

2425/304
AGRICULTURAL ENGINEERING III
AND ENVIRONMENTAL MANAGEMENT
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AGRICULTURE

MODULE III

AGRICULTURAL ENGINEERING III AND ENVIRONMENTAL MANAGEMENT

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments;

Non-programmable scientific calculator.

This paper consists of TWO sections; A and B.

Answer any THREE questions from section A and any TWO questions from section B 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.

SECTION A (60 marks)

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

- ~~1.~~ (a) Outline **five** benefits of water supply on the farm. (5 marks)
- (b) Using labelled sketches, describe the following water supply networks:
- (i) dead end;
 - (ii) grid iron;
 - (iii) ring main.
- (15 marks)
- ~~2.~~ (a) Highlight **five** factors considered in choosing an irrigation method. (5 marks)
- (b) Sketch a layout of a sprinkler irrigation system. (5 marks)
- (c) Determine a crop field area that can be effectively irrigated by a sprinkler irrigation system given the following parameters:
- pump discharge of 12000 litres per hour;
 - depth of irrigation is 5 cm;
 - irrigation interval of 14 days;
 - the pump works for 8 hours per day;
 - efficiency of the system is 70%.
- (10 marks)
3. (a) State **five** causes of water logging on farms. (5 marks)
- (b) A tile drainage system was designed to drain a 100 ha farm land. Given that the run off co-efficient of the farm land was 0.70, rainfall intensity of 3 cm/hr and a storm duration of 40 minutes.
- Determine the:
- (i) discharge of the channel;
 - (ii) total volume of water at the end of the storm.
- (6 marks)
- (c) Illustrate **three** tile drainage systems. (9 marks)

4. (a) Explain **four** factors affecting soil seepage. (8 marks)
- (b) Explain **four** factors that affect soil compaction. (8 marks)
- (c) Outline **four** benefits of soil compaction on the farm. (4 marks)
5. (a) Highlight **five** factors considered in siting a dam. (5 marks)
- (b) Using labelled sketches, describe the following water storage structures:
- (i) sand dam;
 - (ii) rock-fill dam;
 - (iii) rectangular weir.
- (15 marks)

SECTION B (40 marks)

Answer any TWO questions from this section.

6. (a) Outline **five** classifications of wastes. (5 marks)
- (b) Highlight **five** problems of wastes on the farm. (5 marks)
- (c) Explain **five** methods of disposing farm wastes. (10 marks)
7. (a) Outline **four** factors considered in choosing a waste collection vehicle. (4 marks)
- (b) Describe **three** methods of farm waste collection. (12 marks)
- (c) State **four** waste collection records. (4 marks)
8. (a) Explain **five** environmental effects of using river water for irrigation. (10 marks)
- (b) Discuss environmental threats related to irrigation dams. (10 marks)

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