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MECHANICAL PRODUCTION TECHNICIAN LEVEL 5

ENG/OS/ME/CR/02/5

Perform Grinding Operation
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July/August 2025

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

WRITTEN ASSESSMENT

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Time: 3 HOURS

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INSTRUCT CANDIDATE

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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 **swear booklet**.
5. Do not write on the question paper.

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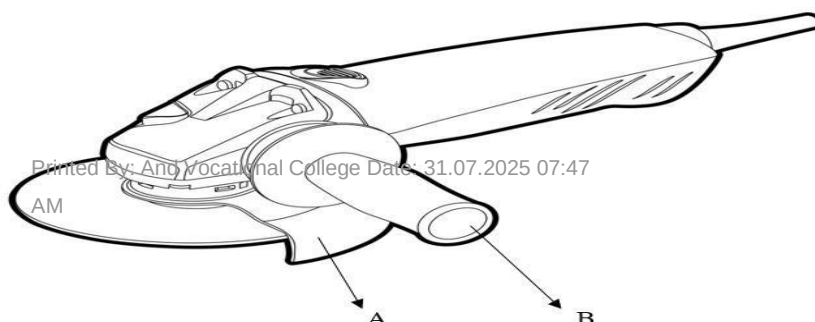
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This paper consists of FIVE (5) printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A: (40 MARKS)**Attempt ALL the questions in this section.**

1. Personal protective Equipment (PPE) plays a crucial role in safeguarding a fabricator while performing grinding operations. Identify FOUR examples of these PPEs (4 Marks)
2. State FOUR Safety Precautions to be observed while using grinding machine tools. (4 Marks)
3. Grinding machines perform different operations depending on the accuracy of machining required. List TWO operations performed by these machines. (2 Marks)
4. Grinding wheel balancing is the process of ensuring the grinding wheel is evenly distributed around its rotational axis. State FOUR problems that can arise when working with an unbalanced wheel (4 Marks)
5. In a grinding process, it is advised to use coolant for various reasons. Explain FOUR importance of using a coolant during grinding operations. (4 Marks)
6. Housekeeping is among the procedures carried out before, during and after any workshop operation in bench work. List TWO activities done during this procedure (2 Marks)
7. Choice of grinding wheels depends on various factors that include the nature of the work. State FOUR examples of grinding wheels. (4 Marks)
8. Grinding defects are situations where grinding wheel reduce efficiency. State FOUR common defects associated with grinding process. (4 Marks)
9. Speed and feed of grinding operation depend on the nature of work or type of material being ground. Identify FOUR factors to consider when selecting a grinding speed. (4 Marks).
10. A grinding machine operator is required to understand the use of all the parts of a grinding machine. Explain ONE function of each of the following parts. (2 Marks)
 - a. Electromagnetic chuck,
 - b. Machine guard.
11. The diagram below is a drawing of a portable grinder.

(A) and (B)**(2 marks)**

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ii. State the purposes of the parts of the machine you have stated above.

(2 marks)

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12. Achieving tight tolerances is a primary reason why grinding is often employed as a finishing process after other machining operations. List TWO activities one should do to achieve the stated tolerance. (2 marks)

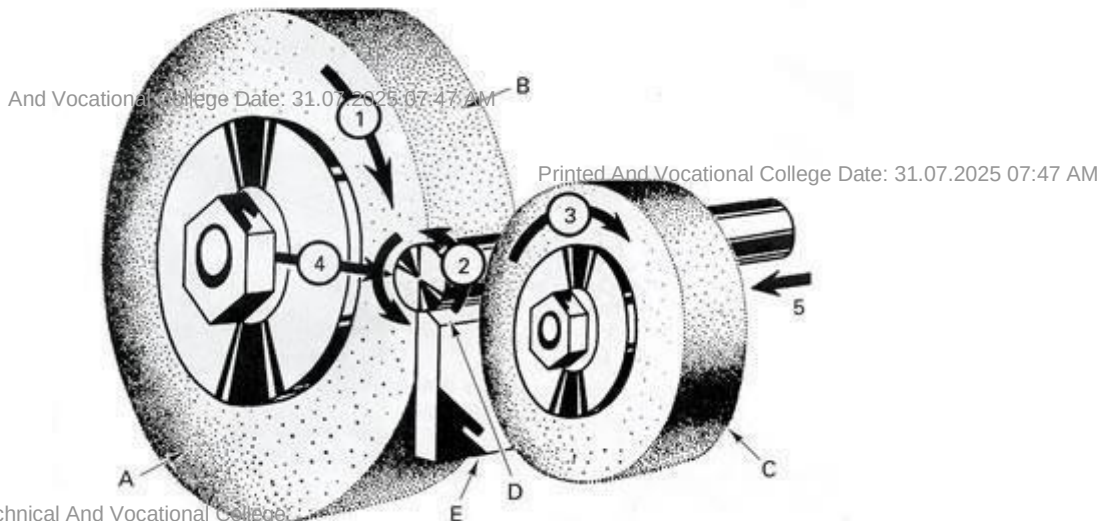
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SECTION B: (60 MARKS)**(Attempt only THREE questions from this section)**

13.

- a. Use the following questions in i, ii and iii below.

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i. Identify the type of grinding operation depicted by the figure above. (1 mark)

- ii. Describe THREE characteristics of the grinding operation shown in the figure above. (3 marks)

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- iii. Explain the primary functions of parts A, C and E above. (6 marks)

- b. To achieve quality surface when performing surface grinding operation, there are

various factors that are considered. Explain FIVE of these factors. (10 marks)

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- a. Your fellow trainees visited a certain manufacturing industry on an academic field trip. They found a grinding technician grinding various components for machine fittings.

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Explain FIVE work-holding devices that he/she could have been using. (10 marks)

- b. You are employed as a technician in a busy mechanical workshop. Mechanical engineering trainees from your former college visited this company for an academic

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, the meaning of the following terms concerning product

precision as it is achieved through grinding operation: (4 marks)

- Nominal Size,
- Upper Limit,
- Lower limit,

Tolerance Zone.

- c. A surface finishing operation is performed on a Mild steel plane surface measuring 150mm × 100mm. The diameter of the grinding wheel is 100mm and it rotates at 480 rpm. Calculate the cutting speed of the wheel. (6 marks)

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- a. You are a workshop technician and it is required that you replace a worn out grinding wheel. Explain THREE factors you would consider before purchasing a new one. (6 marks)

- b. After long use, the grinding wheel surface becomes

ineffective and inefficient. This can be rectified through wheel dressing. Explain

THREE importance of wheel dressing. (6 marks)

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- c. Sometimes in grinding workshops, accidents and incidences may occur, leading to severe injuries. Explain FOUR common causes that can lead to these occurrences

(8 marks)

16.

- a. Several types of tools are commonly used for dressing grinding wheels, each suited for different applications and wheel types. Describe THREE commonly used dressing

to examples of wheels applicable to each tool (6 marks)

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- b. Operation plan is an essential must have document in grinding operations as it gives you the flow of activities or operations during different procedures. Describe THREE important details it should capture. (6 marks)

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- c. Inspecting a finished work piece that has been subjected to grinding operations is crucial to ensure it meets the required specifications for dimensions, geometry, surface

finish. Elaborate FOUR activities done during an inspection (8 marks)

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