

2528/103  
2922/103  
ENVIRONMENTAL BIOLOGY  
June/July 2018  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY  
MODULE I  
ENVIRONMENTAL BIOLOGY

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Non-programmable scientific calculators.*

*This paper consists of TWO sections; A and B.*

*Answer ALL questions in section A and any THREE questions from section B in the answer booklet provided.*

*Each question in section A carries 4 marks while each question in section B carries 20 marks.*

*Maximum marks for each part of a question are as shown.*

*Candidates should answer the questions in English.*

**This paper consists of 3 printed pages.**

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

SECTION A (40 marks)

Answer ALL the questions in this section.

- Name any four types of terrestrial eco-systems. *- Desert - Tropical forest - Tundra - Semi-arid* (4 marks)
- Draw a labelled diagram of the simple columnar epithelium tissue. (4 marks)
- State four characteristics of a child with down syndrome condition. *Appended appendage* (4 marks)
- List the four distinctive features of Arthropods. (4 marks)
- State four examples of discontinuous variation traits in human beings. *3 spots on face, eye colour, blood group, finger printing, tongue rolling* (4 marks)
- Construct a food chain in the ecosystem composed of the organisms: song bird; caterpillar; hawk; mahogany tree. (4 marks)
- Draw a labelled diagram of a sensory neuron. *axon, cell body, dendrite, synapse, myelinated axon* (4 marks)
- Mantophasm Zephyra* is one species of gladiator. Complete Table I showing classification of this species. (4 marks)

Table I

Kingdom	Animalia
—	Arthropoda
—	Insecta
—	Notoptera
Family	Mantophasmatodae
Species	—

- Outline four steps of the sulphur cycle. *- Mineralisation - Biological and chemical oxidation - Biological reduction - Assimilation* (4 marks)
- State four adaptations of cactus plant to arid environment. (4 marks)

- 9 (i) When sulphur metal is *burned* into the environment it combines with oxygen gas
- $$S_8 + O_2 \rightarrow SO_2$$
- (ii) The sulphur II oxide formed is actually released into the atmosphere which combines with *Excess*  $O_2$  in the atmosphere.
- $$SO_2 + O_2 \rightarrow SO_3$$
- (iii) Sulphur II oxide ( $SO_2$ ) formed is very toxic hence it is actually *traced* first in order to reduce environment effect of it.

Large plant  
Regular shape  
smaller in size  
chloroplast  
No

Animal  
Irregular shape  
Larger in size  
No  
Centrioles

**SECTION B (60 marks)**

Answer any **THREE** questions from this section.

11. (a) State **seven** differences between plant and animal cells. (14 marks)
- (b) Give **six** reasons which make food webs unbalanced if one population of organisms in the web dies.  
- ~~competition~~  
- ~~predation~~  
- increase population (6 marks)
12. (a) Outline **five** steps of carrying out selective breeding of dairy cows. (5 marks)
- (b) (i) Define the term deforestation. (1 mark)
- (ii) Describe any **seven** effects of deforestation on the environment. (14 marks)
13. (a) Describe the formation of acid rain. (4 marks)
- (b) Describe **five** negative effects of acid rain on the environment. (10 marks)  
- global warming  
- green-house effects
- (c) Explain **three** measures that can be taken to reduce the occurrence of acid rain. (6 marks)
14. (a) Define the term conservation as used in ecology. (2 marks)
- (b) Explain **four** reasons for conserving species in an ecosystem. (8 marks)
- (c) Describe any **five** differences between hormonal system and nervous system in humans. (10 marks)  
- Education
15. (a) State **three** risks of genetic engineering. (3 marks)
- (b) With the aid of a diagram, outline the production of insulin from bacteria. (17 marks)

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