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AGRICULTURAL ENGINEERING LEVEL 6

ENG/OS/AGR/CR/05/6/A

DEMONSTRATE UNDERSTANDING OF TRACTORS AND POWER UNITS

July/August 2024



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

3 HOURS

INSTRUCTIONS TO CANDIDATE

1. This paper consists of two sections; **A** and **B**
2. Answer **ALL** the questions as guided in each section
3. Marks for each question are as indicated in the brackets
4. You are provided with a separate answer booklet to answer the questions
5. Do not write in this question paper

This paper consists of THREE (3) printed pages

Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (40 Marks)

Answer ALL questions in this section.

1. Define the following tractor hydraulic controls; (6 marks)
 - (i) Draft control
 - (ii) Position Control
 - (iii) Response Control
2. Tractor ignition system provides a method of turning a spark ignition engine *ON* & *OFF*. List other FOUR functions of an ignition system; (4 marks)
3. Highlight FOUR functions of additives in tractor lubrication oil. (4 marks)
4. A tractor is the main source of power commonly used on the farm for various operations. Outline FOUR ways in which power transmitted by the tractor engine is made available for use on the farm. (4 marks)
5. Outline FOUR short term maintenance services carried out on a farm tractor to ensure its' efficient operation. (4 marks)
6. State TWO causes for each of the following clutch operation faults;
 - (i) Clutch Slip
 - (ii) Clutch Judder(4 marks)
7. Define the following terms as used in engine operations;
 - (i) Indicated Power
 - (ii) Friction power
 - (iii) Drawbar Power
 - (iv) Rated Power(4 marks)
8. Piston rings enhance the performance of an engine during its operation. State THREE functions of the piston rings. (3 marks)
9. State THREE advantages of an open centre hydraulic system of a tractor. (3 marks)
10. Outline TWO basic ways in which fuel is supplied to a carburetor of a spark ignition engine of a tractor. (4 marks)

SECTION B (60 Marks)

Answer ANY THREE questions in this section.

11.

- (a) Highlight FOUR benefits of a differential lock during tractor operations. (4 marks)
- (b) With the aid of a diagram, explain the operation of a single plate tractor clutch. (16marks)

12.

- (a) Explain the following engine terminologies
 - (i) Bore and Stroke
 - (ii) Swept volume
 - (iii) Compression ratio (6 marks)
- (b) With the aid of diagrams, describe the operation of a 2-stroke cycle spark ignition engine. (14 marks)

13.

- (a) Farm implements are hitched to the farm tractor for them to harness power for various operations on the farm. Outline THREE ways of hitching an implement to the tractor. (6 marks)
- (b) With the aid of a sketch describe the construction and operation of a tractor three-point linkage. (14 marks)

14.

- (a) The engine lubrication oil is the main component that ensures efficient engine operation and durability in terms of its lifetime. Outline THREE functions of a lubrication oil. (6marks)
- (b) With the aid of a diagram, explain the operation of a Forced feed system engine lubrication system. (14 marks)

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