

**231/3  
BIOLOGY  
PAPER 3  
PRACTICAL  
JULY/AUGUST 2014**

**MAKUENI DISTRICT JOINT FORM 4 EXAMINATION 2014  
Kenya Certificate of Secondary Education  
BIOLOGY  
PAPER 3  
CONFIDENTIAL**

**Provide each candidate with:-**

1.  $6\text{cm}^3$  of solution R - made by mixing sucrose with ascorbic acid.
2.  $2\text{cm}^3$  - Dilute hydrochloric acid supplied with a dropper
3.  $4\text{cm}^3$  – Sodium hydrogen carbonate supplied with a dropper
4.  $3\text{cm}^3$  – Benedict's solution
5. Means of heating
6.  $3\text{cm}^3$  sodium hydroxide solution
7.  $1\text{cm}^3$  copper (ii) sulphate solution supplied with a dropper
8.  $2\text{cm}^3$  DCPIP supplied with a dropper
9. 3 test tubes in a test tube rack
10. Test tube holder;

Name \_\_\_\_\_ Index No. \_\_\_\_\_

Candidate's signature \_\_\_\_\_

Date \_\_\_\_\_

**231/3**  
**BIOLOGY**  
**PAPER 3**  
**PRACTICAL**  
**JULY/AUGUST 2014**  
**1 ¾ HOURS**

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**INSTRUCTIONS TO CANDIDATES**

1. Write your name and index number in the spaces provided.
2. Sign and write the date of the examination in the spaces provided above
3. Answer all questions in the spaces provided
4. 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.,

**FOR EXAMINER'S USE ONLY**

<b>Questions</b>	<b>Maximum score</b>	<b>Candidates score</b>
1	14	
2	15	
3	11	
<b>Total score</b>	<b>40</b>	

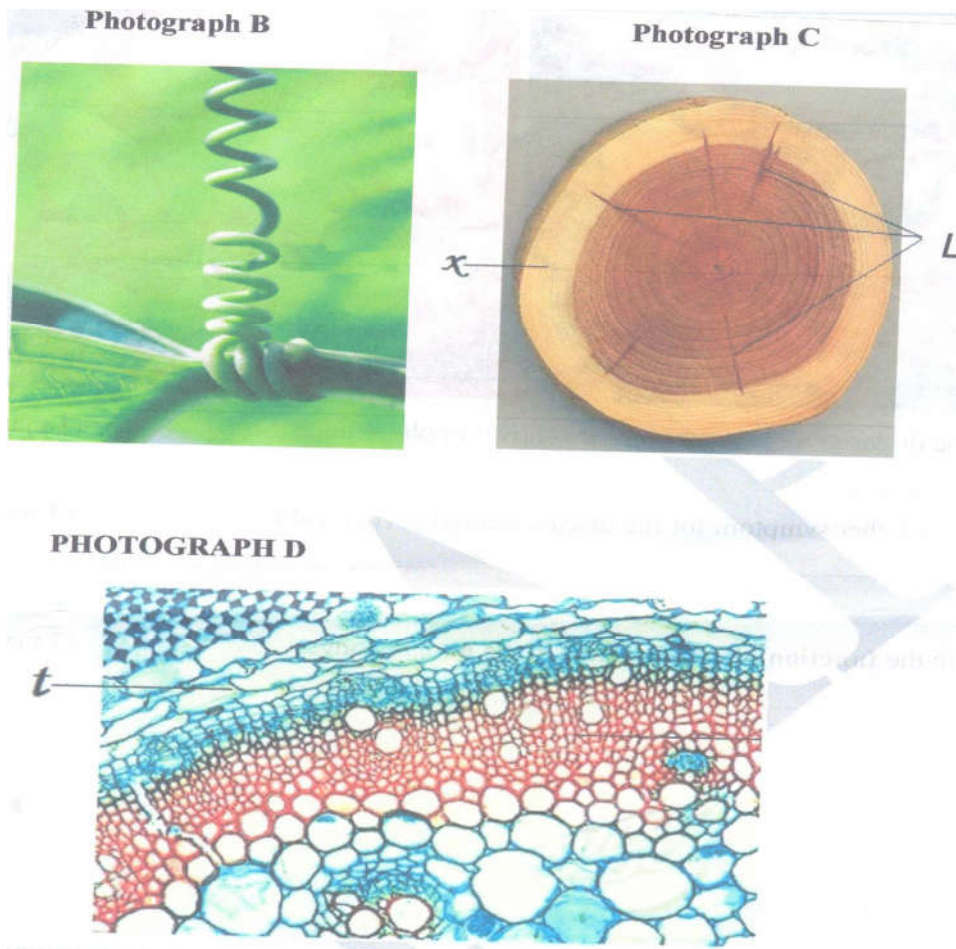
*This paper consists of 6 printed pages*

*Turn Over*

1. You are provided with solution R. Use the solution provided to carry out food tests shown in the table below (14mks)

Test for	Procedure	Observation	Conclusion

2. (a) Photographs B, C and D below represent support structures in plants. Use them to answer the questions that follow.



(i) Name the support structure represented by photograph B (1mk)

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(ii) Explain briefly how the coiling in photograph B occurs (3mks)

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(iii) Name the structures labeled L on photograph C. (1mk)

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(iv) Explain two functions of the structures named (a) (iii) above.

(2mks)

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(b) Photograph D is a magnified photomicrograph of support tissues found in part x of photograph C.

(i) Give the name of the tissue labeled t.

(1mk)

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(ii) Describe the structure of the cells of the tissue named in (b) (i) above

(2mks)

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(iii) Explain two functions of the tissue named in (b) (i) above.

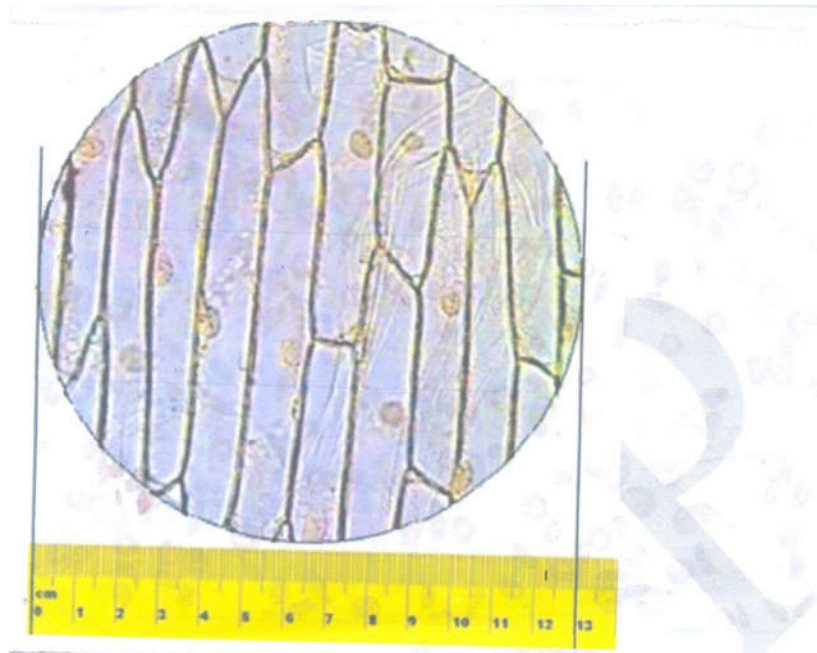
(2mks)

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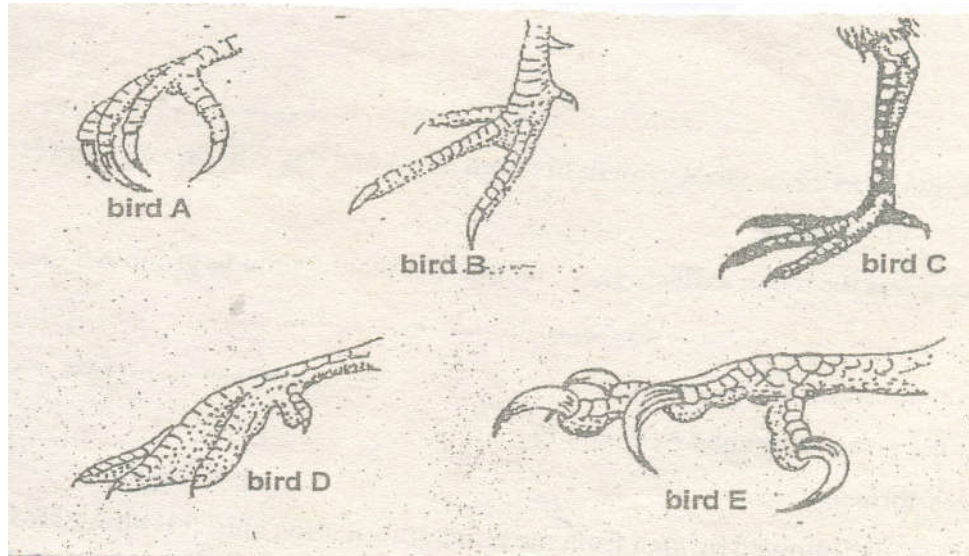
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(c) The diagram below shows onion epidermal cells in a field of view seen under medium power objective lens



If the tissue was observed under x200 magnification, calculate the average actual width of a cell in micrometers. Give your answer to the nearest whole number (Assume that the cells have the same width.) (3mks)

3. (a) The figure below shows feet of various birds. Study the diagram and answer the questions that follow.



- (i) Name the type of evolution represented by the diagrams (1mk)

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- (ii) Using Darwin's theory of evolution, explain how the feet of bird E would have evolved (3mks)

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- (iii) Explain how Lamarck could have explained the evolution of feet of bird C (3mks)

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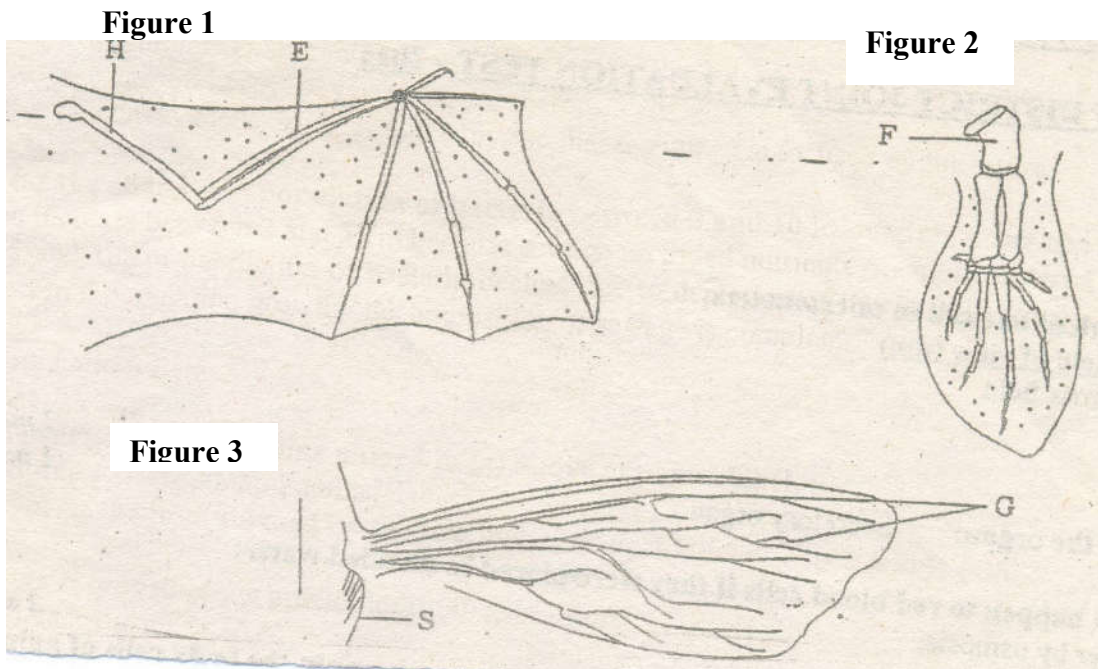


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(b) Figure 1 represents a bat wing, Figure 2 a whale paddle and Figure 3 an insect wing. Study the diagrams and answer the questions that follow



(i) Name parts labeled E and F (2mks)

E \_\_\_\_\_

F \_\_\_\_\_

(ii) State one difference between the wings in figure 1 and 3. (1mk)

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(iii) Name the type of joint found at proximal end of bone marked H. (1mk)

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MARKING SCHEME**

1.

Test for	Procedure	Observation	Conclusion
Non – reducing sugar; (1mk)	- Take (2cm <sup>3</sup> ) R into a test tube. - Add a few drops of dilute hydrochloric acid; - Heat to boil; - Cool; - Add sodium hydrogen carbonate drop wise till fixing disappears - Heat to boil; (3mks)	Changes from blue to green the yellow and finally to orange or brown; Acc. Final colour alone rej. If sequence of colours is wrong (1mk)	- Presence of non-reducing sugars; (1mk)
Proteins; (1mk)	- Take (2cm <sup>3</sup> ) R into a test tube - Add an equal volume of sodium hydroxide add one drop of copper (ii) sulphate solution; (1mk)	- No colour change; (1mk)	- Proteins absent; (1mk)
Vitamin C/ Ascorbic acid; (1mk)	- Take (2cm <sup>3</sup> ) DCPIP into a test tube - Add solution R drop by drop; (1mk)	- Blue colour of DCPIP remains; (1mk)	- Ascorbic acid present;(1mk)

(Total 14mks)

2. (a) (i) Tendril (s); (1mk)  
(ii) Thigmotropism/haptotropism; Auxins/IAA migrate to the side away from the contact of support; faster growth/faster cell elongation/expansion on that side; leading to coiling/twining;  
(3mks)  
(iii) L – Medullary rays; (1mk)  
(iv) - Transport nutrients/substances between phloem and xylem to other parts of the plant;  
- Prevent cracking of the wood hence offer support;  
- Essential for healing of wounds by forming callus tissues;  
(Mark first 2, 2mks)  
NB: (iv) is tied to (iii)

*This paper consists of 2 printed pages*

*Turn Over*



(b) (i) Collenchyma (tissue); (1mk)

(ii) – Consists of living cells;

- Have deposition of extra cellulose at the corners of the cells;
- Cells are elongated in shape;

(Any 2, 2mks)

(iii) – Provides support and elasticity;

- Provides easy bending in various parts of a plant without actually breaking it;
- In some, the photosynthetic cells carry out photosynthesis;

(First 2, 2mks)

(c) – Number of cells across the field of view = 11 (eleven)

- Diameter of field of view = 13cm = 130mm = 13,000 microns

- Size of cell =  $\frac{\text{Diameter of field of view in microns}}{\text{Number of cells across the field of view}}$  ;

=  $\frac{130,000}{11}$  microns;

11

= 11, 818 microns ( $\mu\text{m}$ ); (3mks)

3. (a) (i) Divergent evolution; (1mk)

(ii) Small variations occurred in the feet of birds within the population; competition for limited food occurred in the environment; predation as a mode of feeding favoured birds whose feet had long, sharp and curved claws/talons; to kill prey/tear flesh of prey; OWTTE (3mks)

(iii) All birds had same length of feet; the (aquatic) environment favoured longer feet /talons; leading to continuous natural use of the feet; which kept on increasing in length; the longer feet trait was then passed on to offspring along the generations; OWTTE (3mks)

(b) (i) E – Radius; (1mk)

F – Humerus; (1mk)

(ii) Figure 1

- Have pentadactyl/limb structure
- Originate from endoskeleton

Figure 3

- Have no pentadactyl limb structure;
  - Originate from exoskeleton;
- (Mark first one only) (1mk)

(iii) – Ball and socket joint; (1mk)

Total marks for the question (11mks)