23.4 BIOLOGY (231)

23.4.1 Biology Paper 1(231/1)

Name ..... **Index Number** ...../.....

231/1
BIOLOGY
Paper 1
(Theory)
Oct./Nov. 2007
2 hours

Candidate's Signature .....

Date .....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
BIOLOGY
Paper 1
(Theory)
2 hours

Write your name and index number in the spaces provided above.
Sign and write the date of examination in the spaces provided above.
Answer ALL the questions in the spaces provided.

For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1–26	80	

This paper consists of 10 printed pages

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

1 (a) What is meant by the term binomial nomeclature? (1 mark)

(b) Give **two** reasons why classification is important. (2 marks)

2 (a) What is the formula for calculating linear magnification of a specimen when using a hand lens? (1 mark)

(b) Give a reason why staining is necessary when preparing specimens for observation under the microscope. (1 mark)

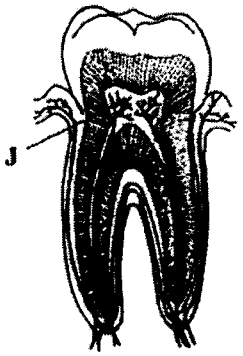
3 Plant cells do not burst when immersed in distilled water. Explain. (2 marks)

4 State **three** functions of Golgi apparatus. (3 marks)

5 Distinguish between diffusion and osmosis. (2 marks)

6 Describe what happens during the light stage of photosynthesis. (3 marks)

7 The diagram below represents a section through a human tooth.



(a) (i) Name the type of tooth shown. (1 mark)

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

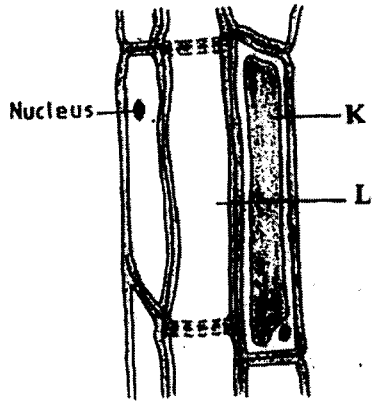
(b) State the functions of the structures found in the part labelled **J**. (2 marks)

8 (a) Name a fat soluble vitamin manufactured by the human body. (1 mark)

(b) State **two** functions of potassium ions in the human body. (2 marks)

9 State **two** ways in which the root hairs are adapted to their function. (2 marks)

10 The diagram below represents a plant tissue.



(a) Name the tissue. (1 mark)

(b) Name the cells labelled **K** and **L**. (2 marks)

K .....

L .....

(c) What is the function of the companion cell? (1 mark)

11 (a) What prevents blood in veins from flowing backwards? (1 mark)

(b) State **two** ways in which the red blood cells are adapted to their function. (2 marks)

12 (a) Name **two** structures for gaseous exchange in aquatic plants. (2 marks)

(b) What is the effect of contraction of the diaphragm muscles during breathing in mammals? (3 marks)

13 (a) Name the products of anaerobic respiration in

(i) plants (1 mark)

(ii) animals. (1 mark)

(b) What is oxygen debt? (1 mark)

14 (a) What is the meaning of the following terms:

(i) homeostasis (1 mark)

(ii) osmoregulation? (1 mark)

(b) Name the hormones involved in regulating glucose level in blood. (2 marks)

15 (a) Distinguish between population and community. (2 marks)

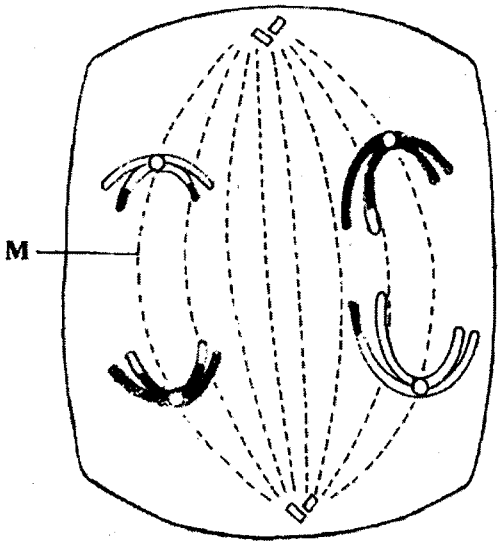
(b) Name a method that could be used to estimate the population size of the following organisms:

(i) fish in a pond (1 mark)

(ii) Black jack in a garden. (1 mark)

16 State **two** ways in which schistosoma species is adapted to parasitic mode of life. (2 marks)

17 The diagram below represents a stage during cell division.



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

(ii) Give **three** reasons for your answer in (a) (i) above. (2 marks)

(b) Name the structures labelled **M**. (1 mark)

18 State **two** disadvantages of sexual reproduction in animals. (2 marks)

19 (a) State **two** environmental conditions that can cause seed dormancy. (2 marks)

(b) Name the part of a bean seed that elongates to bring about epigeal germination. (1 mark)

20 (a) What is meant by the term allele? (1 mark)

(b) Explain how the following occur during gene mutation:

(i) deletion (1 mark)

(ii) inversion. (1 mark)

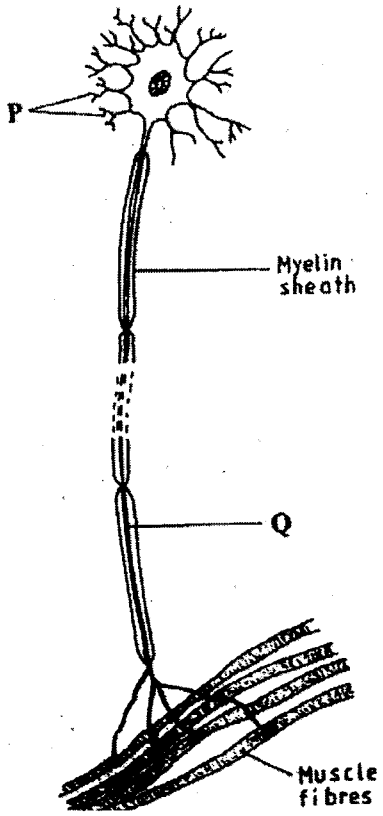
(c) What is a test-cross? (1 mark)

21 (a) What is adaptive radiation? (2 marks)

(b) Give a reason why organisms become resistant to drugs. (1 mark)

22 (a) Where in the human body are relay neurones found? (1 mark)

(b) The diagram below represents a neurone.



(i) Name the neurone. (1 mark)

(ii) Name the parts labelled **P** and **Q**. (2 marks)

P .....

Q .....

(c) State a function of myelin sheath. (1 mark)

23 (a) Name the hormone that is responsible for apical dominance. (1 mark)

(b) What is thigmotropism? (1 mark)

24 (a) State a characteristic that is common to all cervical vertebrae. (1 mark)

(b) Name **two** tissues in plants that provide mechanical support. (2 marks)

25 (a) The action of ptyalin stops at the stomach. Explain. (1 mark)

(b) State a factor that denatures enzymes. (1 mark)

(c) Name the features that increase the surface area of small intestines. (2 marks)

26 State **one** way by which HIV/AIDS is transmitted from mother to child. (1 mark)

23.4.2 Biology Paper 2(231/2)

Name ..... **Index Number** ...../.....

231/2
BIOLOGY
Paper 2
Oct./Nov. 2007
2 hours

Candidate's Signature .....

Date .....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
BIOLOGY
Paper 2
(Theory)
2 hours

Write your name and index number in the spaces provided above.
Sign and write the date of examination 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	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total Score	**80**	

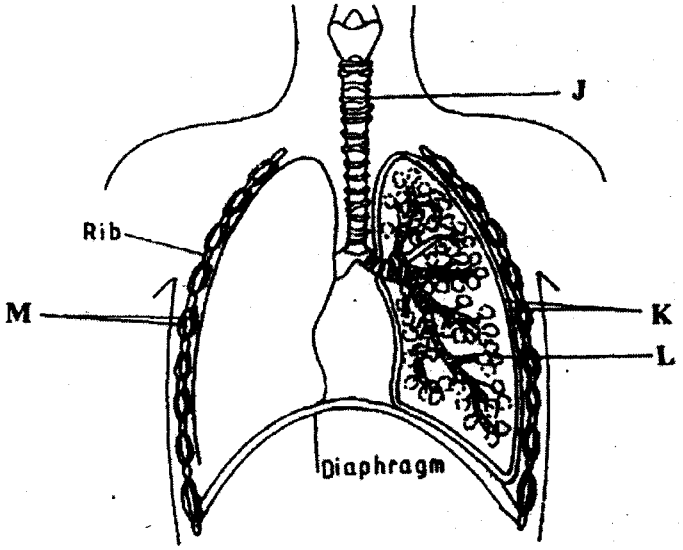
This paper consists of 10 printed pages

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

SECTION A (40 marks)

Answer ALL questions in this section in the spaces provided.

1 The diagram below represents some gaseous exchange structures in humans.



(a) Name the structures labelled **K, L and M.** (3 marks)

(b) How is the structure labelled **J** suited to its function? (3 marks)

(c) Name the process by which inhaled air moves from the structure labelled **L** into blood capillaries. (1 mark)

(d) Give the scientific name of the organism that causes tuberculosis in humans. (1 mark)

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

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

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

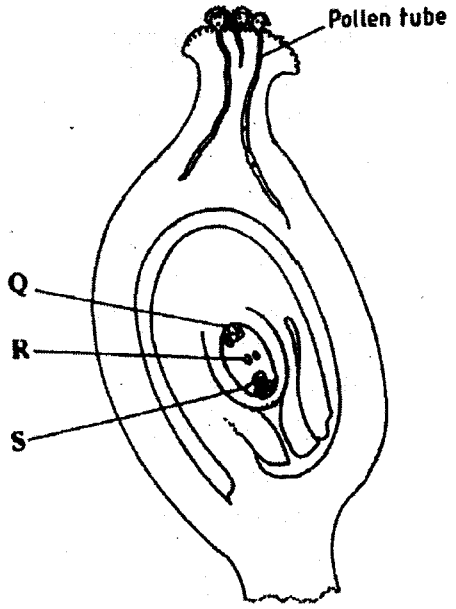
(ii) What term is given to the condition described in (c)(i) above? (1 mark)

3 (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)

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

(c) On the diagram, label the micropyle. (1 mark)

4 (a) Name the three types of muscles found in mammals and give an example of where each one of them is found. (3 marks)

Type of muscle	Where found

(b) State the difference between ball and socket and hinge joint. (1 mark)

(c) State the functions of synonial fluid. (2 marks)

(d) State two advantages of having an exoskeleton. (2 marks)

5 In maize the gene for purple colour is dominant to the gene for white colour.
A pure breeding maize plant with purple grains was crossed with a heterozygous plant.

(a) (i) Using letter G to represent the gene for purple colour, work out the genotypic ratio of the offspring. (5 marks)

(ii) State the phenotype of the offspring. (1 mark)

(b) What is genetic engineering? (1 mark)

(c) What is meant by hybrid vigour? (1 mark)

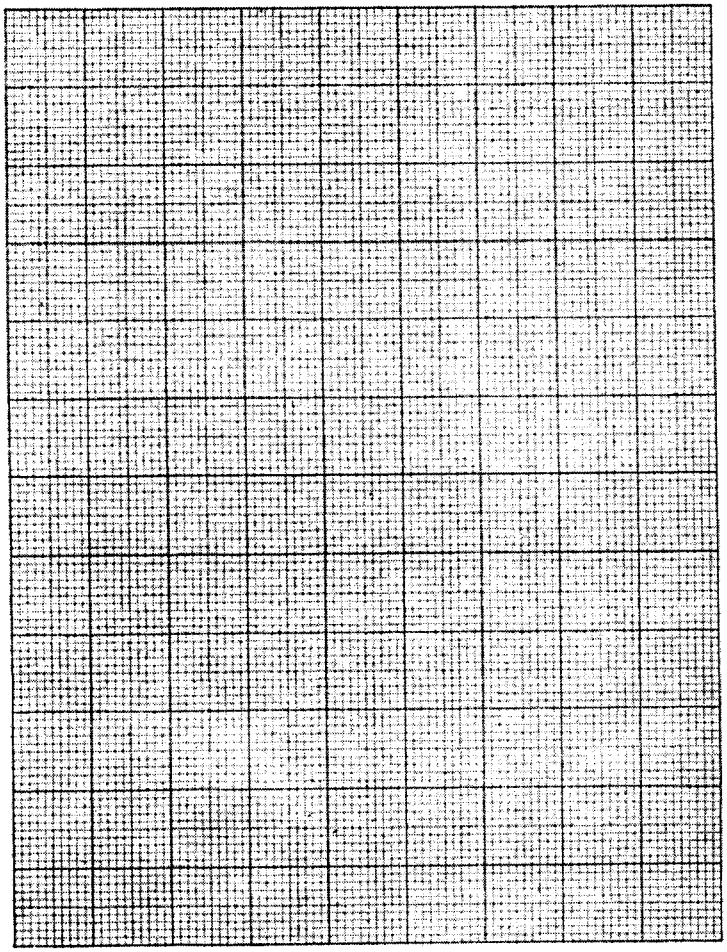
SECTION B (40 marks)

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

6 In an experiment to determine the effect of ringing on the concentration of sugar in phloem, a ring of bark from the stem of a tree was cut and removed. The amount of sugar in grammes per $16cm^3$ piece of bark above the ring was measured over a 24 hour period. Sugar was also measured in the bark of a similar stem of a tree which was not ringed. The results are shown in the table below.

Time of the day	Amount of sugar in grammes per 16 cm^3 piece of bark	
	Normal stem	Ringed stem
06 45	0.78	0.78
09 45	0.80	0.91
12 45	0.81	1.01
15 45	0.80	1.04
18 45	0.77	1.00
21 45	0.73	0.95
00 45	0.65	0.88

(a) Using the same axes, plot a graph of the amount of sugar against time. (6 marks)



(b) At what time was the amount of sugar highest in the

(i) ringed stem (1 mark)

(ii) normal stem? (1 mark)

(c) How much sugar would be in the ringed stem if it was measured at 03 45 hours? (1 mark)

(d) Give reasons why there was sugar in the stems of both trees at 06 45 hours. (2 marks)

(e) Account for the shape of the graph for the tree with ringed stem between:

(i) 06 45 hours and 15 45 hours (3 marks)

(ii) 15 45 hours and 00 45 hours. (2 marks)

(f) Name the structures in phloem that are involved in the translocation of sugars. (2 marks)

(g) Other than sugars name **two** compounds that are translocated in phloem. (2 marks)

7 Describe the structure and functions of the various parts of the human ear. (20 marks)

8 Describe causes and methods of controlling water pollution. (20 marks)

23.4.3 Biology Paper 3(231/3)

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

231/3
BIOLOGY
Paper 3
(PRACTICAL)
Oct./Nov. 2007
1 ¼ hours

Candidate's Signature .....

Date .....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
BIOLOGY
Paper 3
(PRACTICAL)
1 ¼ hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided at the top of this page.
Sign and write the date of examination in the spaces provided above.
*Answer **ALL** the questions.*
You are required to spend the first 15 minutes of the 1 ¼ 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.
*Additional pages must **not** be inserted.*

For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1	15	
2	13	
3	12	
Total Score	40	

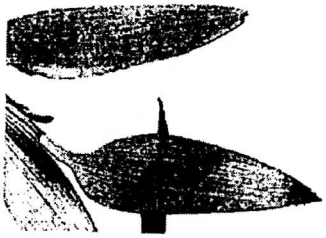
This paper consists of 6 printed pages

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

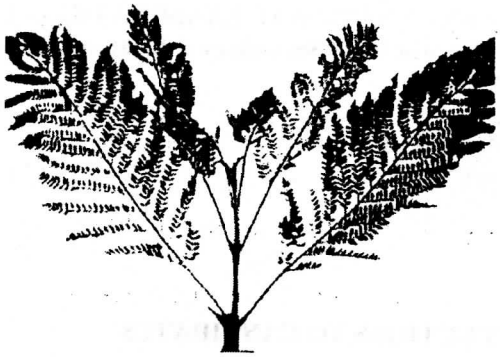
1 Below are photographs labelled **P, Q, R, S, T, U** and **V** of twigs obtained from plants. Examine them.

P

Q

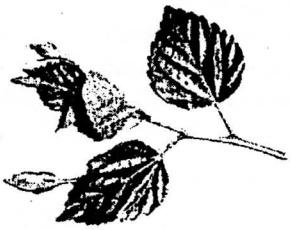


R



S

T



U

V

(a) Using observable features in the photographs, complete the dichotomous key given below. (3 marks)

1 a Simple leaves	go to 2
b Compound leaves	go to 5
2 a Leaves net-veined	go to 3
b Leaves parallel-veined	Commelinaceae
3 a	go to 4
b Leaves with smooth margin	Nyctaginaceae
4 a Leaves alternate	Malvaceae
b	Verbenaceae
5 a	go to 6
b Leaves bipinnate	Bignoniaceae
6 a Leaflets with serrated margin	Compositae
b Leaflets with smooth margin	Papilionaceae

(b) Use the completed dichotomous key to identify the family to which each plant belongs. In each case show the steps you followed to arrive at the identity. (12 marks)

	Identity	**Steps followed**
P	.....	.....
Q	.....	.....
R	.....	.....
S	.....	.....
T	.....	.....
U	.....	.....
V	.....	.....

2 You are provided with solutions labelled **P, Q, S** and a filter paper. The solution labelled **P** will be used in parts (a), (b) and (c).
Solution **Q** is iodine solution.

(a) Use the iodine solution to test for the presence of the food substance in solution **P**.

Food substance (1 mark)

Procedure (1 mark)

Observation (1 mark)

Conclusion (1 mark)

Solution **S** is Benedict's solution.

(b) Use the Benedict's solution to test for the presence of the food substance in solution **P**.

Food substance (1 mark)

Procedure (2 marks)

Observation (1 mark)

Conclusion (1 mark)

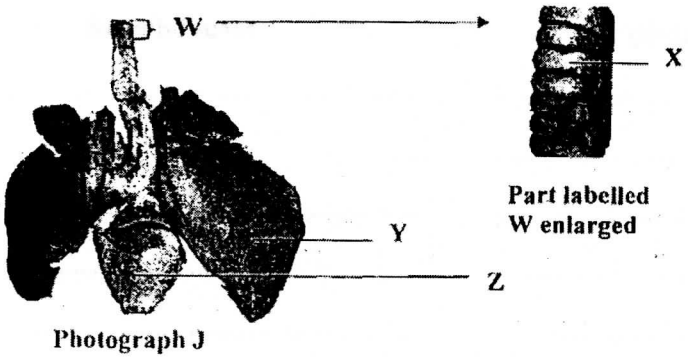
(c) Using the filter paper provided, test for the presence of lipids in solution **P**.

Procedure (2 marks)

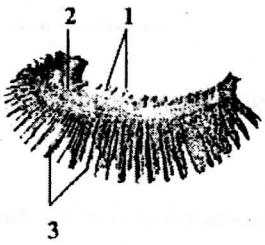
Observation (1 mark)

Conclusion (1 mark)

3 Below are photographs labelled **J** and **K** of organs obtained from different animals. The organs perform similar functions. Examine them.



Photograph J



Photograph K

(a) Identify the organs. (2 marks)

J .....

K .....

(b) State the function performed by the organs. (1 mark)

(c) Name the parts labelled **X, Y** and **Z** in photograph **J**. (3 marks)

X .....

Y .....

Z .....

(d) (i) Identify the parts labelled 1, 2 and 3 in photograph **K**. (3 marks)

1. .....

2. .....

3. .....

(ii) Using observable features, state how the parts labelled 1 and 3 you identified in (d) (i) above are adapted to their functions. (4 marks)