



UNIVERSITY OF SWAZILAND

MAIN EXAMINATION PAPER

PROGRAMME: B.Sc. AGRICULTURAL & BIOSYSTEMS ENGINEERING YEAR 4
B.Sc. AGRIC. ECON. & AGBMGT YEAR 4
B.Sc. AGRICULTURAL EDUCATION YEAR 4

COURSE CODE: CP 409

TITLE OF PAPER: FIELD CROPS

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION 1 AND QUESTION 2 AND ANY OTHER TWO
(2) QUESTIONS

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INVIGILATOR

146

QUESTION 1 (A)

Indicate whether the statements below are true (T) or false (F). For example, in your answer book, simply answer/write, (h) = F (2 marks each).

- a) Ecological services imply anything obtained from the environment to meet societal needs and wants
- b) Diversity is defined as number of species in the community and their relative abundances.
- c) Ecological stability means production objectives staying within the biophysical carrying capacity of an area
- d) Allelopathy is an important mechanism in plant succession
- e) Intensity of soil disturbance is an important factor determining the ratios and diversity of soil organisms
- f) Genetic vulnerability is the irreversible loss in genetic diversity, usually of crop plants or domestic animals.
- g) Increased dependence on high levels of inputs such as irrigation, fertilizers and pesticides is considered one of the causes of genetic erosion

(14 Marks)

QUESTION 1 (B)

Indicate the correct answer for the following statements. For example, in your answer book, write 8 = B, 2 marks each.

1. Primary succession
 - A Develops from a disturbed or destroyed area
 - B Usually colonized first by small plants such as grasses, then shrubs, and finally trees.
 - C First life forms often are pioneer plant species
 - D Occurs in a patchwork pattern rather than in a continuous, monolithic way.
2. Negative interactions amongst plants and plants with other organisms does not include one of the following
 - A Commensalism
 - B Parasitism
 - C Amensalism
 - D Competition
3. The following favour the emergence of intensive, specialized cropping systems
 - A Increased labor opportunities outside agriculture
 - B Cultivation of diverse varieties and landraces
 - C Markets become more developed
 - D Comparative advantage in production and processing
4. Competition between plants occurs
 - A Where plants are very close together
 - B When the supply of a resource is insufficient for unrestricted growth of the plants in question
 - C Amongst all plants in a community that is short of a growth factor
 - D Under dry conditions where seeds lack sufficient water for germination
5. Exudation and leaching of metabolites from above ground plant parts by rain, dew, mist is not an example of one of the following
 - A Mutualism
 - B Protocooperation
 - C Competition
 - D Amensalism
6. An important ecological factor, especially for land plants is
 - A Rainfall
 - B Evaporative power of the air
 - C Humidity
 - D Available surface water supply

7. Conservation agriculture

- A Any system that has few tillage requirements
- B Continuous minimum mechanical soil disturbance including direct seeding and permanent soil cover
- C Tillage of only part of the land
- D The most widely practiced tillage technique used by farmers in Southern Africa

(14 Marks)

[Total 28 Marks]

QUESTION 2

Using the agroecological region of the Middleveld of Swaziland, describe in a logical manner, factors you would consider for purposes of introducing a potential new crop not currently under cultivation in the zone.

[24 Marks]

QUESTION 3

(a) Describe four functions of the soil ecosystem.

(12 Marks)

(b) Identify a cropping system and describe how it positively contributes to the four functions of the soil ecosystem identified in (a) above.

(12 Marks)

[Total 24 Marks]

QUESTION 4

Today, only 30–50% of applied nitrogen fertilizer and about 20% of phosphorus fertilizer is taken up by crops. Discuss the implication of this observation based on the principles and practices of sustainable crop production.

[24 Marks]

QUESTION 5

(a) Plant biotechnology has two meanings. Give the two meanings. Describe the positive contribution of biotechnology based on each of the two meanings.

(12 Marks)

(b) Explain briefly the rationale for yield gap analysis.

(12 Marks)

[Total 24 Marks]