2425/204
AGRICULTURAL ENGINEERING II
June/July 2019
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AGRICULTURE

MODULE II

AGRICULTURAL ENGINEERING II

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 THREE sections; A, B and C.
Answer FIVE questions; taking at least TWO questions from section A, at least ONE question from section B and at least ONE question from section C, 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.**

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SECTION A

*Answer at least **TWO** questions from this section.*

1. The following levels in metres were taken at intervals of 40 m, along the centre line of a proposed drainage channel, starting and ending at chainage 200 m and 360 m respectively:

   5.330, 3.970, 1.760, 1.910, 4.250 and 5.500.

   Given that the elevation of chainage 200 m is 50.40 m and that the observation 1.910 m is a foresight:

   (a) reduce the levels using the rise and fall method, applying appropriate checks;

   (12 marks)

   (b) if the formation of the drainage channel is to rise at a gradient of 1:50 from a formation of 45.00 m at chainage 200 m, determine the depth of cut required at each chainage station.

   (8 marks)

2. (a) Define each of the following contour terms:

   (i) contour line;
   (ii) vertical interval;
   (iii) horizontal equivalent;
   (iv) gradient.

   (4 marks)

   (b) Outline **four** considerations for selecting contour vertical interval when contouring.

   (8 marks)

   (c) Describe the process of contouring by the grid square method.

   (8 marks)

3. (a) Outline **three** benefits of farm planning.

   (6 marks)

   (b) Explain the factors considered in farmstead planning.

   (14 marks)

4. Discuss the merits and demerits of land grading.

   (20 marks)

SECTION B

Answer at least ONE question from this section.

5. (a) Explain **four** requirements of a deep litter poultry housing.   (8 marks)

    (b) Illustrate the features of the front elevation and floor plan of a typical deep litter poultry housing for layers.   (12 marks)

6. (a) Outline **five** desirable qualities of wood as a building material.   (10 marks)

    (b) Describe how each of the following is carried out when testing the quality of sand for making concrete:

       (i)   testing for silt/clay;
       (ii)   testing for organic impurities.

                                                    (10 marks)

SECTION C

Answer at least ONE question from this section.

7. (a) Outline **four** requirements of a good grain storage facility.   (4 marks)

    (b) With the aid of a sketch, explain the drying process in a deep layer grain dryer.
                                                   (16 marks)

8. (a) Define each of the following terms:

       (i)   relative humidity;
       (ii)   absolute humidity;
       (iii) temperature;
       (iv) dew point.

                                                    (4 marks)

    (b) With the aid of a diagram, explain the working principle of the wet and dry bulb thermometers for determining relative humidity.   (16 marks)

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