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AGRICULTURAL ENGINEERING LEVEL 6**ENG/OS/AGR/CR/02/6/****Farmstead Structures and Farm Roads July/August 2025**Printed By: Technical And Vocational College Date: 25.07.2025
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07:56 AM**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL
(TVET CDACC)****WRITTEN ASSESSMENT****Time: 3 HOURS****INSTRUCTIONS TO CANDIDATE**

1. This paper consists of TWO sections: A and B.
2. Attempt ALL questions in section A and ANY THREE (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet.
5. Do not write on the question paper.

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This paper consists of FOUR (4) 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)***Attempt ALL the questions in this section.***

1. Proper to quality and durable wood products. State FOUR advantages of wood as a building material. (4 Marks)
2. Construction of farm structures requires of correct tools and equipment which varies from one structure to another. Outline FOUR ways of ensuring there is proper maintenance of the construction tools in the farm. (4 Marks)
3. Strong foundation requires the use of the right materials in the right proportions for strong and durable structures. State FOUR factors that affect the strength of concrete. (4 Marks)
4. Construction materials have got their advantages and disadvantages. Identify FOUR advantages of using steel reinforced concrete during construction of farm structures. (4 Marks)
5. Farm roads play an important role in ensuring that farm activities are carried out effectively and efficiently. Outline FOUR steps involved in constructing farm roads. (4 Marks)
6. Design of animal structures is very key when it comes to high productivity and durability. Identify FOUR factors that should be considered when siting a beehive. (4 Marks)
7. In the farm it is always important to have amenities and recreational facilities which gives workers and the farmer time to rest as a way of increasing productivity. State FOUR examples of farmstead amenities structures. (4 Marks)
8. A newly constructed zero grazing unit is to be commissioned and start operations. Outline FOUR main components it must possess for it to be deemed good for use. (4 Marks)
9. A farmer has been having challenges with his farm become impassable during rain seasons as a result of poor-quality materials used in construction. You have been tasked to advice on the materials selection for the road construction. Outline FOUR factors you will consider on top of the quality of the materials. (4 Marks)
10. As an agricultural engineer you been tasked to design and construct greenhouse in a given farm. Your first assignment is to carry out a site visit as feasibility study. List FOUR equipment you will be required to carry during the assignment. (4 Marks)

SECTION B (60 MARKS)***Attempt Any THREE Questions in This Section***

11. Metameta Farm pld a facility for drying and preserving their farm produce in preparation for market distribution. To achieve this, they have hired an agricultural engineer to design and oversee the construction of the structure, specifically for maize production. As the first step, the engineer is expected to conduct a feasibility study and present a detailed report on the findings.

- State FOUR reasons why feasibility studies need to be carried out before construction work begins. (4 Marks)
- Describe EIGHT Engineering design steps he would consider while undertaking the exercise. (16 Marks)

12. A standard pig stay is a specially designed shelter used in pig farming to provide pigs with a safe, clean, and comfortable environment for living, feeding, and breeding.

- Outline SEVEN factors to consider when constructing a pig sty. (7 Marks)
- Explain FOUR parts of a standard pig stay unit. (8 Marks)

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- Outline FIVE Maintenance practices carried out on a standard pig stay. (5 Marks)

13. Timber is widely used in construction due to its strength, availability, and ease of use. However, because it is a natural material, timber is vulnerable to threats such as decay, insect attacks, moisture damage, and fire. To enhance its strength, and resistance to these factors, timber treatment methods are employed before or during its use in building construction.

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- Outline FIVE methods of treating timber as a building material. (10 Marks)

- A concrete beam measuring 10m by 0.5 m by 0.1m is required. The concrete mix proportion by dry basis is of 1:3:5. Given that:

- Density of cement = 1440 kg/m³
- Density of sand = 1700 kg/m³
- Density of ballast = 1650kg/m³
- Water cement ratio = 0.45

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- 50 kg Bag of cement = 37 litres

Ignoring the volume of reinforcing rods, 30% material waste and shrinkage, determine the following;

- Number of 50 kg bags of cement required (4 Marks)
- Weight of ballast required in tons (2 Marks)
- Weight of sand required in tons (2 Marks)

(iv) Amount of water required to mix the concrete in litres (2 Marks)

14. Construction of structures requires proper documentation and reporting of all the operations for ease of management.

(a) Explain FIVE advantages of integrating construction reports into the day-to-day activities of a construction project. (10 Marks)

(b) Explain FIVE features that should be included in a daily construction report.

(10 Marks)