Name_____ **Index No.** _____

Candidate's signature _____

Date _____

231/1
BIOLOGY
PAPER 1
THEORY
JULY/AUGUST 2021
2 HOURS

GOLDEN ELITE EXAMINATION CYCLE 1

Kenya Certificate of Secondary Education
BIOLOGY
PAPER 1
2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer all the questions
4. Answers must be written in the spaces provided in the question paper
5. Additional pages must not be inserted
6. This paper consists of 11 printed pages
7. Candidates should check the questions paper to ascertain that all the pages are printed as indicated and no questions are missing

For examiner's use only

Question	Maximum score	Candidate's score
1 – 27	80	

This paper consists of 11 printed pages

Turn Over

1. (a) What is a specimen? (1mk)

_____

_____

_____

(b) Name the chemical used for preservation of specimen in the laboratory (1mk)

_____

_____

_____

2. Explain how the following cells are specialized to perform their function
(a) Root hair cell. (1mk)

_____

_____

_____

(b) Sperm cell (1mk)

_____

_____

_____

3. Give a reason for the following during investigation of starch in a leaf
(a) Exposing the leaf to light for a few hours (1mk)

_____

_____

_____

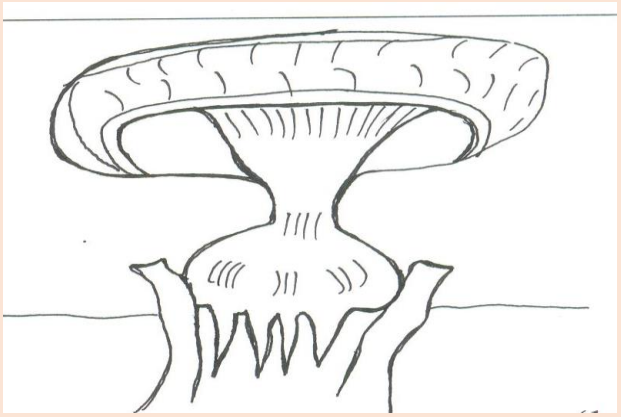
(b) Dipping the leaf in boiling water (1mk)

_____

_____

_____

4. The following diagram represents a plant



(a) To which division does the above plant belong? (1mk)

_____

_____

_____

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

_____

_____

_____

(c) State one economic importance of the plant above. (1mk)

_____

_____

_____

5. The following is a food chain that was presented by a pupil in a class

Grasshopper ⟶ lizards ⟵ chicken ⟶ hawk

State errors that are in the food chain. (2mks)

_____

_____

_____

_____

6. After four months of pregnancy, the ovaries of a woman can be removed without terminating pregnancy. However during the first four months of pregnancy the ovaries must remain intact if pregnancy is to be maintained. Explain these observations. (2mks)

_____

_____

_____

_____

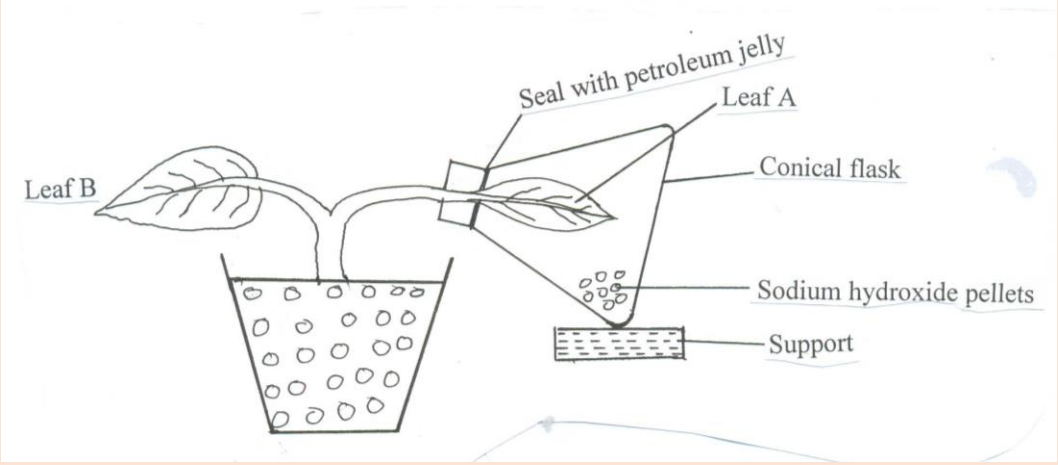
7. What is the significance of chiasma formation during meotic cell division? (1mk)

_____

_____

_____

8. Below is an experiment set to investigate a factor necessary for photosynthesis



(a) Suggest the aim of the experiment above (1mk)

_____

_____

_____

(b) Give a reason for

(i) Using sodium hydroxide pellets. (1mk)

_____

_____

_____

(ii) Testing leaf B for starch (1mk)

_____

_____

_____

(iii) Sealing the mouth of the conical flask with petroleum jelly. (1mk)

_____

_____

_____

9. Mention two differences between pollen grains of wind and insect pollinated flowers (2mks)

_____

_____

_____

_____

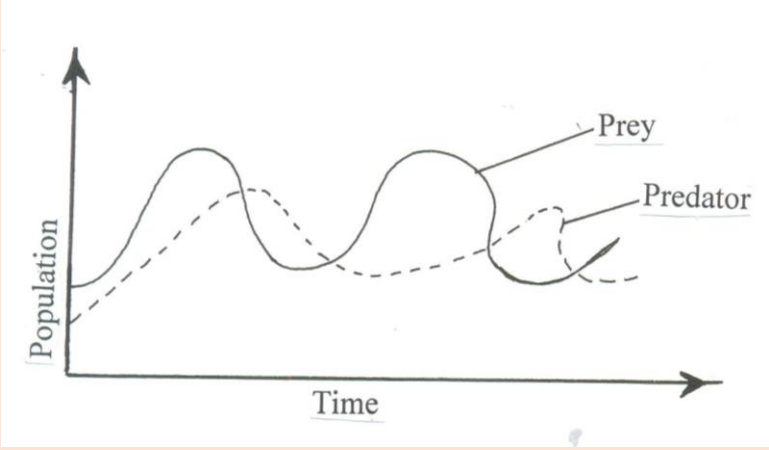
10. (a) Distinguish between predator and prey? (2mk)

_____

_____

_____

_____



(b) The figure above shows predator/prey relationship. Study the figure and answer the questions that follow

Describe the relationship between the predator and prey. (2mks)

_____

_____

_____

_____

11. A person who is 30 years old is able to see clearly far objects and not near objects. State the defect and how it can be corrected. (2mks)

_____

_____

_____

_____

12. In a certain bird species, black colour of feather is dominant over the white colour. A heterozygous black bird is crossed over with a homozygous white bird.

(a) State the genotypes of the two parents. Use letter B to represent gene for black colour and b for white colour. (2mks)

_____

_____

_____

_____

(b) (i) Using the information above work out the crossing. (3mks)

13. What is the importance of caecum and appendix in herbivores? (1mk)

_____

_____

14. The table below shows the effect of wind, still air and stomatal opening on the rate of transpiration of a plant in milligrams of water lost per hour dm^2. Study the table and answer the following questions

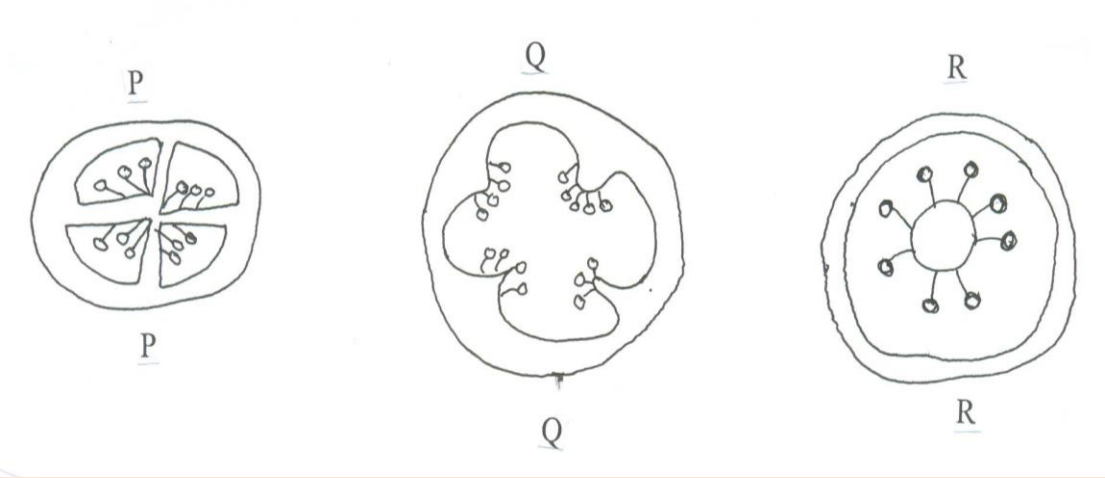
Stomatal opening (μm)	1	2	3	4	5	6	7
Windy	40	63	74	86	94	110	124
Still air	0	6	12	19	23	27	30

(a) (i) Compare the rates of transpiration in windy and still air conditions (1mk)

(ii) Explain your observation (2mks)

(b) How does stomatal opening affect transpiration rate? (2mks)

15. Below are cross sectional diagrams of fruits



Identify the type of the placentation present in the three diagrams. (3mks)

16. In a prolonged drought period, forage was scarce. It made animals reach out to higher forage and this way the giraffes got the stretched long necks.

(a) What is the term used for a characteristic such as long necks outlined. (1mk)

(b) What theory is this? (1mk)

(c) State its limitation. Explain. (2mks)

17. (a) What happens when a Rh^+ blood is given to a Rh^- recipient. (2mks)

(b) Suggest what happens if the same recipient is given another dose of Rh^+ blood in a period less than two weeks. (1mk)

18. The table below shows the effect of temperature on the activity of amylase on starch. Six test – tubes each containing a mixture of starch and amylase were placed in water baths maintained at 0^0c, 10^0c, 20^0c, 30^0c, 40^0c and 50^0c and allowed to stand. Study the table and answer the questions that follow

Test –tube	Temperature 0^0c	Time taken for starch digestion (minutes)
1	0	Starch still present after 60 minutes
2	10	22
3	20	11
4	30	5
5	40	3.5
6	50	Starch still present after 60 minutes

(a) How does temperature affect the action of amylase? (1mk)

(b) Give one reason in each case for the results obtained in the tubes kept at:

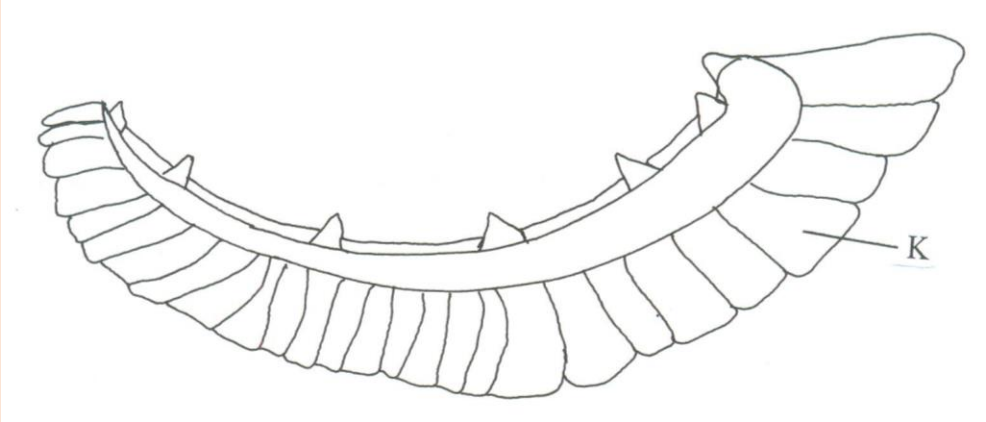
(i) 0^0c (1mk)

(ii) 50^0c (1mk)

(c) Suggest the time it would take amylase to digest starch if the temperature is kept at 0^0c (1mk)

19. By which process does the mammalian body maintain a constant temperature? (1mk)

20. The diagram below represents an organ from the body of a fish. Study it and answer the questions that follow.

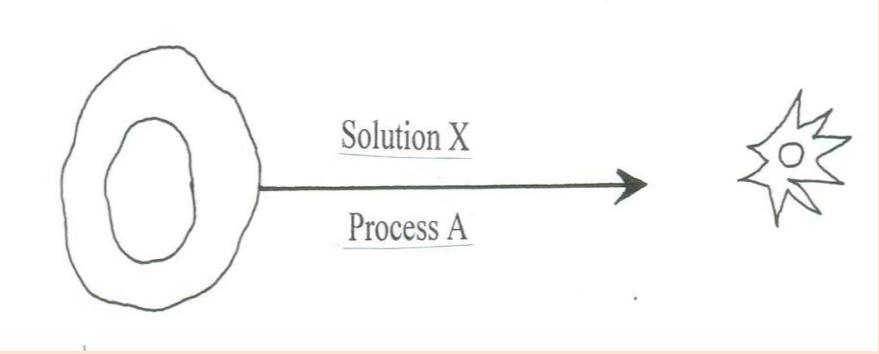


(a) Name the organ (1mk)

(b) State three ways in which part K is adapted to its function. (3mks)

21. State three functions of mammalian blood (3mks)

22. The diagram below illustrates the behaviour of a red blood cell when placed in solution X

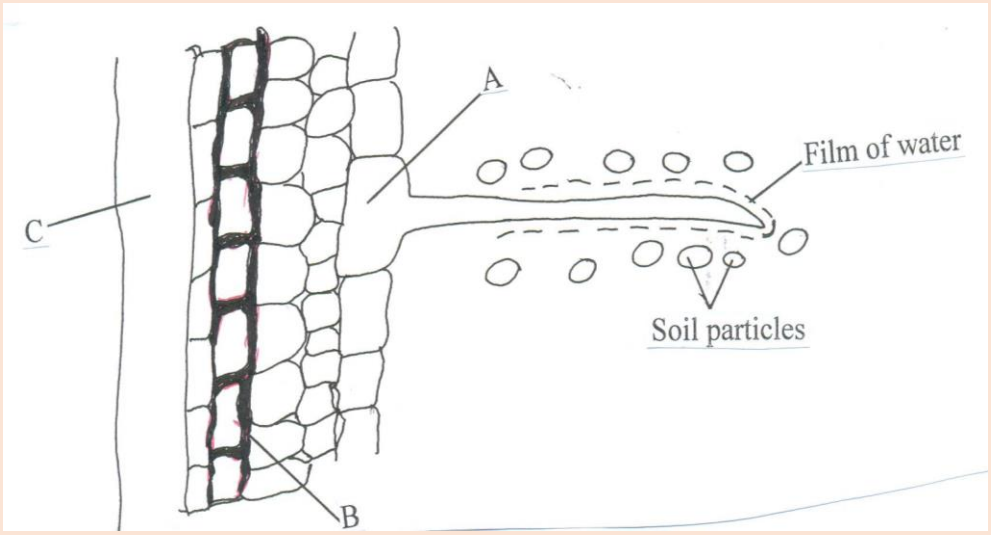


(a) Suggest the nature of solution X (1mk)

(b) Name process A (1mk)

(c) Account for the appearance of the red blood cell (3mks)

23. The diagram below illustrates the path way of water from soil into the plant



(a) Name the structures labeled C and B (2mks)

C _____

B _____

(b) State two ways in which the structure labelled A is adapted to its functions. (2mks)

_____

_____

_____

_____

24. Explain why oxygen is important in the process of active transport in cells (2mks)

_____

_____

_____

_____

25. State two advantages of metamorphosis to the life of insects (2mks)

_____

_____

_____

26. The process that occurs in plants is represented by the equation below;

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

(a) Name the process (1mk)

(b) State economic importance of the process named in (a) above. (3mks)

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

(b) Explain why they are not present in the glomerular filtrate (2mks)

Name_____ Index No. _____

Candidate's signature _____

Date _____

231/2
BIOLOGY
PAPER 2
THEORY
JULY/AUGUST 2021
2 HOURS

GOLDEN ELITE EXAMINATION CYCLE 1
Kenya Certificate of Secondary Education
BIOLOGY
PAPER 2
2 HOURS

INSTRUCTIONS TO CANDIDATES
(a) Write your name and index number in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided above.
(c) This paper consists of two sections A and B
(d) Answer all the questions in section A in the spaces provided
(e) In section B answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.

For examiner's use only

Question	Maximum score	Candidate's score
1	8	
2	8	
3	8	
4	8	
5	8	

6	20	
	20	
Total score	80	

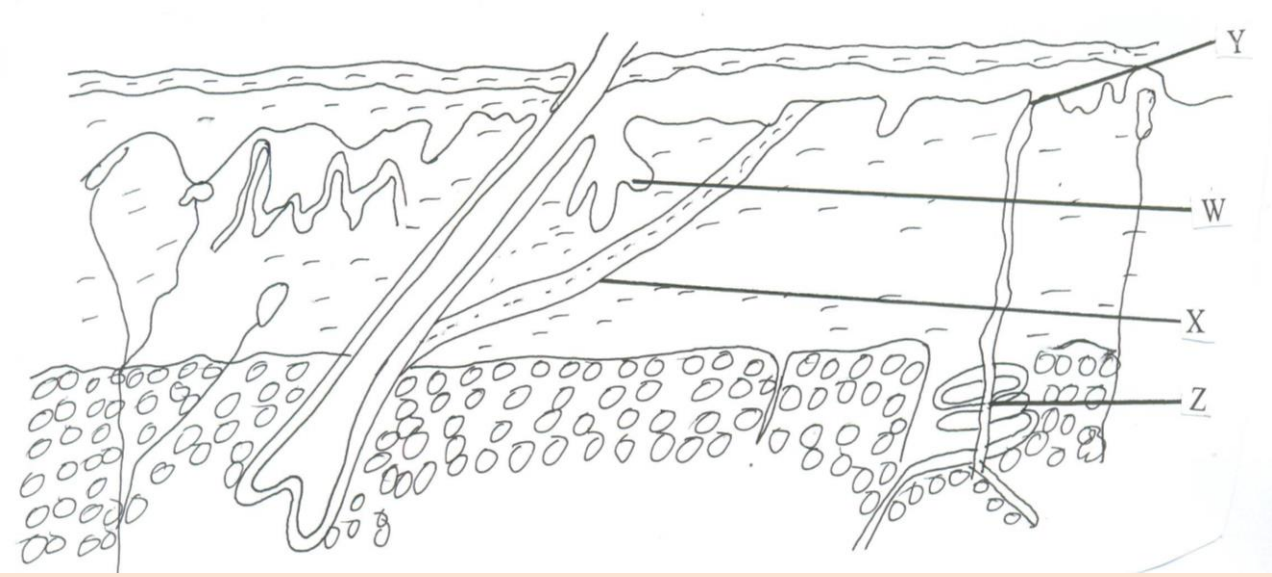
This paper consists of 11 printed pages

Turn Over

SECTION A 40 MARKS

Answer all the questions in this section in the space provided

1. The diagram below shows a section through the mammalian skin



(a) Name the parts labelled W and X (2mks)

W _____

X _____

(b) State the function of the parts labelled Y and Z (2mks)

_____

_____

_____

_____

(c) Explain the changes that occur in the skin when it is cold (4mks)

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. (a) Eye colour in fruits flies is sex-linked. Red eye colour R is dominant to white eye colour r
A heterozygous red –eyed female fly was crossed with a white eyed male

(i) Show the parental genotypes (1mk)

_____

_____

_____

(ii) By means of a genetic cross, determine the genotypic ratio of the offsprings (4mks)

(iii) Explain why the actual phenotype ratio obtained from this cross could differ from the Expected (1mk)

_____

_____

_____

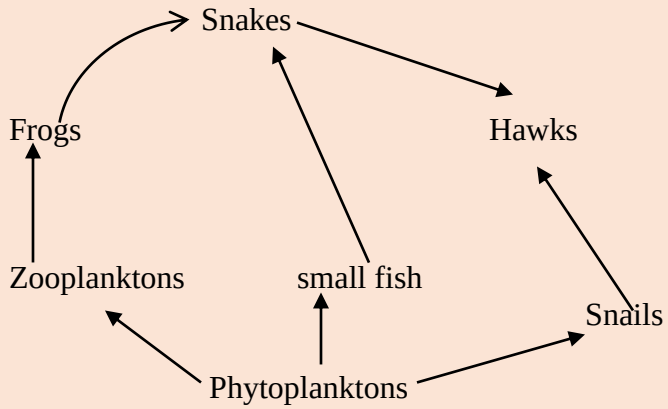
(b) Name two disorders due to non-disjuction (2mks)

_____

_____

_____

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



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

_____

_____

_____

(b) Name the organism in the food web that

(i) Is a producer

_____

_____

_____

(ii) Occupies the highest tropic level. (1mk)

_____

_____

_____

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

_____

_____

_____

_____

(ii) State two short terms effects on the above ecosystem if all the small fish were killed (2mks)

_____

_____

_____

_____

(d) (i) How does oil spills lead to death of fish? (1mk)

_____

_____

_____

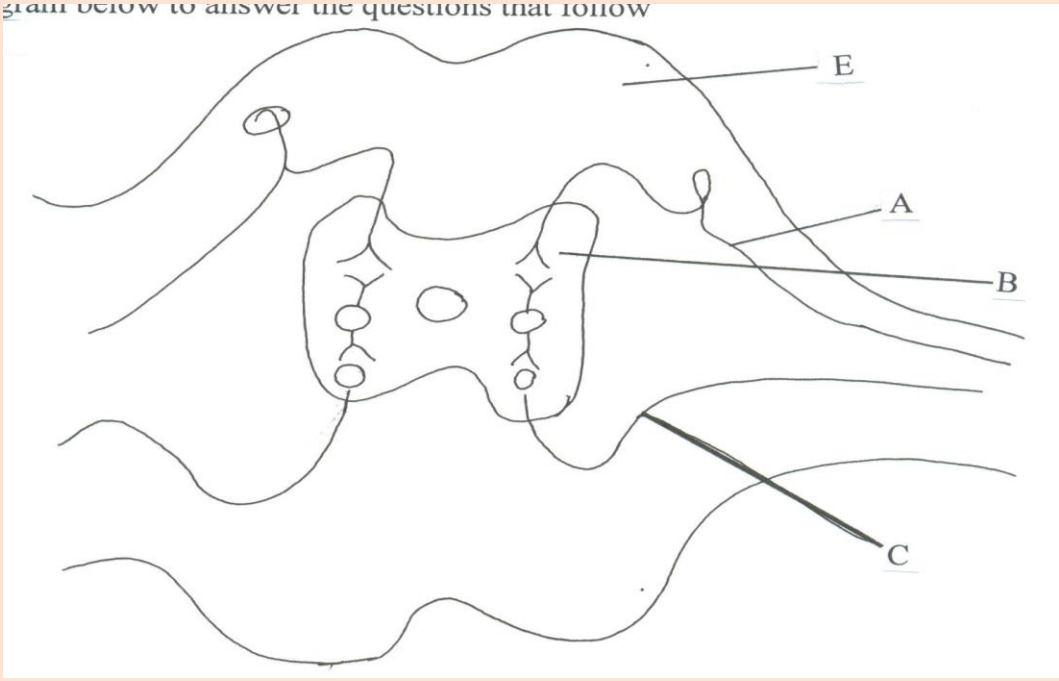
(ii) Name one other cause of water pollution apart from oil spills. (1mk)

_____

_____

_____

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



(a) Name parts labeled A, B and C (3mks)

A _____

B _____

C _____

(b) What is the function of the following?

(i) A (1mk)

_____

_____

_____

(ii) C (1mk)

_____

_____

_____

(c) Name a part (not on the diagram) that

(i) Detects a stimulus (1mk)

_____

_____

_____

(ii) Brings about a response (1mk)

_____

_____

_____

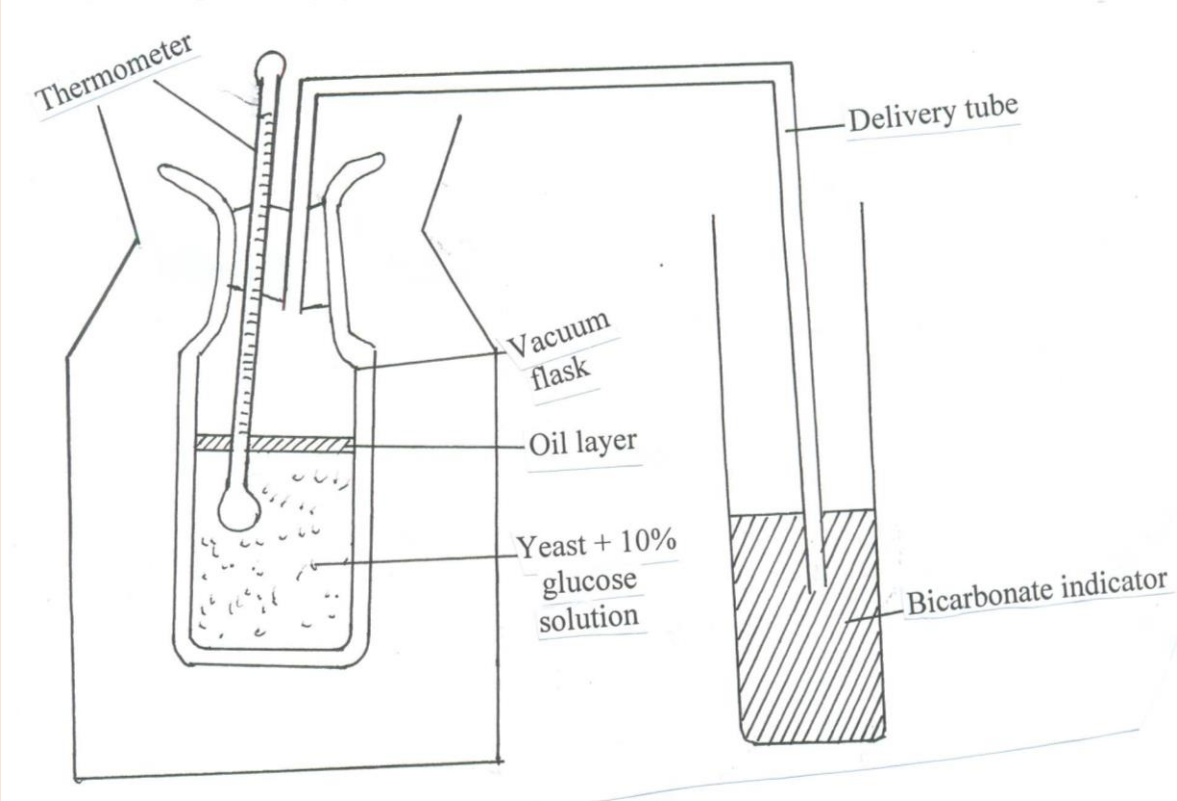
(d) Why is part B darker than part labelled E (1mk)

_____

_____

_____

5. The experiment below was set – up to investigate some physiological processes. The glucose solution was first boiled then cooled. The set up was left for 24 hours



(a) Suggest two aims of the experiment. (2mks)

_____

_____

_____

_____

(b) (i) State the expected observations after 24 hours (2mks)

_____

_____

_____

_____

(ii) Explain your observations in a (i) above (2mks)

_____

_____

_____

_____

(iii) Why was glucose solution boiled then cooled? (1mk)

_____

_____

_____

(c) Suggest a control for the above experiment. (1mk)

_____

_____

_____

SECTION B – 40 MARKS

6. In an experiment to investigate a certain process in a given plant species, the rate of carbon(iv) oxide consumption and the rate of carbon (iv) oxide released were measured over a period of time of the day. The results of the investigation are shown in the table below.

Time of day (hrs)	6	8	10	12	14	16	18	20	22	24
Carbon (iv)oxide consumption mm^3/min	0	43	69	91	91	50	18	0	0	0
Carbon (iv) oxide released mm^3/min	38	22	10	3	3	6	31	48	48	48

(a) On the same axes, draw the graphs of volume of carbon (iv) oxide consumed and released against time (7mks)

(b) Name the biochemical process represented by

(i) Carbon (iv) oxide consumption (1mk)

_____

_____

_____

(ii) Carbon (iv) oxide release (1mk)

_____

_____

_____

(c) Account for the shape of the curve for

(i) carbon (iv) oxide consumption (3mks)

_____

_____

_____

_____

(ii) Carbon (iv) oxide release. (3mks)

_____

_____

_____

_____

(d) (i) From the graph state the time of the day when the plant attains compensation point (1mk)

(ii) What is made by compensation point? (2mks)

(e) Explain how temperature affects the rate of carbon (iv) oxide consumption in a plant. (2mks)

7. Explain how the following organisms are adapted to their mode of feeding
   (a) Herbivores (10mks)
   (b) Carnivores (10ms)

8. Describe how fruits and seeds are suited to their modes of dispersal. (20mks)

Name_____ **Index No.** _____

Candidate's signature _____

Date _____

231/3
BIOLOGY
PAPER 3
PRACTICAL
JULY/AUGUST 2021
1 ¾ HOURS

GOLDEN ELITE EXAMINATION CYCLE 1
Kenya Certificate of Secondary Education
BIOLOGY
PAPER 3
1 ¾ HOURS

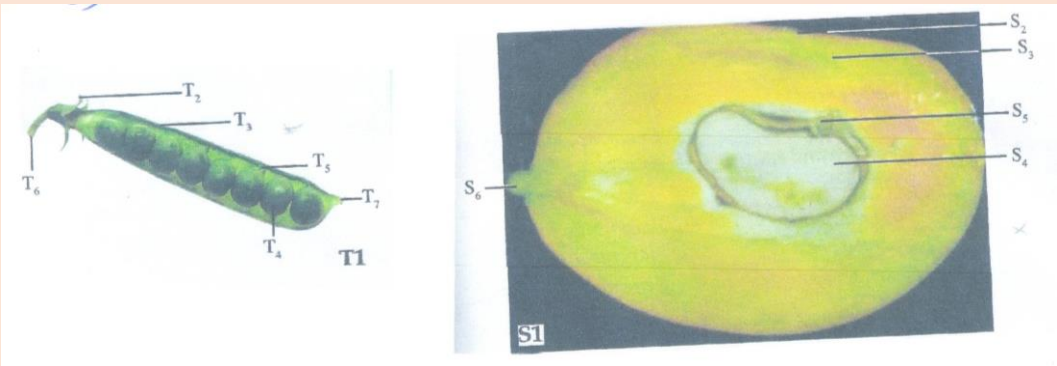
INSTRUCTIONS TO CANDIDATES
(a) Write your name and index number in the spaces provided above.
(b) Answer all the three questions in the spaces provided
(c) You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully before commencing your work.
(d) Additional papers must not be inserted in this paper

For examiner's use only

Question	**Maximum score**	**Candidate's score**
1	21	
2	07	
3	12	
Total score	40	

This paper consists of 5 printed pages

1. (a) Study the diagrams T_1 and S_1 carefully and answer the following questions:



(i) Name the parts labeled S_2, S_3, S_4, S_5 and S_6. (5mks)

S_2 _____

S_3 _____

S_4 _____

S_5 _____

S_6 _____

(ii) Name the parts labeled T_2, T_3, T_4 and T_5. (4mks)

T_2 _____

T_3 _____

T_4 _____

T_5 _____

(iii) Complete the following table showing the type of fruit and reasons for each answer

Specimen	Type of fruit	Reasons
S_1		
T_1		

2

(iv) Complete the table below showing method of dispersal and reasons for each answer.

Specimen	Method of dispersal	Reasons
S_1		
T_1		

Max 2mks

(b) You are provided with a fruit labeled V.

(i) Cut a transverse section through specimen V. Draw and label of the cut surfaces. (4mks)

(ii) State the type of placentation of specimen V. (1mk)

_____

_____

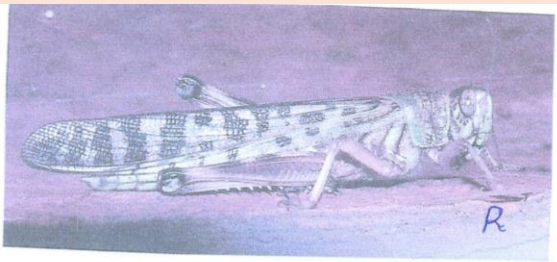
_____

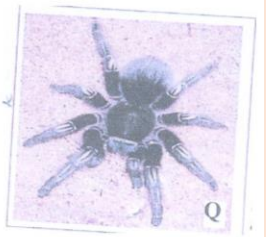
(iii) Squeeze out the juice from one of the halves of specimen V. Using the reagents provided carry out tests to identify the type of food substances present in the juice

Food substance	Procedure	Observation	Conclusion

(3mks)

2. Study the diagrams Q and R carefully and answer the following questions.





(a) (i) Name the phylum to which specimens R and Q belong. (1mk)

_____

_____

_____

(ii) State two reasons for your answer in a (i) above. (2mks)

_____

_____

_____

_____

(b) (i) Name the class to which each of R and Q belong (2mks)

R _____

Q _____

(ii) State reasons for your answer in (b) (i) above (2mks)

R _____

Q _____

3. Study the diagrams set A_1, set E_1, set M_1 and set B carefully and answer the questions below

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

Set A_1 _____

Set E_1 _____

Set B _____

(b) (i) Name the phenomenon exhibited by seedlings in set E_1 (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 A_1 and set M_1. (2mks)

Set A_1 _____

Set M_1 _____

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

Set A_1 _____

Set M_1 _____

5