2425/304
AGRICULTURAL ENGINEERING III AND
ENVIRONMENTAL MANAGEMENT
June/July 2019
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;
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.

Turn over

SECTION A (60 marks)

Answer any THREE questions from this section.

1.   (a)   Define each of the following terms as used in irrigation:

   (i)   field capacity;
   (ii)   available water;
   (iii)   readily available moisture;
   (iv)   wilting point.

   (4 marks)

   (b)   Outline **four** factors to consider when choosing an irrigation method.   (12 marks)

   (c)   A soil has a moisture holding capacity of 200 mm per metre depth. The depth of the root zone is 20 mm and the soil bulk density is 1200 kg/m^3. Calculate the depth of water stored in the root zone.   (4 marks)

2.   (a)   State **two** advantages and **two** disadvantages of sprinkler irrigation.   (4 marks)

   (b)   An area of land measuring 0.1 hectare was irrigated using border irrigation when the application efficiency was 80%. The depth of irrigation varied linearly from 10 mm at the head end to 8 mm at the tail end of the border. Given that:

Field capacity	= 20%
Critical soil moisture content	= 10%
Soil bulk density	= 1500 kg/m^3
Crop root zone depth	= 1 metre
Daily crop water requirement	= 10 mm/day

   Calculate:

   (i)   water distribution efficiency;
   (ii)   net irrigation depth;
   (iii)   gross water requirement in mm;
   (iv)   irrigation frequency, assuming that no rain falls during this period.

   (16 marks)

3.   (a)   Give **four** disadvantages of gabions.   (4 marks)

   (b)   (i)   Highlight **four** uses of check dams in farms;

   (ii)   Explain **four** factors considered in the spacing of check dams in the farm.

   (8 marks)

   (c)   Differentiate between broad based terraces and narrow based terraces.   (8 marks)

4. (a) State **four** physical indicators of water erosion. (4 marks)

   (b) Discuss the factors that influence the occurrence of surface creep. (12 marks)

   (c) Outline **four** preventive measures for surface creep. (4 marks)

5. (a) Explain **four** factors affecting site selection for water distribution reservoirs.

   (8 marks)

   (b) Differentiate between confined aquifer and unconfined aquifer. (4 marks)

   (c) Describe each of the following methods of drilling farm wells:

   (i) percussion drilling;
   (ii) rotary drilling.

   (8 marks)

SECTION B (40 marks)

Answer any TWO questions from this section.

6. (a) Explain the meaning of each of the following terms as used in environmental management:

   (i) natural resources;
   (ii) biodiversity;
   (iii) ecosystem;
   (iv) conservation.

   (8 marks)

   (b) Outline **four** characteristics of hazardous wastes. (8 marks)

   (c) Differentiate between biodegradable and non-biodegradable wastes. (4 marks)

7. Discuss the issues to be addressed in environmental impact assessment process. (20 marks)

8. (a) Outline **three** challenges encountered in participatory approach of environmental management. (6 marks)

   (b) Describe the main characteristics of participatory rural appraisal as a tool of identifying and investigating local environmental problems. (14 marks)

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