

FORM 4 END TERM 1 EXAMS BIOLOGY

Class of KCSE March 2022.

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BIOLOGY
PAPER 1
END TERM 1

Name..... Index No:.....
Signature
Date:

231/1
Biology
Paper 1
2 hours

INSTRUCTIONS TO CANDIDATES

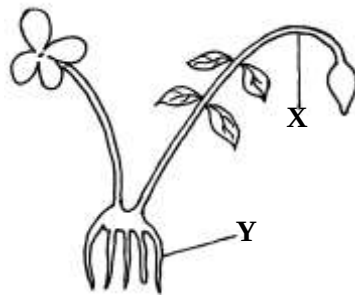
- Write your name, Index number and school in the spaces provided above.
- Answer All questions in the spaces provided on the question paper.
- Sign and write the date of examination in the spaces provided above.
- Additional pages must NOT be inserted.

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 missing.

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.

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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)

.....

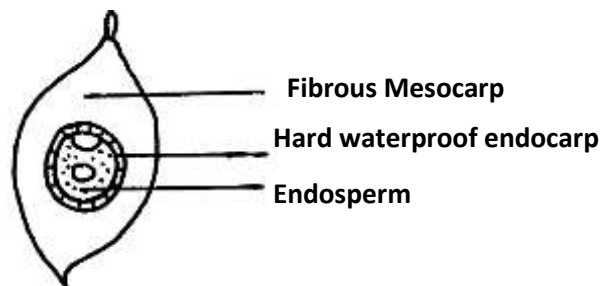
11. Explain the following:

- (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)

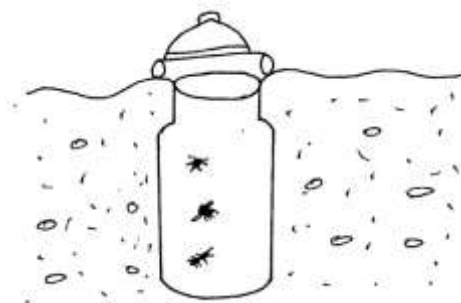
.....
15. State the function of the following organelles:

(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)

.....

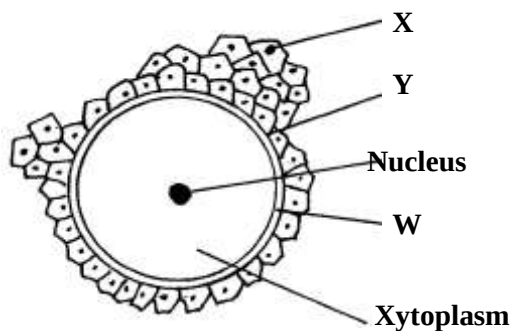
 22 State **three** roles played by active transport in living organisms. (3mks)

.....

 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).....

.....
.....

28.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) Crescent-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.



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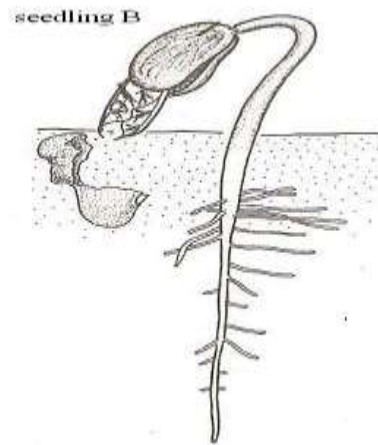
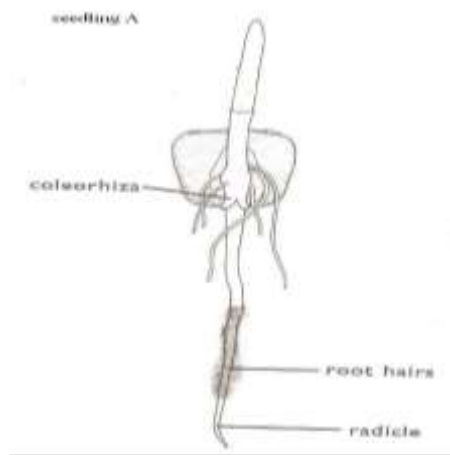
(Substance X)

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]

.....

BIOLOGY PAPER 2
(THEORY)
END TERM 1
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	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7 or	20	
	8	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

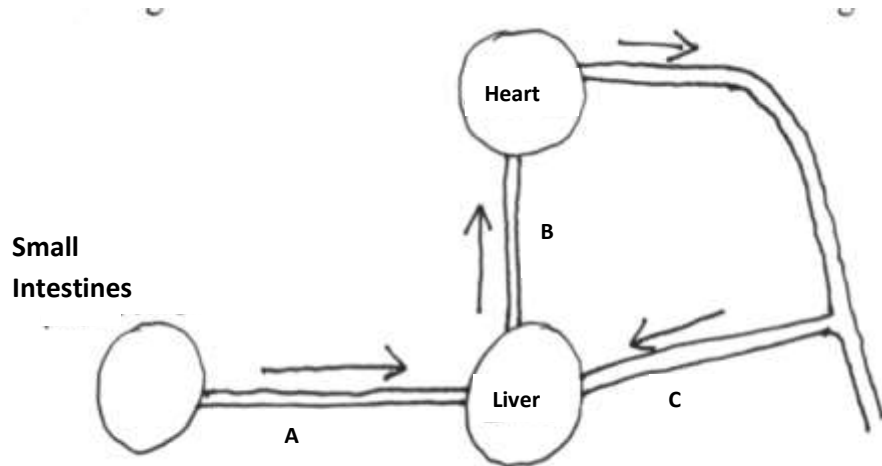
1. An investigation was carried out to study the effects of the concentration of sucrose solutions on pieces of tulip stem 44mm in length. The pieces were placed in different concentrations of sucrose solutions and measured after two hours of immersion. The results are shown in the table below.

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.

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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	

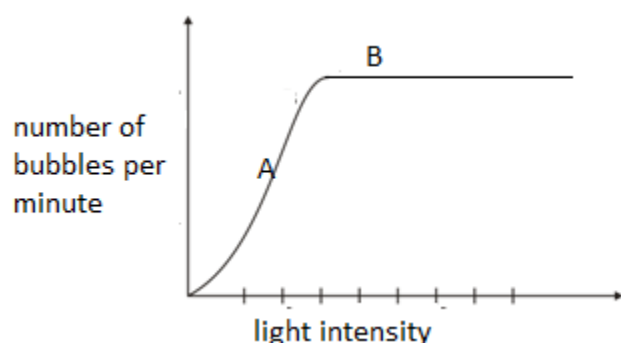
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- b) The table below shows results of marriages between various parents. Complete the table by writing the probability of each marriage producing a child with polydactyl. One has been done for you. (2mks)

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)

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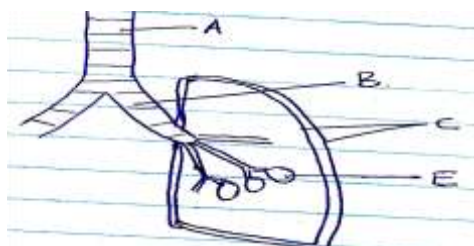
ii) Water.

(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 the 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)

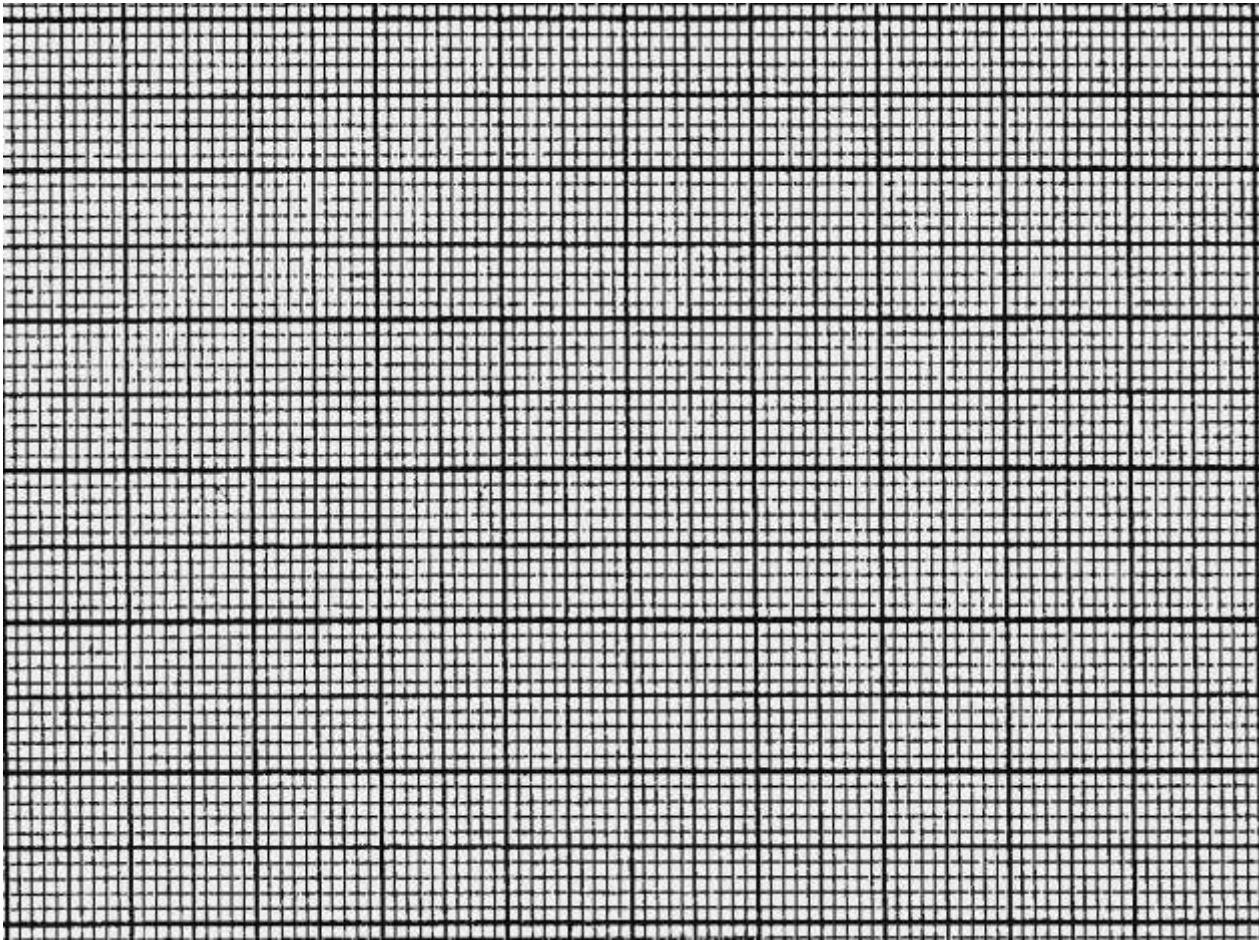
Answer question 6 (compulsory) and either questions 7 or 8 in the spaces provided after questions 8

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)

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(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)

[illegible]

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BIOLOGY PAPER
231/3
END TERM 1

CONFIDENTIAL

REQUIREMENTS

Each student will require:

1. Cork borer 3mm in diameter
2. An Irish potato (medium size)
3. 3 Petri dishes
4. Tissue paper
5. Distilled water solution labeled solution P (25mls)
6. Concentrated Salt solution Q (25mls)
7. 3 labels
8. A fresh Bougainvillea leaf labeled L.
9. A ripe tomato fruit labeled S.
10. A scalpel
11. A hand lens.
12. A 30cm plastic ruler.

BIOLOGY PAPER 3 (PRACTICAL)

231/3

END TERM 1

NAME INDEX NO.....DATE

SIGN

TIME 1 ¼ HOURS.

1. You are provided with;

- One Irish potato
- A cork borer
- Solution P
- Solution Q
- 3 Petri dishes
- Tissue paper
- 3 labels.

(a) Make three Irish potato cylinders each measuring 30mm in length. Place one cylinder on an empty Petri dish, one cylinder in solution P on a Petri dish and the other in solution Q on a Petri dish. Label the three Petri dishes as Air, P and Q respectively leave the set-ups to stand for 30 minutes. After 30 minutes, feel each cylinder with your fingers for texture and flexibility. Record your observation in the table below.

Cylinder in	Texture	Flexibility
Air		
Solution P		
Solution Q		

(6mks)

(b) Remove each cylinder from the solution (*after 30 minutes*). Wipe each with a tissue paper and measure their lengths again. Also measure the length of the cylinder placed in air. Record your measurements in the table below. Work out the percentage change in length and record in the last column.

Cylinder in	Initial length	Final length	% change
Air	30mm		
Solution P	30mm		
Solution Q	30mm		

(6mks)

(c) From your results in (a) and (b) above state the nature of solutions P and Q in relation to the potato cells.

Solution P

Solution Q(2mks)

(d) Why was the potato cylinder placed in air included in the experiment? (1mk)

.....

(e) (i) Account for the change in length of the potato cylinder placed in solution P. (3mks)

.....

.....

.....

(ii) Account for the change in length of the potato cylinder placed in solution Q. (3mks)

.....

.....

.....

(f) (i) Name the physiological process that was taking place in this experiment. (1mk)

.....

(ii) State the importance of the physiological process that you have named in f (i) above to plants. (3mks)

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.....

(g) (i) What would happen if the potato cylinders were first boiled before putting them in solutions P and Q? (1mk)

.....

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

.....

.....

2. You are provided with specimen L and a hand lens.
(a) (i) Draw and label the external parts of specimen L. (2mks)

(ii) Work out magnification. (1mk)

.....

.....

(b) What is the significance of total surface area of the leaf to the plant? (1mk)

.....

.....

(c) How is specimen L adapted to perform its functions? (3mks)

.....

.....

3. You are provided with specimen S. Observe specimen S carefully.

(a) With a reason, state the agent of dispersal for specimen S.

Agent..... (1mk)

Reason..... (1mk)

(b) Make a transverse section of specimen S.

(i) Name the type of placentation in specimen. (1mk)

.....

(ii) Name the type of reproduction exhibited by specimens S. (1mk)

.....

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

.....