

1405/315
AGRICULTURAL ENGINEERING
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
CRAFT CERTIFICATE IN GENERAL AGRICULTURE
AGRICULTURAL ENGINEERING

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Non-programmable scientific calculator;

Drawing instruments;

Answer booklet.

This paper consists of SIXTEEN questions in TWO sections; A and B.

Answer ALL questions in section A and any FOUR questions from section B in the answer booklet provided.

Each question in section A carries 4 marks while each question in section B carries 15 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 (40 marks)

Answer ALL questions in this section.

1. State **four** general safety rules of a workshop. (4 marks)
2. Sketch each of the following marking out tools:
 - (a) inside callipers; (2 marks)
 - (b) outside callipers. (2 marks)
3. Highlight **four** aims of secondary tillage. (4 marks)
4. State **four** advantages of a reversible plough. (4 marks)
5. Outline **two** operational differences between external combustion engine and internal combustion engine. (4 marks)
6. Identify **four** types of P.T.O arrangements. (4 marks)
7. List **four** types of water erosion. (4 marks)
8. Name **four** defects that may be found in timber. (4 marks)
9. List **four** types of micro catchments used in agriculture. (4 marks)
10. State **four** functions of pumps in an irrigation system. (4 marks)

SECTION B (60 marks)

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

11. (a) Beside trapezoidal rule, state **four** other methods of area approximation of irregular surfaces. (4 marks)
- (b) The following offsets were taken at 15 m intervals from a survey line to an irregular boundary line:
3.50, 4.30, 6.75, 5.25, 7.50, 8.80, 7.90, 6.40, 4.40 and 3.25 m.
- (i) Sketch the area enclosed between the survey line, the irregular boundary line and the offsets. (4 marks)
- (ii) Calculate the area of the field using trapezoidal rule. (7 marks)
12. (a) Using labelled diagrams, explain the principle of operation of a two stroke cycle diesel engine. (12 marks)
- (b) Highlight **three** maintenance practices of the diesel engine. (3 marks)
13. (a) Explain **six** functions of a seed drill. (12 marks)
- (b) State **three** factors influencing germination of drilled seeds. (3 marks)
14. (a) Using a labelled diagram, explain the operation of a rack and pinion steering system of a farm tractor. (10 marks)
- (b) Highlight **five** maintenance practices of a tractor power steering system. (5 marks)
15. (a) Outline **five** factors influencing water erosion. (10 marks)
- (b) Highlight **five** benefits of agroforestry. (5 marks)
16. (a) Outline **five** differences between weirs and dams. (10 marks)
- (b) State **five** problems of irrigation. (5 marks)

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