

NAME .....

INDEX NUMBER .....

SIGNATURE .....

DATE .....

231/1

**BIOLOGY**

PAPER 1

TIME: 2 HRS

JULY/AUGUST 2014

# WESTLANDS FORM 4 JOINT EXAMINATION

Kenya Certificate of Secondary Education

## BIOLOGY

Paper 1 (Theory)

JULY/AUGUST 2014

Time: 2 hours

### INSTRUCTIONS TO CANDIDATES

- Write your **name** and **index number** in the spaces provided at the top of this paper.
- There are **eight (8)** printed pages. Ensure that **all pages** are printed.
- Write the **date** of examination in the spaces provided above.
- Answer **all** the questions in the spaces provided in the question paper.
- Additional papers must not be inserted

### FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidates Score
1-26	80	

*This paper consists of 8 printed pages.  
Candidates should check the question paper to ensure that all pages are printed as indicated and  
that no questions are missing.*

1. Mention **three** distinguished characteristics that make man more developed and superior to all other mammals. (3 mks)

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2. A group of Form one students went out to collect organisms for observation. Name the biological tools the students used to collect the following organisms. (3 mks)

a) spiders .....

b) Grasshoppers .....

c) Crawling animals in cracks on buildings .....

3. a) What is Photosynthesis? (1 mk)

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- b) i) State how the rate of photosynthesis differs in plants growing in high altitude areas from those growing in the lowland areas. (1 mk)

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- ii) Give **two** reasons for your answer in b (i) above. (2 mks)

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4. a) Mention **two** ways by which blood capillaries are structurally adapted to perform their functions. (2 mks)

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- b) State **two** ways in which the skin naturally protects the human body. (2 mks)

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5. Mention **two** roles of aerenchyma tissue in plants. (2 mks)

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6. a) Differentiate between aerobic and anaerobic respiration. (1 mk)

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b) State **two** ways by which lactic acid that is formed in muscles can be removed in the human body. (2 mks)

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7. a) State **two** roles of interphase in cell division. (2 mks)

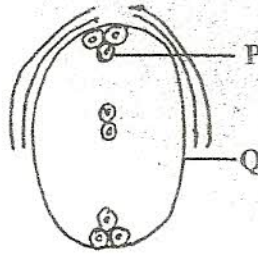
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b) State the significance of Meiosis in cell division. (1 mk)

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8. The diagram below shows a structure in a flowering plant.



a) Identify part labelled P. (1 mk)

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b) Explain the changes that take place in the parts labelled P and Q after fertilization. (2 mks)

i) Changes in P .....

ii) Changes in Q .....

9. Inhalation in man occurs when the volume of air in the thoracic cavity increases while its pressure decreases. Explain briefly how the above mentioned changes can take place. (3 mks)

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10. Explain the importance of predation in ecosystems. (2 mks)

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11. A certain mammal was found to have the following numbers of various teeth in the mouth.

	Incisors	Canines	Pre-molars	Molars
Lower jaw	6	2	4	6
Upper jaw	0	0	6	6

a) Write the dental formula for this animal. (1 mk)



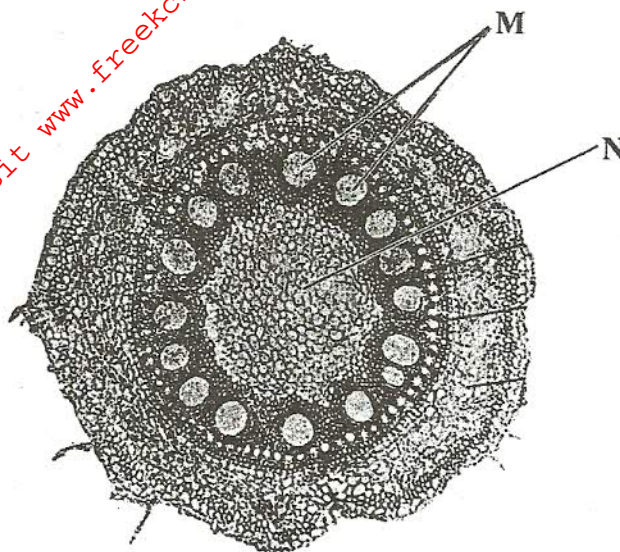
b) With a reason, state the mode of feeding of the animal.

(2 mks)

i) Mode of feeding .....

ii) Reason.....

12. The diagram below shows a section through a structure in a plant.



a) Name the part of the plant from which the section was obtained. Give a reason for your answer.

(2 mks)

i) Part .....

ii) Reason .....

b) State the functions of parts labelled M.

(1 mk)

13. State **one similarity** and **one difference** between osmosis and diffusion.

a) Similarity

(1mk)

b) Difference

(1 mk)

14. a) Mention functions of the following parts of a light microscope.

i) Fine adjustment knob

(1 mk)

ii) Condenser

(1 mk)

b) State **two** precautions that should be taken when storing a light microscope in the laboratory.

(2 mks)

15. Explain how loss of body heat can be reduced by vasoconstriction of blood capillaries in the skin during cold weather. (2 mks)

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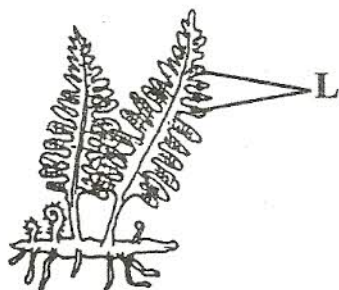
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16. a) Explain why members of the phylum arthropoda are able to occupy a large variety of habitats. (2 mks)

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- b) The diagram below shows a certain plant.



- i) Name the division in the kingdom Plantae to which the plant belongs. (1 mk)

- ii) State the function of structures labelled L. (1 mk)

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17. a) Two tall pea plants were crossed and 75% of the offspring were tall while the rest were short. Using letter (T) to represent gene for tallness, state the genotypes of the parents. (1 mk)

- b) What is artificial selection? (1 mk)

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18. a) What is metamorphosis? (1 mk)

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- b) What is the biological significance of metamorphosis to an insect. (2 mks)

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19. a) State two functions of Luteinizing hormone during the menstrual cycle in the human female. (2 mks)

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b) State the functions of the following structures in the umbilical cord in the human female during pregnancy.

i) Umbilical artery ..... (1 mk)

ii) Umbilical vein ..... (1 mk)

20. In an investigation, a student collected two plants A and B. Plant A had hairy leaves and few stomata sunken in pits into the leaf epidermis while leaves of plant B were broad and many stomata on upper surface only.

a) In which habitat would you find;

i) Plant A ..... (1 mk)

ii) Plant B ..... (1 mk)

b) What is the significance of hairs on leaves of plant A. (1 mk)

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21. State two ways in which nephrons of animals inhabiting dry areas are modified to conserve water. (2 mks)

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22. A solution of sugar cane was boiled with a small amount of dilute hydrochloric acid and allowed to cool. Sodium hydrogen carbonate solution was added drop by drop until the fizzing stopped. Few drops of Benedict's solution were added to the mixture and boiled. An orange precipitate formed at the end of the experiment.

a) What was the role of the following in the experiment?

i) Dilute hydrochloric acid. (1 mk)

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ii) Sodium hydrogen carbonate (1 mk)

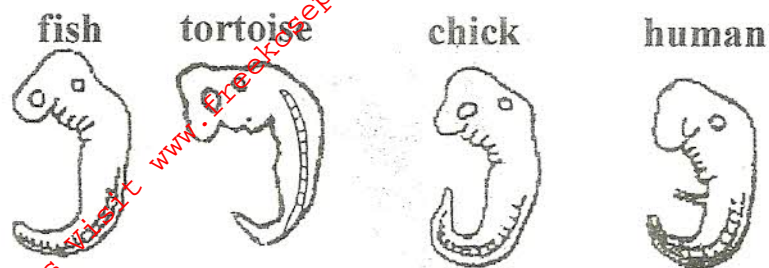
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b) To which class of carbohydrates does sugar cane belong? (1 mk)

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23. The diagrams below show embryos of certain vertebrate animals. Examine them and answer the questions that follow.



- a) Mention two observable structural features in these embryos that suggest that they have a common ancestral origin. (2 mks)

- b) What phenomenon in organic evolution is being exhibited by these diagrams of the embryos? (1 mk)

24. a) Where in the human body are relay neurones found? (1 mk)

- b) State the survival value of these responses in organisms.

- i) Phototropism. (2 mks)

- ii) Chemotaxis (2 mks)

25. State three functions of an exoskeleton in members of the phylum arthropoda. (3 mks)

26. The diagram below shows a structure obtained from an animal. Examine it and answer the questions that follow.



a) Identify the structure.

(1 mk)

b) Give two reasons for your answer.

(2 mks)

c) State a functional difference between a tendon and a ligament.

(1 mk)