

2910/201
APPLIED SCIENCE II
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN SUSTAINABLE AGRICULTURE
AND RURAL DEVELOPMENT

MODULE II

APPLIED SCIENCE II

3 hours

INSTRUCTIONS TO CANDIDATES

*This paper consists of EIGHT questions.
Answer any FIVE questions in the answer booklet provided.
All questions carry equal marks.
Maximum marks for each part of a question are indicated.
Candidates should answer the questions in English.*

This paper consists of 3 printed pages.

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

1. (a) (i) Define the term 'field capacity'. (2 marks)
- (ii) State two advantages and two disadvantages of the pyramid of productivity as a representation of bioproductivity at each trophic level in a given ecosystem. (4 marks)
- (b) (i) Distinguish between interspecific and intraspecific biotic factors. (2 marks)
- (ii) Explain the ways in which light affects the activities of organisms. (12 marks)
2. (a) Distinguish between:
- (i) oligophagous and polyphagous pests; (2 marks)
- (ii) occasional and key pests. (2 marks)
- (b) Using a flow diagram, outline the life cycle of *Fasciola hepatica*. (16 marks)
3. (a) (i) Name the chambers of the ruminant stomach. (4 marks)
- (ii) Highlight the roles of each of the chambers named in a(i) in ruminant digestion. (4 marks)
- (b) (i) Distinguish between mutualism and commensalism. (2 marks)
- (ii) Describe the life cycle of *Phytophthora infestans*. (10 marks)
4. (a) Describe the cohesion-tension theory in the transpiration stream. (10 marks)
- (b) Draw a labelled diagram of the vertical section through a stoma. (10 marks)
5. (a) (i) Define the term 'transgenic'. (2 marks)
- (ii) State four advantages of transgenics. (4 marks)
- (b) (i) Define the term 'multiple allelomorph'. (2 marks)
- (ii) State the principle of Mendel's law of independent assortment. (2 marks)
- (c) Outline the similarities between events occurring during meiosis & fertilization and proposals of Mendel's hypothesis. (10 marks)

6. (a) (i) Highlight **eight** characteristic features of nematodes. (8 marks)
- (ii) Name a common gut nematode parasite of pigs. (1 mark)
- (b) (i) Identify the phylum and class of a leech. (2 marks)
- (ii) Draw a diagram to illustrate the external features of a leech. (4 marks)
- (c) Explain the biological significance of the coelom. (5 marks)
7. (a) Draw a labelled cross-section of the dicot stem. (6 marks)
- (b) Differentiate between Dicotyledoneae and Monocotyledoneae classes. (14 marks)
8. (a) Highlight **eight** characteristics of chordates. (8 marks)
- (b) (i) Name **six** hormones produced by the anterior pituitary gland. (6 marks)
- (ii) Outline **six** physiological effects of insulin. (6 marks)

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