

071505T4MTP

MECHANICAL PRODUCTION TECHNICIAN LEVEL 5

ENG/OS/ME/CR/02/5/A

PERFORM GRINDING OPERATIONS

March/April 2025



**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. 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 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)

Answer ALL the questions in this section.

1. In selecting a grinding wheel for use in a grinding operation, one must consider the wheel specifications, which determine the type and characteristics of the wheel. List FOUR wheel identity specification used in specifying these cutting tools. (4 Marks)
2. For the operations on a grinding machine, you need to understand all the parts of the machine and their functions. Name FOUR parts of this machine. (4 Marks)
3. Grinders used in an engineering workshop have specific parameters that determine their size and output. Identify FOUR key specifications that define these characteristics. (4 Marks)
4. Trainees working in grinding workshops must protect themselves from hazards associated with the grinding process. Name THREE common hazards they may encounter. (3 Marks)
5. In order to protect yourself from grinding operation hazards, you need to wear the right attire for grinding operations. Identify FOUR personal protective equipment needed for such operations. (4 Marks)
6. While using a grinding machine adhering to safety measures is essential to prevent accidents and injuries. (4 Marks)
7. Grinding is an operation that is generation. List THREE ways in which this waste can be managed. (3 Marks)
8. There are various types of operations that can be carried out on a grinding machine. Outline FOUR types of these operations. (4 Marks)
9. All work pieces to be ground on grinding machines must be well secured. List TWO work holding and supporting devices that are used. (2 Marks)
10. Grinding operation has advantages that are not found in other machining methods. Outline FOUR of these advantages. (4 Marks)
11. Grinding wheels are bound with grits of abrasive bonding material that bound particles together in a solid matrix. List FOUR types of these bonds. (4 Marks)

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

12.

- a. As the manager of a machining company, you are tasked with educating your team about the qualities of good cutting fluids for grinding operations. Discuss FIVE such qualities. (10 Marks)
- b. Structure and grade are terms used when describing grinding wheels in relation to their working. Explain these two terms. (4 Marks)
- c. The following machines are used in surface grinding operations. Describe each one of them: (6 Marks)
 - i. Tool grinders;
 - ii. Jig grinders;
 - iii. Disk grinders.

13.

- a. Rough and precision grinding are both special grinding operations. Describe the two operations. (4 Marks)
- b. When it comes to grinding and other machining operations, there are several cooling lubricants that are used for the cooling purpose. Discuss THREE of them. (6 Marks)
- c. A technician in your college is required to carry out grinding operation on a square work piece using a flatbed surface grinding machine. It is a requirement to reduce the surface of the square work by one (1mm) millimetre from all sides. Describe FIVE operational steps that one is expected to follow. (10 Marks)

14.

- a. Grinding wheels are multipoint cutting tools of a grinding machine that require proper mounting for an effective cutting action. Sketch and label a fully mounted wheel on a pedestal grinding machine. (8 Marks)
- b. During grinding operation, the wheel wears out with time as it cuts the work piece. The following are principles of grinding wheel wear mechanisms. Describe each one of them. (6 Marks)
 - i. Attritions wear,
 - ii. Bond fracture.
- c. In selecting a grinding wheel for a particular use, there are factors that determine their selection. Discuss THREE of these factors. (6 Marks)

- d. Lapping is a finishing process that is done after grinding to produce a geometrically true shape. Describe FOUR of its objectives. (4 Marks)
- e. Tumbling (or liquid honing) is the process of revolving small work piece in a barrel with abrasive and water for the purpose of producing the required quality. Describe six purposes of tumbling. (6 Marks)
- f. Grinding wheel become worn out and glazed from its original shape due to breakings of abrasives and bond particles. This renders away its sharpness. To return the wheel into proper cutting action, '**dressing**' and '**truing**' operations are performed. Illustrate these operations with the use of sketches. (10 Marks)