

071606T4MCT

MECHATRONIC TECHNICIAN LEVEL 6

ENG/OS/MC/CR/02/6/A

Install Mechatronic Systems

July /Aug 2023



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

WRITTEN ASSESSMENT

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INSTRUCTIONS TO CANDIDATE:

1. This paper consists of TWO sections: **A** and **B**.
2. Answer ALL questions in sections A and B in the answer booklet provided.
3. Marks for each question are indicated in brackets.
4. Do not write on this question paper.

This paper consists of FIVE printed pages.

Candidate 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)

Attempt **all** the questions in this section.

1. Outline TWO possible scenarios that could cause electrical circuit to become overloaded. (2 Marks)
2. Make a comparison between cable insulation and cable sheathing. (2 Marks)
3. Distinguish between active and passive sensor and give ONE example of each type. (4 Marks)
4. Identify the following piping components. (2 Marks)

a.



b.



5. Draw the symbols for each of the following electrical components.
 - a. One-way one gang switch (1 Mark)
 - b. Intermediate switch (1 Mark)
 - c. Two-way switch (1 Mark)
6. Define the function of each of the following wiring components. (3 Marks)
 - a. Junction box
 - b. Fuse
 - c. Circuit breaker
7. Outline the function of each of the following tools during wiring installation. (2 Marks)
 - a. Wire crimpers
 - b. Fish tape
 - c. Labeling machines
 - d. Spirit level
8. Distinguish between a sensor and a transducer. (4 Marks)
9. Identify THREE elements of a Mechatronic system. (3 Marks)
10. Highlight any TWO reasons why electrical drives are needed. (2 Marks)

11. Discuss TWO functions of a hydraulic fluid. (2 Marks)
12. Identify any TWO electrical wiring testing tools and equipment. (2 Marks)
13. Outline any THREE types of conduits used in electrical installations. (3 Marks)
14. A direct current (DC) motor fails to start when switched on. Identify TWO possible reasons and remedies. (4 Marks)
15. Discuss TWO precautions which should be taken when stripping cable sheaths and insulation, state the reason. (2 Marks)

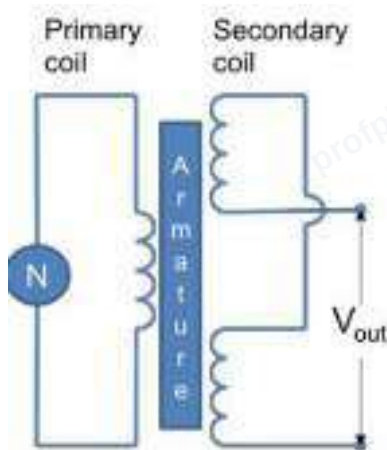
SECTION B (60 Marks)*Attempt any **three** questions in this section*

16.

- a. Define a key and state its main functions. (3 Marks)
- b. Discuss FOUR purposes of coupling in machinery. (8 Marks)
- c. Describe, with the help of neat sketches, the following shaft couplings mentioning the uses of each type. (9 Marks)
 - i. Muff-coupling
 - ii. Split-Muff Coupling
 - iii. Flange Coupling

17.

- a. Explain FIVE factors to consider when choosing an electrical wiring system to be used in an installation. (10 Marks)
- b. The figure below shows a Linear Variable Differential Transformer (LVDT). Describe how the LVDT works. (9 Marks)



- c. Define ONE application of LVDT. (1 Mark)

18.

- a. Discuss any FIVE types of sensors used in mechatronic systems. (10 Marks)
- b. Identify TWO classes of control systems. (2 Marks)
- c. Explain the following terms as used in sensor specification. (8 Marks)
 - i. Sensor range
 - ii. Sensor accuracy
 - iii. Sensitivity
 - iv. Error

19.

- a. Define the term system commissioning. (2 Marks)
- b. Commissioning of the electronic systems is done as per the system manuals. Discuss in detail FOUR objectives of commissioning an electro-mechanical system. (8 Marks)
- c. Various fittings are used in pipe installation in order to transverse bends, form branches and corners. Identify any FIVE fittings commonly used and explain their functions. (10 Marks)

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