

2425/104

AGRICULTURAL ENGINEERING I

June/July 2022

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AGRICULTURE

MODULE I

AGRICULTURAL ENGINEERING I

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 a total of **FIVE** questions, taking at least **ONE** question from each section.*

*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

*Answer at least ONE question from this section.*

1. (a) Outline **four** possible causes of fire in an agricultural engineering workshop. (4 marks)
- (b) Sketch and state the function of each of the following workshop tools:
- (i) taper shank twist drill;
  - (ii) plug gauge;
  - (iii) half round scraper;
  - (iv) chipping hammer. (16 marks)
2. (a) State the function of the following components of an oxy-acetylene gas welding equipment:
- (i) regulator;
  - (ii) gauges;
  - (iii) blowpipe;
  - (iv) welding hose. (4 marks)
- (b) With the aid of a sketch, describe the features of an oxy-acetylene gas cutting torch. (12 marks)
- (c) Highlight **four** routine maintenance requirements for an oxy-acetylene gas welding equipment. (4 marks)

## SECTION B

*Answer at least ONE question from this section.*

3. (a) Outline the function of any **four** components of a simple carburetor. (8 marks)
- (b) With the aid of a labelled diagram, explain the operation of a tractor engine starting system. (12 marks)
4. (a) State **four** functions of a tractor lubrication system. (4 marks)

- (b) Using a labelled diagram, explain the operation of the full internal force feed engine lubrication system of a tractor. (12 marks)
- (c) Highlight **four** maintenance requirements for a tractor engine lubrication system. (4 marks)
5. (a) Explain **six** factors considered when choosing a source of farm power. (12 marks)
- (b) Outline **four** managerial actions that can be taken to improve the work output of a draught animal. (8 marks)

### SECTION C

*Answer at least ONE question from this section.*

6. (a) Explain the meaning of the following tractor plough attachment terms:
- (i) integral ploughs;
- (ii) semi-integral ploughs;
- (iii) drawn ploughs. (6 marks)
- (b) With the aid of a labelled diagram, explain the operation of a single bottom tractor mounted mould board plough. (10 marks)
- (c) State **four** maintenance requirements for mould board ploughs. (4 marks)
7. (a) Outline **four** applications of sprayers in agriculture. (4 marks)
- (b) (i) Draw a schematic diagram of a boom sprayer. (8 marks)
- (ii) State the functions of any **four** components of a boom sprayer. (4 marks)
- (c) State **four** safety precautions to be observed when handling spray chemicals. (4 marks)
8. (a) Explain the operation of a grain roller mill. (6 marks)
- (b) With the aid of a labelled sketch, explain the operation of a hammer mill. (10 marks)
- (c) Highlight **four** maintenance requirements for hammer mills. (4 marks)

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