

2425/104  
AGRICULTURAL ENGINEERING I  
June/July 2018  
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

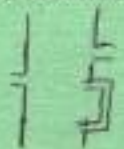
Answer at least **ONE** question from this section.

1. (a) Outline any **four** common safety hazards in an agricultural engineering workshop. (8 marks)
- (b) Sketch a labelled diagram of a vernier caliper. (6 marks)
- (c) Illustrate a reading of a vernier caliper set at 43.34 mm. (6 marks)
2. (a) Define the following oxy-acetylene gas welding terms, giving any **two** causes for each:
- (i) flash back;
- (ii) back firing. (6 marks)
- (b) With the aid of labelled sketches, describe any **two** types of oxy-acetylene gas welding flames stating **one** application for each. (14 marks)

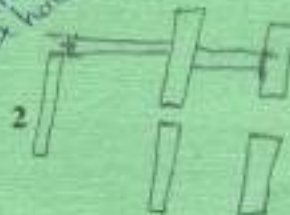
## SECTION B

Answer at least **ONE** question from this section.

3. (a) State any **four** functions of a tractor engine lubrication system. (4 marks)
- (b) With the aid of labelled sketches, explain the operation of a two stroke cycle compression ignition engine. (16 marks)
4. (a) Give any **four** functions of a power transmission gearbox in a tractor. (4 marks)
- (b) With the aid of a labelled diagram, explain the operation of a three speed sliding mesh gear box of a tractor. (16 marks)
5. (a) Outline **two** methods of supplying fuel to an injection pump/carburetor in a tractor. (4 marks)
- (b) With the aid of a labelled diagram, explain the operation of a simple carburetor. (16 marks)



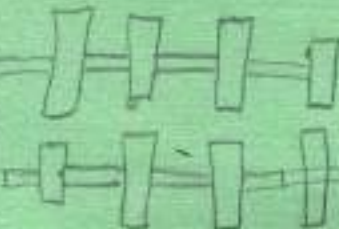
Hydrocarbon  
Ignition  
Compression  
Exhaust



2. 10/10



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Drive  
Shaft



## SECTION C

Answer at least ONE question from this section.

6. (a) Illustrate the following disc plough angles and explain the effect of each on the plough performance:
- (i) disc angle;  $15-25^\circ$  
- (ii) tilt angle.  $42-45^\circ$  
- (10 marks)
- (b) Outline any five safety precautions to be observed by tractor mounted disc plough operators. (5 marks)
- (c) State any five maintenance requirements of a disc plough. (5 marks)
7. (a) Explain any five advantages of drill sowing over broadcasting seeds. (10 marks)
- (b) With the aid of a labelled sketch, describe the operation of an internal wheel force-feed seed metering mechanism. (10 marks)
8. (a) Draw a cross-sectional view to illustrate the knife assembly of a cutter bar mower and explain its operation. (11 marks)
- (b) Explain the purpose of the following cutter bar mower adjustments:
- (i) knife register;
- (ii) cutter bar lead;
- (iii) knife clips. (9 marks)

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