

NAME:..... INDEX NO.....  
SCHOOL:..... CANDIDATE'S SIGN .....  
DATE .....

231/1  
**BIOLOGY**  
Paper 1  
**THEORY**  
July/August- 2015  
**Time: 2 Hours**

**BONDO SUB-COUNTY SECONDARY SCHOOLS JOINT EVALUATION- 2013**  
*Kenya Certificate of Secondary Education (K.C.S.E)*

231/1  
**BIOLOGY**  
Paper 1  
**THEORY**  
July/August- 2015  
**Time: 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) Answer ALL the questions in the spaces provided
- (d) This paper consist of 11 printed pages
- (e) Candidates should check the question paper to ascertain that all the pages are provided as indicated and that no questions are missing.

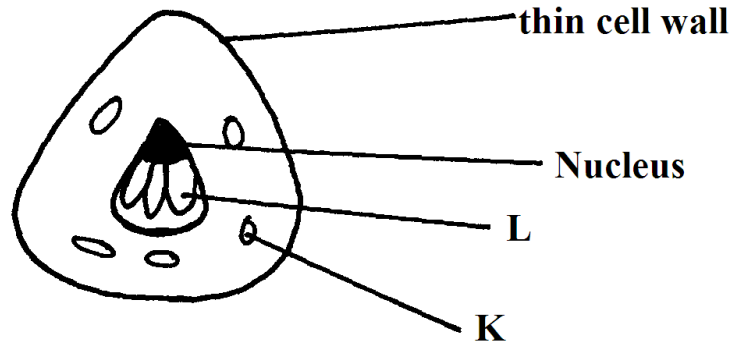
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Question	Maximum Score	Candidate's Score

***This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.***

**Answer all questions in spaces provided**

1. Name the antigens present in red blood cells of a person whose blood group is B positive. (2mks)  
.....  
.....  
.....  
.....
  
2. Give reasons for the following structural modifications in axial skeleton of humans
  - (i) Fused sacral vertebrae (1mk)  
.....  
.....
  
  - (ii) Long transverse process in lumbar vertebrae. (1mk)  
.....  
.....
  
3. (a) What is adaptive radiation? (1mk)  
.....  
.....  
  
(b) State two ways in which homosapiens differs from homohabilis (2mks)  
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.....  
.....  
.....
  
4. State three characteristics of class Reptilia. (3mks)  
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.....  
.....
  
5. The diagram below represents the structure of a yeast cell as seen under a light microscope.



(a) Name parts labeled (2mks)

L.....

K.....

6. (a) Which part of plant normally shows

(i) Increased growth at lower auxin concentration (1mk)

.....  
.....

(ii) Decreased growth at lower auxin concentration (1mk)

.....  
.....

7. State the functions of the following parts of a light microscope.

(i) Fine adjustment knob (1mk)

.....  
.....

(ii) Condenser (1mk)

.....  
.....

8. Give a reason for the following features present in human trachea

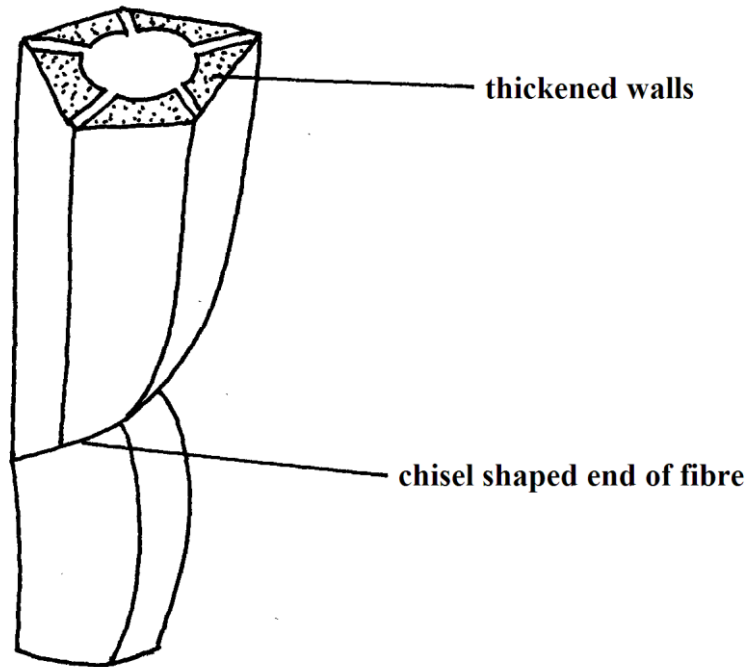
(i) Ring of cartilage (1mk)

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.....

(ii) Presence of cilia (1mk)

.....  
.....

9. The diagram below shows a plant supportive tissue



(a) Identify the tissue (1mk)

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.....

(b) State two similarities between tissue named in 9(a) above and one conducting water in dicotyledonous plant. (2mks)

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.....  
.....

10. A wild beast in Masai Mara National Park were found to be infested with a lot of ticks. State the trophic level occupied by the following organisms:

(a) (i) Wild beast (1mk)

.....  
.....

(ii) Ticks (1mk)

.....  
.....

(b) Sketch a pyramid of numbers to represent above feeding relationship. (1mk)

11. (a) Name the causative agent of the following diseases in humans.

(i) Bilhaziasis (1mk)

.....  
.....

(ii) Syphilis (1mk)

.....  
.....

(b) What do you understand by the following terms?

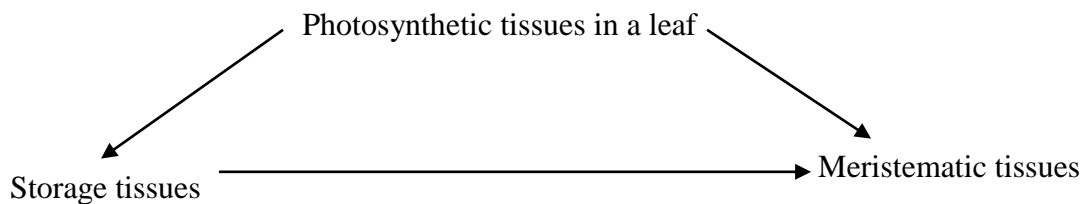
(i) Varicose veins (1mk)

.....  
.....

(ii) Thrombosis (1mk)

.....  
.....

12. The flow chart below shows the movement and fate of carbohydrate synthesized by green plants.



(a) Name the type of carbohydrate that is

(i) Transported from leaf to other parts of plant (1mk)

.....  
.....

(ii) Found in storage tissues (1mk)

.....  
.....

(b) Name two main photosynthetic tissues found in a leaf (2mks)

.....  
.....

.....  
.....

13. State the roles of the following cell organelles in a cell

(a) Lysosomes (2mks)

.....

.....  
.....  
.....

(b) Centrioles (1mk)

.....  
.....

14. Name the physiological process involve in the movement of the following substances in and out of the cell.

(a) Mineral salts (1mk)

.....  
.....

(b) Water (1mk)

.....  
.....

15. Below is the dental formula of an organism

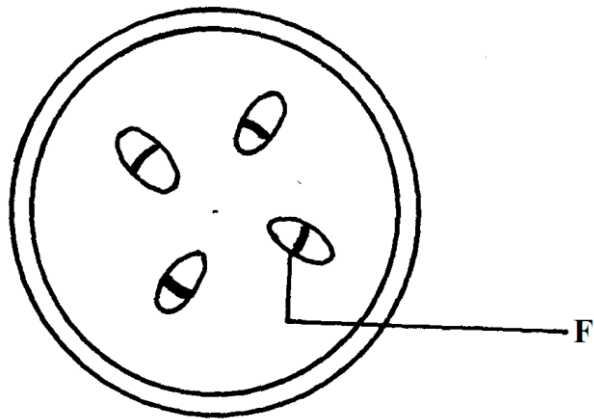
$$i \frac{3}{3} \quad C \frac{1}{1} \quad Pm \frac{4}{4} \quad m \frac{2}{3}$$

(i) Calculate the total number of teeth in the month of the animal (2mks)

(ii) With a reason, identify the type of dentition for the organism (2mks)

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.....

16. The diagram below shows a section through a plant organ



(a) (i) Name the class of the plant from which the section was obtained (1mk)

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.....

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

.....  
.....

17. (a) Name two structures for gaseous exchange in aquatic plants. (2mks)

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.....

(b) State one adaption of the above named structures. (1mk)

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.....

18. During a biological trip, plants that had flowers drew the attention of students

(a) Name the subdivision of the plants (1mk)

.....  
.....

(b) Name two possible characteristics that students would use to conclude that they were insect pollinated. (2mks)

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19. Define the following terms

(a) Homologous structures (1mk)

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.....

(b) Vestigial structures (1mk)

.....  
.....

20. Name the type of responses exhibited by the following

(a) Pollen tube growth towards the embryo sac (1mk)

.....  
.....

(b) Maggot moving from the lit part of boiling tube to the part painted black (1mk)

.....  
.....

(c) Folding of the leaves of the Mimosa Pudica plant on touch (1mk)

.....  
.....

21. Insulin is a hormone synthesized using bacteria DNA. It is possible to obtain from hospitals because of the new technology

(a) Name the technology used in the case above. (1mk)

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.....

(b) Why were bacteria preferred in the medicine production (2mks)

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.....  
.....  
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22. (a) State the role of the following parts of ear in the hearing process

(i) Ear drum (1mk)

.....  
.....

(ii) Cochlea (1mk)

.....  
.....

(b) Explain why the body temperature of a healthy human being must rise upto 39<sup>0</sup>C on a hot humid day. (3mks)

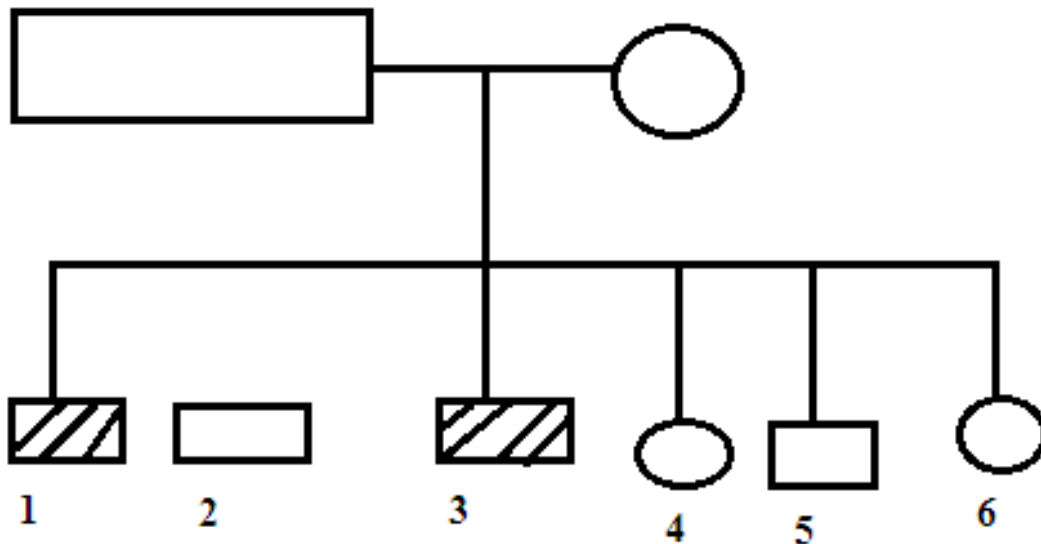


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23. Explain what happens to human body when glucose level is above normal (3mks)

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24. Study the genetic chart below showing the inheritance of gene responsible for colour blindness in a family.



Using letter capital N to represent gene for normal colour vision, write the genotypes of the following individuals (3mks)

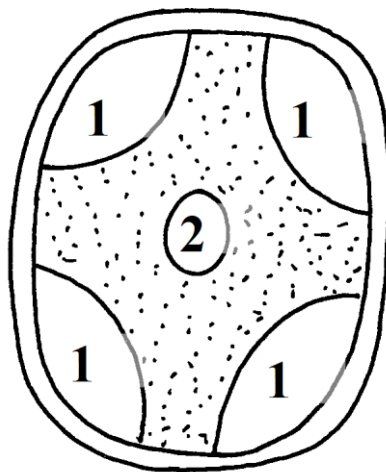
1.....  
2.....  
6.....

25. State the functional difference between sensory and motor neurons (1mk)

.....  
26. Give two reasons why class insect is the most numerous among members of phylum arthropoda. (2mks)

.....  
.....  
.....

27. The diagram below shows the appearance of a plant cell after it had been placed in a strong salt solution



(a) Name the process occurred in the cell shown above. (1mk)

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.....

(b) (i) Which substance is present in the regions marked 1? (1mk)

.....  
.....

(ii) Give reasons (2mks)

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28. State two roles of a fruit to a plant (2mks)

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.....

29. What is the importance of the following in an ecosystem?

(i) Bacteria and fungi (1mk)

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.....

(ii) Predators (1mk)

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.....

30. Outline three roles of active transport in the human body. (3mks)

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NAME:..... INDEX NO.....  
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231/2  
**BIOLOGY**  
Paper 2  
**THEORY**  
July/August- 2015  
**Time: 2 Hours**

**BONDO SUB-COUNTY SECONDARY SCHOOLS JOINT EVALUATION - 2015**  
*Kenya Certificate of Secondary Education (K.C.S.E)*

231/2  
**BIOLOGY**  
Paper 2  
**THEORY**  
July/August- 2015  
**Time: 2 Hours**

**INSTRUCTIONS TO CANDIDATES**

- (a) Write your name and Index number in the spaces provided above
- (b) This paper consists of two section; A and B Answer all questions in section A and in section B answer question 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8.

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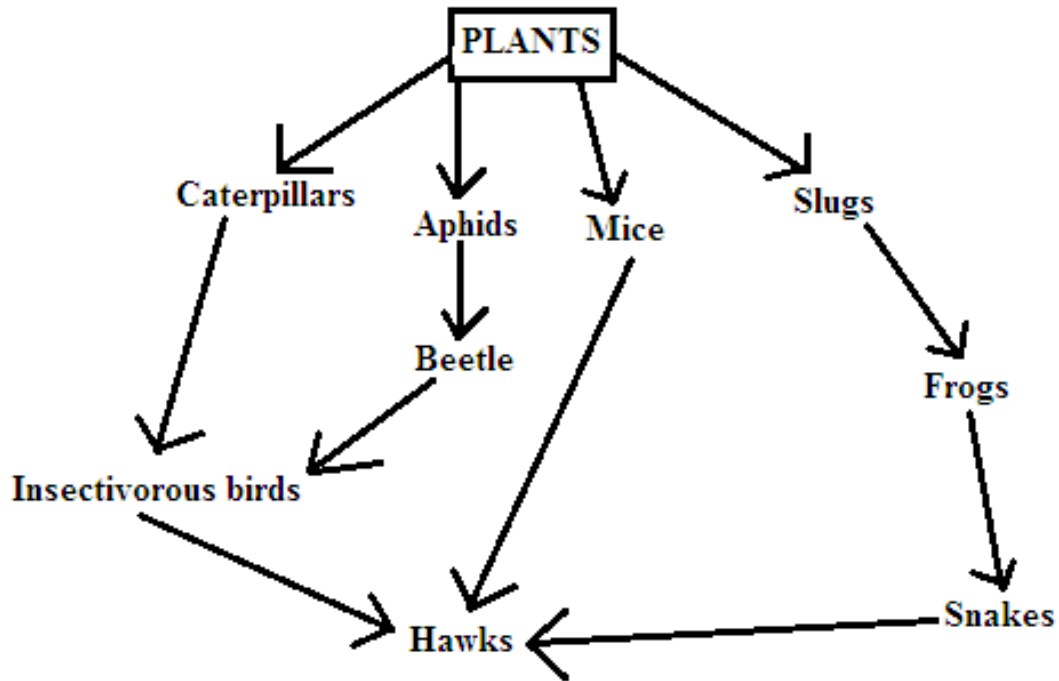
Section	Question	Maximum Score	Candidate's Score
<b>A</b>	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
<b>B</b>	6	20	
	7 or 8	20	
<b>TOTAL</b>		<b>80</b>	

*This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.*

**SECTION A (40 marks)**

**Answer all questions in this section in spaces provided**

1. Study the following food web and answer questions that follows;



(a) (i) Name the organisms that occupy the second trophic level . (2mks)

.....

.....

.....

.....

(ii) What is the other name for the second trophic level (1mk)

.....

.....

(b) Write down two food chains from the food web that:

(i) Ends with hawks as tertiary consumer. (1mk)

(ii) Ends with hawks as quaternary consumer (1mk)

(c) Explain how Abiotic fixation nitrogen occurs. (3mks)

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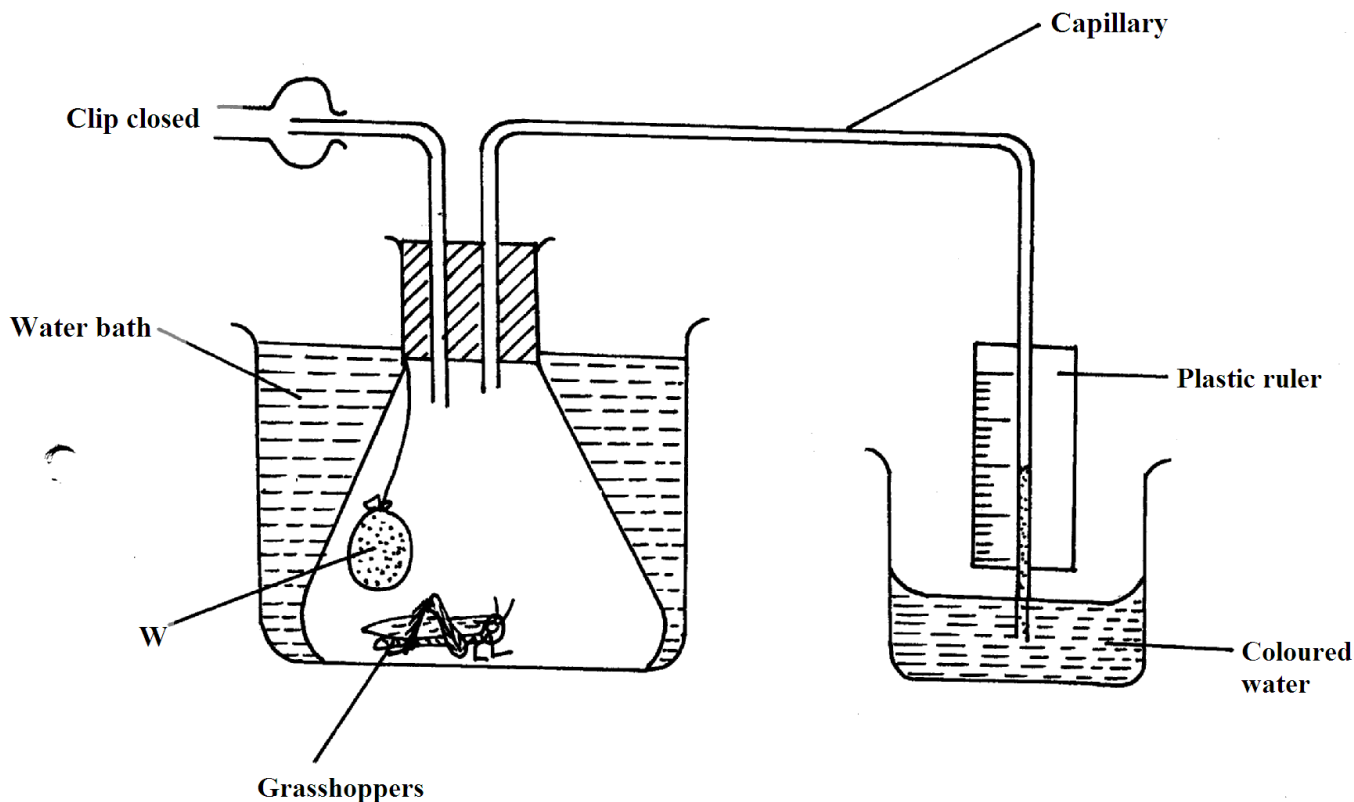
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2. The diagram below illustrates an experiment to determine the rate of respiration in a small insect



(a) Name the chemical labeled W and state its function (2mks)

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.....

.....

(b) Why is it necessary to place the flask in a water bath (1mk)

.....

.....  
(c) (i) What observation do you expect in the level of coloured water in capillary tube after experiment has run for 5 minutes. (1mk)

.....  
(ii) Explain the observation stated in C(i) above (2mks)

.....  
(d) Other than age and occupation give two other factors that influence energy requirement in man. (2mks)

.....  
3. A pea plant with round seeds was crossed with a pea plant that had wrinkled seeds. The gene for round seed is dominant over that for wrinkled seeds.

Using letter M to represent the dominant gene state:

(a) The genotypes of the parent if plant with round seeds was heterozygous (2mks)

.....  
(b) The gametes produced by the round seed and wrinkles seed plants (2mks)

Round seed parent

.....  
Wrinkled seed parent

.....  
(c) The genotypes and phenotypes of F<sub>1</sub> generation. Show your workings. (3mks)



(d) What is multiple allelism? (1mk)

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

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(b) Name two parts of human nephron which are only found in the kidney cortex. (2mks)

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(c) (i) In what form is carbon(ii) oxide transported in blood. (1mk)

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.....

(ii) Explain why it may cause death (2mks)

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5. (a) State three ways in which the leaf of a mesophyte plant is adapted for gaseous exchange. (3mks)

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(b) How is the trachea of a mammal adapted to its function (3mks)

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(c) Explain why it is important to breathe through the nose rather than the mouth. (2mks)

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**SECTION B (40 Marks)**

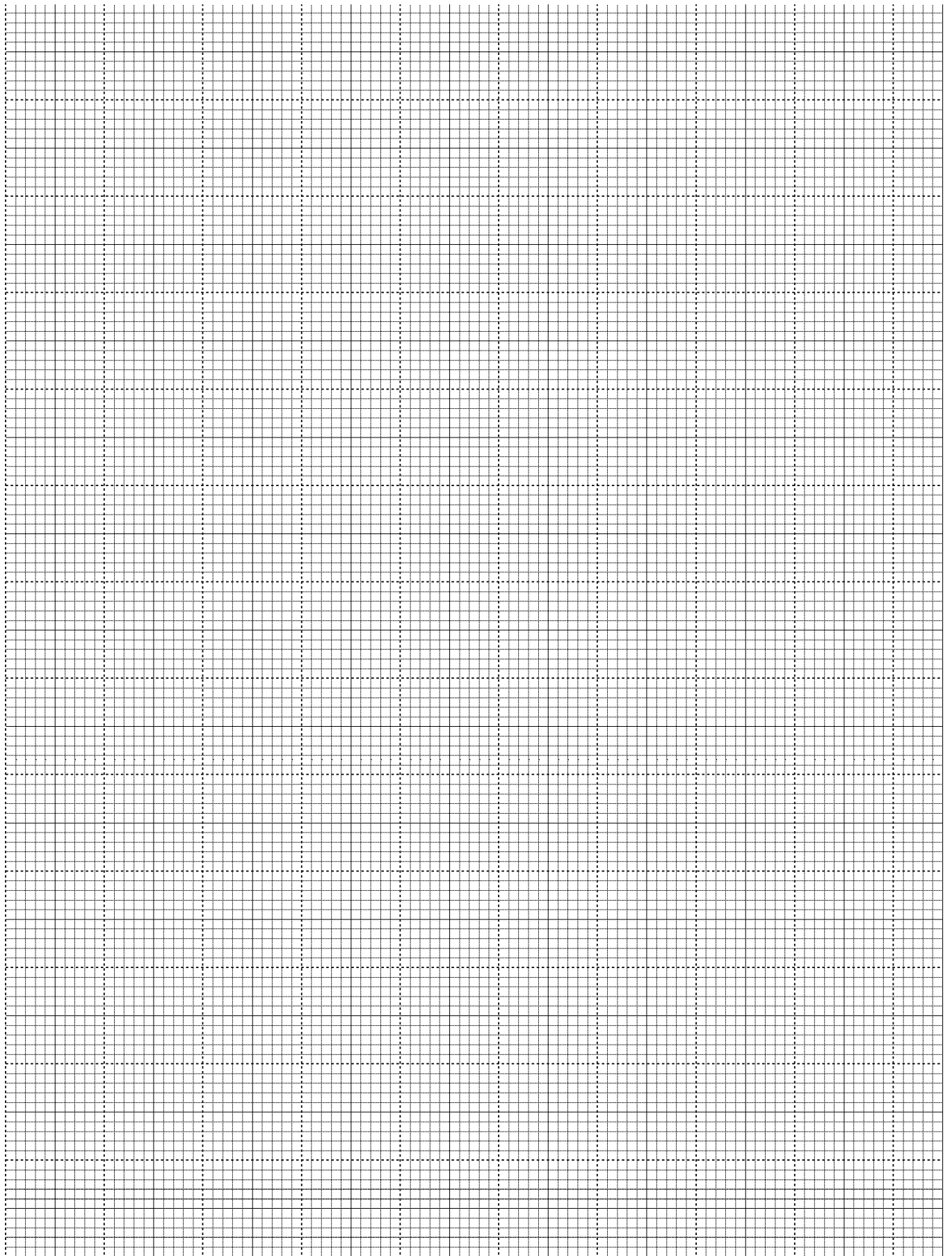
**Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.**

6. An experiment was carried out to investigate the effect of PH on the rate of reaction catalysed by an enzyme. The result are as shown in the table below.

PH	Rate of reaction in mg of products per unit time	
	Enzyme R	Enzyme T
0.5	0.2	0.0
1.5	1.5	0.0
2.0	2.3	0.0
3.0	3.4	0.0
4.0	2.2	0.8
5.5	0.1	1.6
7.0	0.0	2.6

8.0	0.0	3.2
9.0	0.0	1.2

- (a) On the grid provided draw a graph of rate of reaction against PH. (7mks)



(b) (i) What is the rate of reaction of the two enzymes at a P<sup>H</sup> of 5.0? (2mks)

.....  
.....  
.....  
.....

(ii) What is the optimum P<sup>H</sup> of each enzyme? (2mks)

.....  
.....  
.....  
.....

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

.....  
.....

(c) Suggest the identity of enzyme R and T and name the region of the alimentary canal they are likely to be found in. (4mks)

Enzyme R: Identity.....  
Region.....  
Enzyme T: Identity.....  
Region.....

(d) Other than P<sup>H</sup> name two factors which may alter the rate of enzyme controlled reactions. (2mks)

.....  
.....  
.....  
.....

(e) Explain the role of bile juice in digestion. (2mks)

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7. (a) Discuss the importance of support and movement in animals (8mks)

(b) Explain how carbon (iv) oxide produced by respiring muscle of the biceps reaches the alveolar cavities in mammalian lungs. (12mks)











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*End*

NAME:..... INDEX NO.....  
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DATE .....

231/3  
**BIOLOGY**  
Paper 3  
**THEORY**  
July/August- 2015  
**Time: 2 Hours**

**BONDO SUB-COUNTY SECONDARY SCHOOLS JOINT EVALUATION - 2015**  
*Kenya Certificate of Secondary Education (K.C.S.E)*

231/3  
**BIOLOGY**  
Paper 3  
**THEORY**  
July/August- 2015  
**Time: 2 Hours**

**INSTRUCTIONS TO CANDIDATES**

- (a) You are required to spend the first 15 minutes of the 1 ¾ hours for this paper reading the whole paper certainly before commencing your work.
- (b) Answers must be written in the spaces provided in the question paper.
- (c) Additional pages must not be inserted

**For Examiner's Use Only**

Question	Maximum Score	Candidate's Score
1	16	
2	12	
3	12	
<b>TOTAL</b>	<b>40</b>	

*This paper consists of 12 printed pages.*

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

1. Using the cork borer provided bore out three long pieces of potato tissues. Measure out and cut three 3 cm cylindrical pieces.

Take the pieces of potato tissue and place each into a separate test-tube labeled D, e and F respectively.

Fill test tube D with solution labeled L<sub>1</sub>

Fill test-tube E with solution labeled L<sub>2</sub>

Leave test-tube F blank, I.e add no liquid to it

Allow the experiment to stand for 30 minutes

- (i) After 30 minutes, remove one piece of tissue at a time; dry it with blotting paper and measure its length. Record your measurements in the table below. (3mks)

Solution into which tissue was placed	Measurement before putting in solution	Measurement after adding solution
L <sub>1</sub>	3cm	
L <sub>2</sub>	3cm	
Zero (0)	3cm	

- (ii) Account for the observation made in the measurements of each tissue after 30 minutes in test tubes labeled D and E above. (3mks)

D.....  
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.....  
.....  
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.....

E.....  
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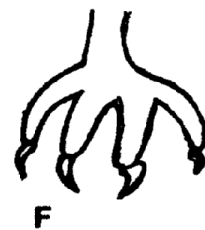
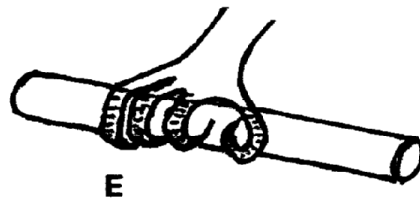
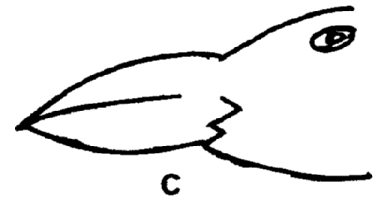
- (iii) What was the purpose of test – tube F and its content. (1mk)

.....  
.....

- (iv) Crush the rest of the potato into paste using a pestle and mortar and add little water to make a suspension and stir. Carry out food tests on the suspension using the reagents provided. Fill your answers in the table below. (6mks)

Food Substance	Procedure	Observation	Conclusion

2. The diagrams below represent body parts of some organisms (animals). Study them and answer the question that follow.



(a) (i) Suggest the type of food eaten by organisms with the parts labeled A, B, C and F

Food

Reason

(4mks)

A

B

C

F

(ii) With reasons, suggest the likely habitat of the organism from which the parts labeled D and E were obtained.

Part

Habitat

Reason

D

E

(4mks)

(b) (i) Suggest the type of evolution that is exemplified by the organisms labeled D, E and F. Give reason for your answer.

The type of evolution (2mks)

.....  
.....

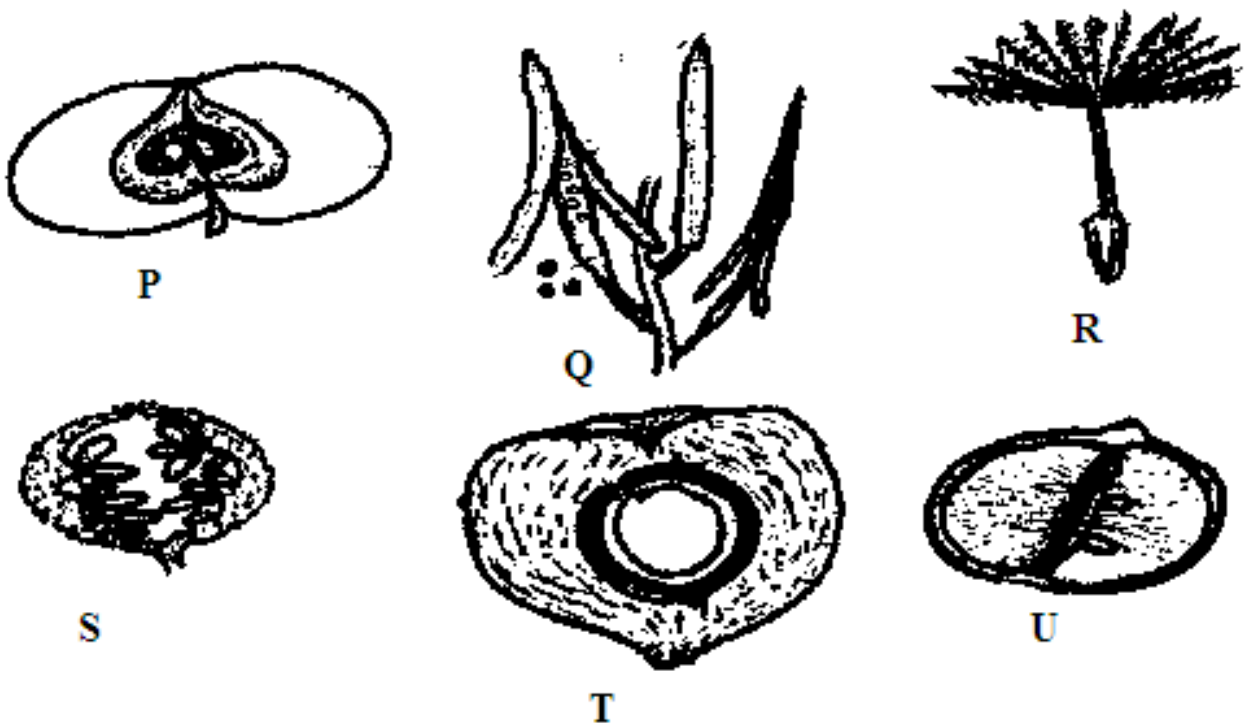
Reason

.....  
.....

(ii) Suggest the significance of the above named type of evolution for the organism (2mks)

.....  
.....  
.....

3.



Above are photographs labeled P, Q, R, S, T and U of fruits obtained from different plants. Examine them and answer the questions underneath.

(a) With reasons, Determine the modes of dispersal for the fruits labeled Q, R and S (6mks)

Q.....  
Reason.....  
.....

.....  
.....  
.....

R.....

Reason.....

.....  
.....  
.....  
.....

S.....

Reason.....

.....  
.....  
.....  
.....

(b) State the form of placentation in Q, S, T and U. (4mks)

Q.....

S.....

T.....

U.....

(c) With a reason, identify the type of fruit represented by specimen U (2mks)

Type.....

Reason.....

.....  
.....  
.....  
.....





