NAME…….. INDEX NO…….....

231/1 **CANDIDATE'S SIGN……..……**
BIOLOGY
PAPER 1 **DATE……..……...**
(THEORY)
JULY/AUGUST, 2015
TIME: 2 HOURS

CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2015

Kenya Certificate of Secondary Education
BIOLOGY
PAPER 1
(THEORY)
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Write your **name** and **index number** in the spaces provided.
2. **Sign** and write the **date** of examination in the spaces provided.
3. Answer **all** the questions in the spaces provided.
4. Answers must be written in the spaces provided in the question paper.
5. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
6. The paper consists of **10** printed pages.

FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidate's Score
1 – 28	80	

Biology Paper 1 *Turnover*

1. (i) What biological knowledge or study is required in dealing with locusts that infest a maize crop. (1 mark)

_____

(ii) State the functions of the following cell structures. (2 marks)

(a) Sap vacuole._____

(b) Nucleolus._____

2. Which **two** classes of phylum arthropoda have their head fused with the thorax? (2 marks)

_____

_____

3. (a) Name the part of the eye in which the light sensitive cells are located. (1 mark)

_____

(b) List the **two** types of sensory cells found in the part named in (a) above. (2 marks)

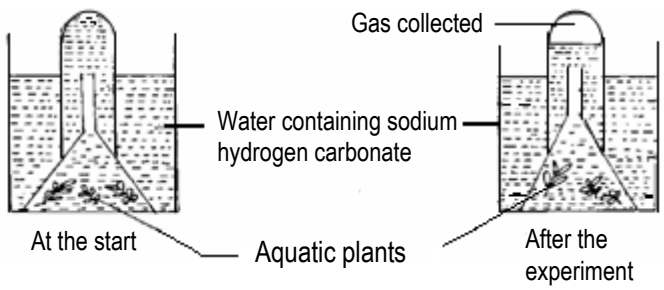
_____

4. (a) Name **two** raw materials for the dark stage process of photosynthesis. (2 marks)

_____

_____

(b) The set up shows an experiment to investigate photosynthesis.



(a) What gas was collected in the test tube? (1 mark)

_____

(b) What was the role of sodium hydrogen carbonate in the experiment? (2 marks)

_____

_____

_____

5. State **three** adaptations of the phloem tissue. (3 marks)

_____

_____

_____

_____

6. (a) State **one** structural and one functional difference between motor and sensory neurone. (2 marks)

_____

_____

_____

_____

_____

_____

(b) What name is given to the gap between the sensory neurone and intermediate neurones. (1 mark)

_____

(c) Name the transmitter substance found in the gap named in (b) above. (1 mark)

_____

7. Name **two** enzymes and **one** metal ion that are needed in the blood clotting process. (3 marks)

Enzymes. _____

Metal ion _____

8. Name causative agents of each of the following diseases.

(a) Typhoid _____

(b) Malaria _____

9. Name **three** properties of the cell membrane. (3 marks)

_____

_____

_____

_____

10. (a) Define the term carrying capacity. (1 mark)

_____

_____

_____

(b) The table below gives information about an aquarium community which is ecologically balanced.

Type of organism	Dry weight (g)
Insect larvae	500
Fishes	5000
Water plants	5000
Bacteria	10

(c) What do you understand by term ecologically balanced? (1 mark)

_____

_____

_____

11. List the changes that takes place during inhalation in the breathing cycle of mammal in the following. (4 marks)

(a) Ribcage and thoracic cavity.

_____

_____

_____

_____

(b) Diaphragm

_____

_____

_____

_____

(c) External intercostal muscles. _____

(d) Internal intercostal muscles. _____

12. Name the fins that prevent the following movements of fish during swimming. (3 marks)

(i) Yawing _____

(ii) Pitching _____

(iii) Rolling _____

13. (a) Give an example of a sex linked trait in humans. (2 marks)
Y chromosome.

_____

_____

_____

X chromosome.

_____

_____

(b) Write the types of gene mutation represented by the following analogues. (2 marks)

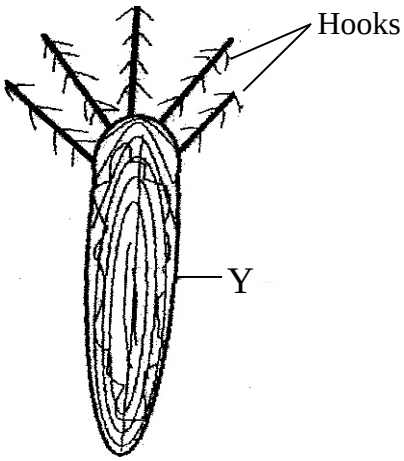
(i) Intended message BRING THERMOS ON OUTING
Actual message BRING MOTHERS ON OUTING

Type _____

(ii) Intended message PLEAS SAY WHERE YOU ARE
Actual message PLEASE STAY WHERE YOU ARE

Type _____

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



(a) Name structure labelled **Y**. (1 mark)

_____

(b) (i) State the agent of dispersal for the structure above. (1 mark)

_____

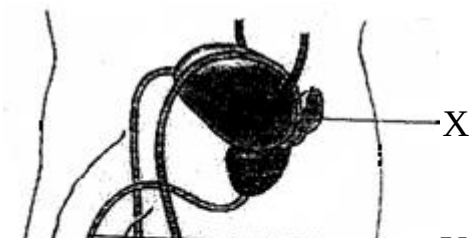
(ii) Give a reason for your answer in b(i) above. (1 mark)

_____

_____

_____

15. The diagram shown below represents a male reproductive system.



(a) Name the structure labelled **X**. (1 mark)

_____

(b) Name **two** substances that pass through structure labelled **Y**. (1 mark)

_____

_____

16. Name the type of response shown by: (3 marks)

(a) Leaves of Mimosa pudica when they fold after being touched.

_____

(b) Sperms when they swim towards ovum.

_____

(c) Euglena when they swim towards the source of light.

_____

17. Give **two** reasons why the pressure of blood is greater in the arteries than in the veins in mammals. (2 marks)

_____

_____

_____

_____

18. What happens when respiration exceeds photosynthesis in the guard cells of terrestrial plants? (3 marks)

_____

_____

_____

_____

19. The leaf of a potted green plant which had been kept in dark for 24 hours was smeared with petroleum jelly on its lower surface and then exposed to sunlight for 6 hours. Starch test on the leaf was negative. Account for the observation. (2 marks)

_____

_____

_____

_____

20. State the importance of the structure given below in a seed.

(a) Endosperm. (1 mark)

_____

(b) Testa. (1 mark)

_____

_____

21. (a) State **two** disadvantages of self pollination in plants. (2 marks)

_____

_____

_____

_____

(b) Explain why the tube nucleus disintegrates just before reaching the embryo sac. (1 mark)

_____

_____

22. (a) State the circulatory system found in members of the class insecta. (1 mark)

_____

(b) Name the blood vessels that transport blood from: (2 marks)

(i) Small intestine to the liver.

_____

(ii) Lungs to the heart.

_____

23. Two populations of the same species of birds were separated over a long period of time by an ocean. Both populations initially fed on insects only but later it was observed that one population fed entirely on fruits and seeds although insects were available. Name;

(a) The type of isolation. (1 mark)

_____

(b) The type of evolutionary change. (1 mark)

_____

(c) What are vestigial structures? (1 mark)

_____

(d) Name **one** vestigial structure in man. (1 mark)

_____

24. Eight potato cylinder of the same size were used to investigate a certain physiological process. Four of the potato cylinders were placed in solution S. The other four potato cylinders were placed in solution T. After 2 hours, the potato cylinders from solution S were found to longer and stiff, while those from solution T were found to be shorter and flexible. Explain the results in solution S and T. (2 marks)

_____

_____

_____

_____

_____

_____

(b) Distinguish between active transport and diffusion. (2 marks)

_____

_____

_____

_____

25. Why is the pancreas considered a dual gland? (2 marks)

_____

_____

_____

26. List **two** enzyme that are secreted in their precursor forms. (2 marks)

_____

_____

27. State **two** effects of gibberellins on shoots of plants. (2 marks)

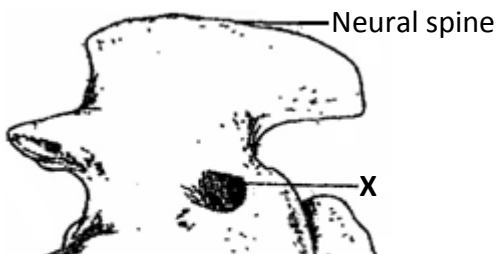
_____

_____

_____

_____

28. The diagram below represents a type of bone in the mammalian skeleton.



(a) Identify the bone illustrated in the diagram. (1 mark)

_____

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

_____

_____

_____

NAME…….. INDEX NO…….....

231/2 **CANDIDATE'S SIGN……..……**
BIOLOGY
PAPER 2 **DATE…….……...**
(THEORY)
JULY/AUGUST, 2015
TIME: 2 HOURS

CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2015

Kenya Certificate of Secondary Education
BIOLOGY
PAPER 2
(THEORY)
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- Write your **name**, **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 space provided after question **8**.
- Check to ascertain that all questions are printed as indicated.

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	

SECTION A: (40 MARKS)

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

1. Sickle cell anaemia is a hereditary disease due to a recessive gene which changes normal haemoglobin (Hb – A) to abnormal haemoglobin (Hb – S). The red blood cells of people with sickle cell anaemia are sickle shaped.

   (a) What are the possible phenotypes of the offsprings of a man who is heterozygous and a woman who is also heterozygous? Show your working. (5 marks)

   (b) Sickle cell trait is more prevalent in tropical countries than in temperate countries. Give an explanation for this observation. (3 marks)

   _____

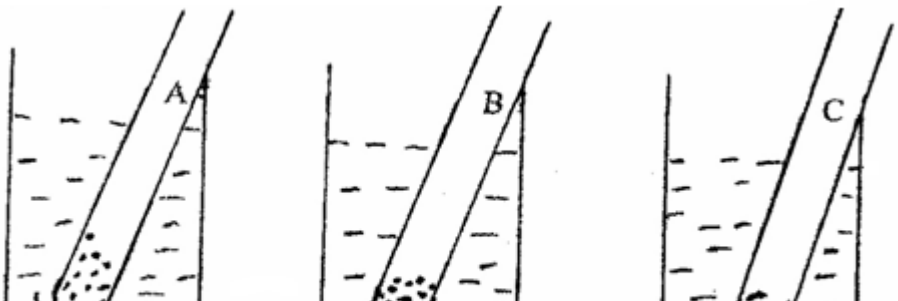
   _____

   _____

   _____

   _____

2. Three tubes each containing 1ml saliva and 1ml water were incubated in water baths at different temperatures as shown in the diagram below for 30 minutes. Another one tube containing 1ml starch solution was incubated for the same length of time in each water bath. The contents of the two tubes in each water bath was then mixed and incubated for further 30 minutes. The content of each tube was then tested for starch using iodine solution.



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

_____

_____

_____

(b) Why was it necessary to incubate the tubes for 30 minutes before mixing their contents? (1 mark)

_____

_____

_____

(c) State the colour changes you would expect to observe after adding iodine solution. (3 marks)

_____

_____

_____

_____

(d) Account for the expected observations. (3 marks)

_____

_____

_____

_____

3. Below is a diagram of a sperm cell.

(a) Identify parts labeled **X** and **Y**. (2 marks)

X _____

Y _____

(b) Explain how parts **W** and **Z** adapt the cell to its function. (4 marks)

_____

_____

_____

_____

(c) Using letter **P** identify or label on the diagram the part of the cell rich in DNA. (1 mark)

_____

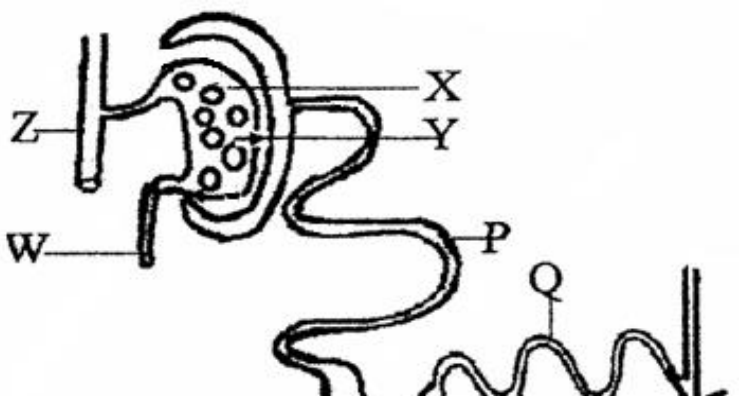
(d) State the function of part **X**. (1 mark)

_____

_____

_____

4. The figure shown below represents a kidney nephron. Use it to answer the questions that follow.



(a) (i) **X** is made up of a tuft of capillaries. How do they differ from other capillaries in the body? (1 mark)

_____

_____

_____

(ii) What structural difference exist between **W** and **Z**? (1 mark)

_____

_____

_____

(iii) State the significance of the difference stated in (a) (ii) above. (1 mark)

_____

_____

_____

(b) State **three** adaptations that enable **P** to perform its function. (3 marks)

_____

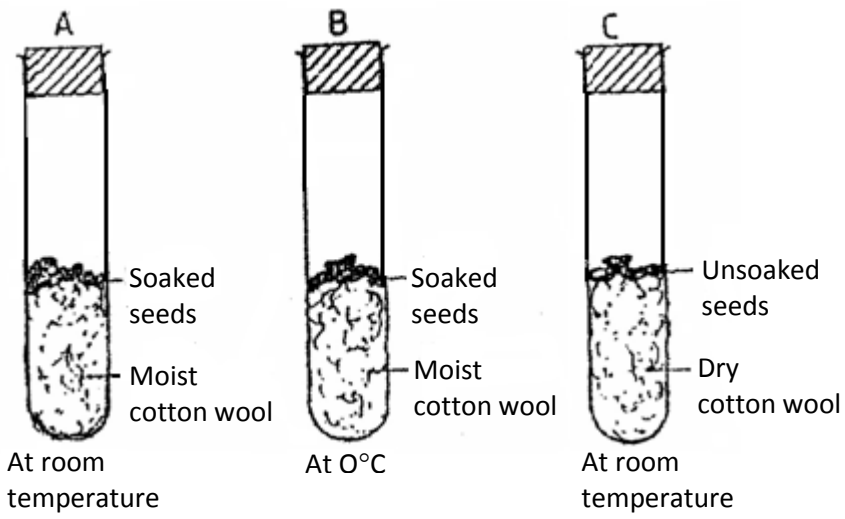
_____

_____

_____

(c) What is counter flow and in which part of the nephron does it occur. (2 marks)

5. The diagrams below represent a set up to investigate the conditions necessary for seed germination.



The set was left for 7 days.

(a) What conditions were being investigated in the experiment? (2 marks)

(b) State **three** reasons for soaking seeds in set ups **A** and **B**. (3 marks)

(c) What were the expected results after seven days? (3 marks)

Step A _____

Step B _____

Step C _____

SECTION B: (40 MARKS)

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

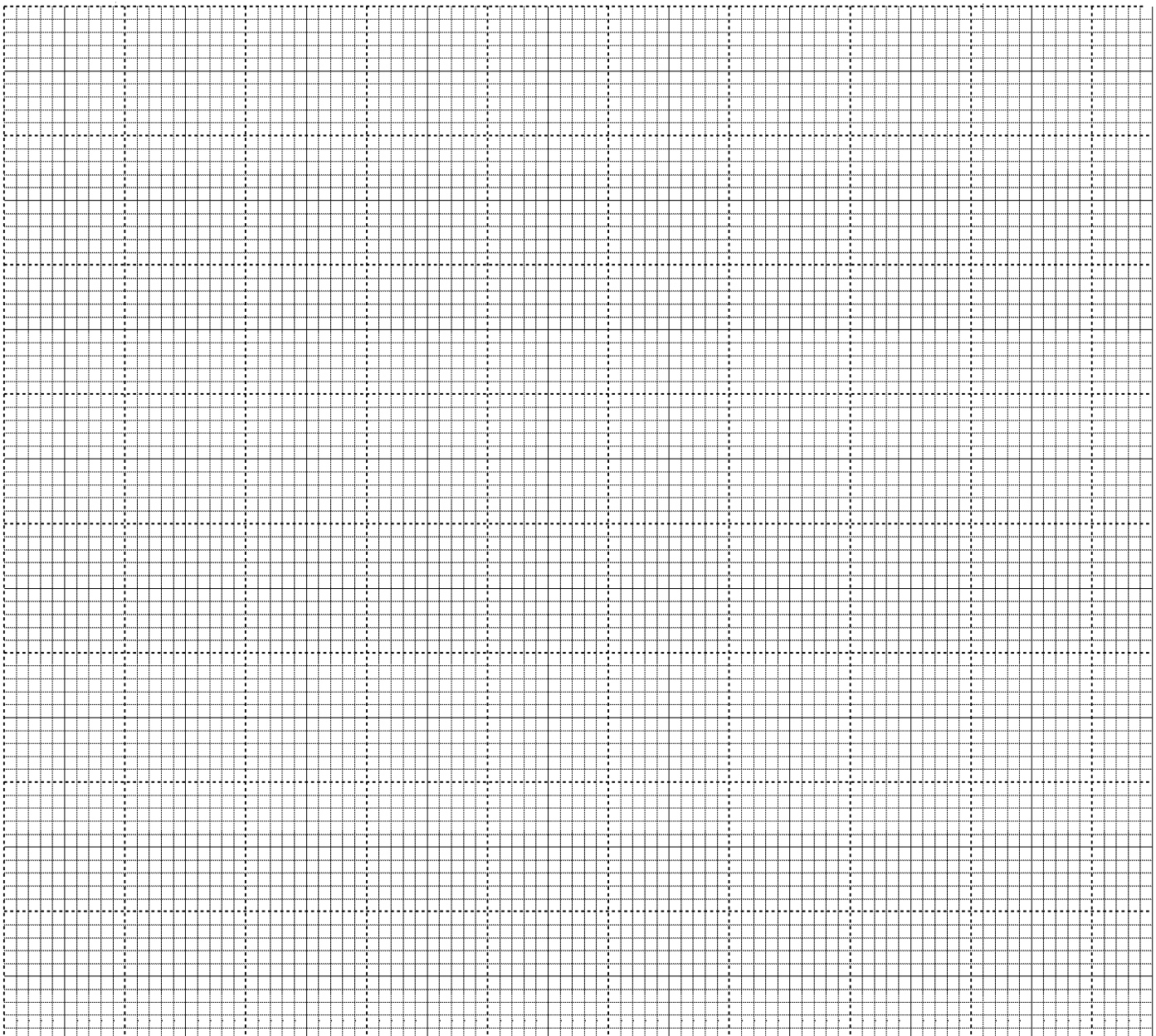
6. An experiment was carried out to investigate the effect of hormones on growth of lateral buds of three pea plants.

The shoots were treated as follows.
(a) Shoot A – Apical bud was removed.
(b) Shoot B – Apical bud was removed and gibberellic acid placed on the cut shoot.
(c) Shoot C – Apical bud was left intact.

The lengths of the branches developing from the lateral buds were determined at regular intervals. The results obtained are shown in the table below.

Time in days	Length of branches in millimeters		
	Shoot A	Shoot B	Shoot C
0	3	3	3
2	10	12	3
4	28	48	8
6	50	90	14
8	80	120	20
10	118	152	26

(i) Using the same axes, draw graphs to show the lengths of branches against time.
(8 marks)



(ii) (a) What was the length of the branch in Shoot B on the 7th day? (1 mark)

_____

_____

(b) What would be the expected length of the branch developing from Shoot B on the 11th day?

_____

(iii) Account for the results obtained in the experiment. (6 marks)

_____

_____

_____

_____

_____

_____

_____

(iv) Why was Shoot C included in the experiment? (1 mark)

(v) What is the importance of gibberellic acid in agriculture? (1 mark)

(vi) State **two** physiological processes that are brought about by the application of gibberellic acid on plants. (2 marks)

7. Describe the role of hormones in the mammalian female reproductive cycle. (20 marks)

8. Explain how structures of the human ear are adapted to their functions. (20 marks)

NAME…….. INDEX NO…….....

231/3 **CANDIDATE'S SIGN……..……**
BIOLOGY
PAPER 3 **DATE……..……...**
(PRACTICAL)
JULY/AUGUST, 2015
TIME: 1¾ HOURS

CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2015

Kenya Certificate of Secondary Education
BIOLOGY
PAPER 3
(PRACTICAL)
TIME: 1¾ 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) Answer all the questions in the spaces provided.
(d) You are required to spend the first 15 minutes of the 1¾ hours allowed for this paper reading the whole paper carefully before commencing your work.
(e) Additional papers must not be inserted.
(f) This paper has **three** questions and pages.
(g) Students should check the question paper to ascertain that all the papers are printed as indicated and that no questions are missing.

FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidate's Score
1	12	
2	14	
3	14	
Total Score	40	

Biology Paper 3 *Turnover*

1. You are provided with the following:
   - 25ml Bromothymol blue.
   - Solution X.
   - A drinking straw.
   - 2 test tubes.
   - 10ml measuring cylinder.
   - A boiling tube.
   - Dilute hydrochloric acid.
   - Dilute sodium hydroxide.

   (a) Place 2ml of Bromothymol Blue (B.T.B) in a clean test tube. Add dilute hydrochloric acid drop by drop and shake after each drop till there is a permanent colour change.

   (i) State the resulting colour. (1 mark)

   _____

   (ii) To the mixture obtained above, now add sodium hydroxide solution drop by drop until there is a colour change. Record your observation. (1 mark)

   _____

   (iii) From your observations in (a)(i) and (a)(ii) above what is the nature of Bromothymol blue. (1 mark)

   _____

   (b) Place 10ml of fresh Bromothymol blue in a boiling tube. Using the drinking straw, bubble air through the bromothymol blue until there occur colour change.

   (i) Record your observation. (1 mark)

   _____

   (ii) What does the colour obtained in (b)(i) above suggest about the nature of the gas breathed out? (1 mark)

   _____

   (c) Rinse the measuring cylinder and use it to place 2ml of solution X in a clean test tube. Rinse the drinking straw used in (b) above and use it to bubble air through solution X.

   (i) Record your observation. (1 mark)

   _____

   (ii) Suggest the identity of solution X. (1 mark)

   _____

   (iii) Suggest the identity of the gas that gave rise to the observation above. (1 mark)

   _____

   (d) (i) Name the physiological process in cells that leads to formation of the gas named in c(iii) above. (1 mark)

   _____

(ii) Write down a word equation for the process named in d(i) above. (2 marks)

_____

_____

(iii) What is the importance of the identified process in cells of living organisms? (1 mark)

_____

_____

2. Study the photographs and answer the following questions.

PLATE 5

PLATE 6

PLATE 7

(I) The photograph in Plate **5** shows the germination process in a species of legume.

(a) (i) Name the type of germination shown in the photograph. (1 mark)

_____

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

_____

_____

(b) Other than germination the seedling have shown some responses.

(i) Name **two** responses shown in the photograph. (2 marks)

_____

_____

(ii) State **one** survival value of each of the response named above. (1 mark)

_____

(II) Examine the photograph in Plate **6** and Plate **7** which show different essential parts of a flower of a species on two different plants.

(a) Name the flower parts shown in Plate **6** and Plate **7**. (2 marks)

Plate **6**_____

Plate **7** _____

(b) (i) Name the phenomenon described in the statement above. (1 mark)

_____

(ii) Explain the significance of the phenomena stated in (a)(i) above. (1 mark)

_____

(c) (i) State the mode of pollination of the flower shown in the photograph. (1 mark)

_____

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

_____

(d) (i) State the type of pollination of the flower shown in the photograph. (1 mark)

_____

(ii) Give **two** reasons for your answer. (2 marks)

_____

3. The photographs in Plate **J**, **K** and **L** shows the anterior part of two different animals, Plate **L** shows the longitudinal dissection of Plate **K**. Examine the photographs and answer the questions below.

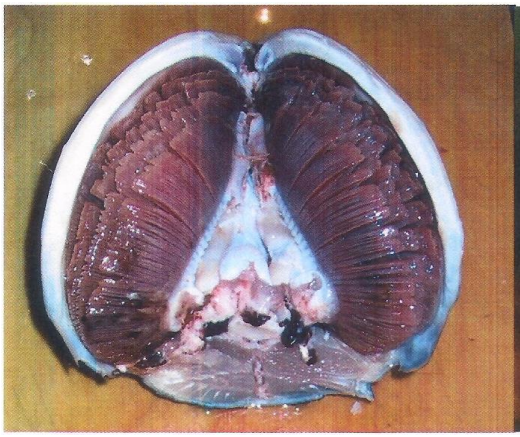


PLATE J

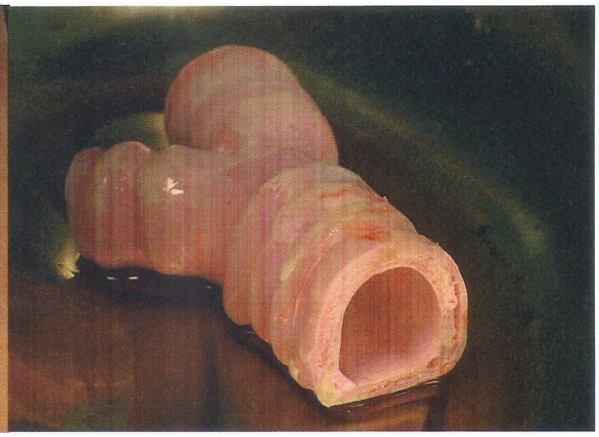


PLATE K

PLATE L

(a) (i) State the class to which the animal organ in Plate **J** belongs. (1 mark)

_____

(ii) State the habitat of the animal. (1 mark)

_____

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

_____

(b) (i) Name the organ shown in the photograph in Plate **J**. (1 mark)

_____

(ii) State the function of the organ named above (i). (1 mark)

_____

(iii) Name the structure that protects the organ named in (b(i) above from mechanical damage. (1 mark)

_____

(iv) From observable features only explain three adaptation of the organ to its function. (3 marks)

_____

_____

_____

_____

(c) (i) Identify the structure in the photograph Plate **K** and **L**. (1 mark)

_____

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

_____

(iii) Using observable features only state three adaptations of the structure to its functions. (3 marks)

_____

_____

_____

_____