

071506T4MTP

MECHANICAL TECHNICIAN LEVEL 6

ENG/OS/ME/CR/3/06/A

JOIN PARTS BY MANUAL METAL ARC WELDING (MMAW)

March/April 2025



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

WRITTEN ASSESSMENT

INSTRUCTIONS TO CANDIDATE

1. This paper consists of **TWO** sections: **A** and **B**.
2. Answer **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.

This paper consists of FIVE (5) 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 the questions in this section.

1. You are assigned to demonstrate the Manual Metal Arc (MMA) welding process to a group of new apprentices in the welding workshop. Outline FOUR precautions to be followed while performing this type of welding. (4 Marks)
2. During a training session in the workshop, you observed a welder performing an arc welding operation on a window frame. Outline FOUR hazards that the welder may encounter during the operation. (4 Marks)
3. During a practical welding session in the workshop, the instructor is teaching you how to strike an arc using the Manual Metal Arc (MMA) welding process. The instructor demonstrates two methods for striking an arc. Identify the difference between the two methods. (4 Marks)
4. After completing a Manual Metal Arc (MMA) welding operation, you notice that slag has accumulated on the surface of the welded joint, covering the weld bead. Name FOUR tools that should be used to remove that slag effectively. (4 Marks)
5. As a ~~mechanical technician~~ you good weld joint. Outline these TWO factors that would be considered. (2 Marks)
6. You are working on a welding project that involves fabricating a steel structure with varying material thicknesses and joint designs. During cost estimation of welding electrodes, the designer included different sizes of electrodes. Give TWO reasons for purchasing the different sizes. (2 Marks)
7. After completing a welding operation on a butt joint in the workshop, as a quality inspector, you conducted a visual inspection of the weld to evaluate its quality. During the inspection, you identified several defects. State FOUR defects you may have observed. (4 Marks)
8. You are assigned to weld a 5 mm thick mild steel plate using the Manual Metal Arc (MMA) welding process. During the setup, the instructor explains that the welding current needs to be adjusted based on specific factors to ensure a strong, high-quality weld. State FOUR of these factors. (4 Marks)
9. Care and maintenance of manual metal arc welding machine is crucial to increase the lifespan of the machine. List FOUR of these care and maintenance practices. (4 Marks)

10. During a welding practical, you are tasked with joining two pieces of metal using a Direct Current (DC) welding machine. The instructor explains that depending on the thickness of the material, you will need to choose polarity settings. Define each of the following as explained by the instructor:

- i. Direct Current Electrode Positive (DCEP);
- ii. Direct Current Electrode Negative (DCEN).

(4 Marks)

11. You are working as a quality assurance supervisor in a welding workshop and requested to assess the weld quality of a newly welded pressure vessel using a non-destructive test. Outline FOUR advantages of the test.

(4 Marks)

SECTION B: (60 MARKS)

Answer Any THREE Questions in This Section

12.

- a. As a welder performing the welding of a 6 mm thick mild steel plate; Explain the consequences of current settings to each of the following problems:

- i. Irregular weld bead
- ii. Excessive spatter
- iii. Electrode sticking to the workpiece
- iv. Poor penetration

(8 Marks)

- b. A customer needs an electric meter box made by manual metal arc welding process. As a workshop technician discuss the activities involved in each of the following steps:

- i. Material selection;
- ii. Tools selection;
- iii. Material preparation;
- iv. Machine set up;
- v. Welding process;
- vi. Finishing.

(12 Marks)

13.

- a. As a workshop technician in a Manual Metal Arc (MMA) welding workshop, you are tasked with guiding a group of interns who are learning on the various weld bead patterns used during the welding process. With the aid of sketches explain to them FOUR different patterns. (8 Marks)

- b. During a welding demonstration in the workshop, the instructor shows you four different types of weld joints used in the Manual Metal Arc (MMA) welding process. With the aid of sketches describe each of the FOUR types. (12 Marks)

14.

- a. You are a quality control inspector in a metal fabrication workshop. During your routine inspection of a batch of welded steel components, you noticed some welds defects. Explain THREE parameters causing the defects during the welding process. (6 Marks)

- b. You are teaching a group of welding students during their introductory class on welding consumables. As an experienced welder, you give the learners on industrial attachment a packet of carbon steel covered welding electrodes labeled E6013. Explain the meaning of the numbers and letters in the coding system.

(6 Marks)

- c. When conducting orientation to new students, they are shown the manual metal arc welding machine set up. Illustrate it.

(8 Marks)

15.

- a. As a supervisor in a welding workshop, you gather the workers to perform housekeeping activities after carrying out a welding operation. Explain SIX of these activities.

(6 Marks)

- b. You are leading a team of new technicians on their first hands-on metalworking project in the workshop. In order to carry out work effectively, it is important to prepare an operation plan. Explain SIX of its contents.

(6 Marks)

- c. You are conducting a hands-on training session for students in the welding workshop on how to set starting a welding operation. Describe FOUR aspects in the procedure for set up.

(8 Marks)