk)

(ii) Explain how the response named in (c) (i) above occurred
(2mks)

(d) (i) State the type of germination exhibited by seedlings in set A₁ and set M₁.
(2mks)

Set A₁ _____

Set M₁ _____

(ii) Give a reason for your answer in (d) (i) above (2mks)

Set A₁ _____

Set M₁ _____

(iii) State the mode of dispersal in set A above when mature.(1 mk)

(iv) Name the type of fruit formed by M₁ on maturity. (1 mk)
