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071505T4MTP**MECHANICAL PRODUCTION TECHNICIAN LEVEL 5****ENG/OS/ME/CR/03/5****Produce Components on a Lathe****July/August 2025**

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

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WRITTEN ASSESSMENT**Time: 3 HOURS**

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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

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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 questions in this section***

1. A lathe machine is used in doing various operations. Apart from turning, threading and facing, identify FOUR other operations. (4 Marks)
2. Feed rate determines the quality of the product produced on a lathe machine. List FOUR mechanisms of automatic feed rate. (4 Marks)
3. There are various types of lathe machines used depending on the nature of the work to be performed. State FOUR types of these machines. (4 Marks)
4. List FOUR safety precautions you need to observe while working on lathe machine in the workshop. (4 marks)
5. Lathe machines have various parts that perform various roles. Give THREE parts of this machine. (3 marks)
6. Different lathe operations require specific work holding devices. Identify FOUR work holding devices used on these machines. (4 marks)
7. Cutting speed determines the quality of work produced on the lathe machine. State TWO effects of varying the cutting speed. (2 Marks)
8. Certain features are used to specify the different types of lathe machines. State THREE such features. (3 marks)
9. Tool failure depends on the condition of the tip of the cutting tool. State FOUR properties of the lathe cutting tool tip. (4 marks)
10. A number of fixtures can be used on a centre lathe to increase production efficiency and widen its scope of works. Identify FOUR types commonly used. (4 marks)
11. Selection of cutting speed depends on several factors which determine the quality of the finished product. Identify FOUR factors to consider when selecting cutting speed. (4 Marks)

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SECTION B: (60 MARKS)**Answer Any THREE questions in this section**

12.

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a. With well labelled diagrams, discuss the following two lathe operations;

i. Facing; (6 marks)

ii. Knurling. (6 marks)

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b. With the aid of a sketch, explain TWO effects of turning with the tool set above the

centre (8 Marks)

13.

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a. When machining long work pieces on a lathe it is necessary to ensure that the work is not deformed by employing various techniques like “Turning between the Centres”.

With the help of a sketch, explain how this is achieved. (8 marks)

b. When carrying out various machining operations on a lathe machine, material is removed from the work piece in form of chips. Discuss THREE types of chips that are formed while machining. (6 Marks)

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c. The tailstock set over method is used for producing only external tapers. In this method, the tailstock is moved from its middle position to one side of the bed, which makes the work-piece tilted with respect to the lathe axis and feed. Describe THREE advantages of this method. (6 marks)

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14.

a. Threading is one of main lathe operations; it is done on various shafts for applications in engineering works. Explain the following terms as applied to threads:

i. Pitch,

ii. Root,

iii. Lead, (6 marks)

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b. Compound rest method is used to produce short and steep taper. The compound rest is swivelled to the required angle and clamped in position, it can be moved up to 45° on

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b. describe TWO advantages of this method.

(6 marks)

c. While performing operations on a lathe machine, cutting oil is used to safeguard the cutting tools and the work piece. Describe FOUR requirements of good cutting oil.

(8 marks)

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15.

- a. Calculate the cutting speed to be used while turning a work piece with a diameter of 100 mm and spindle speed (4 marks)
- b. A hollow work piece of 50 mm diameter and 200 mm long is to be turned all over in 4 passes. If approach length is 20 mm, over travel is 10 mm, feed is 0.8 mm/rev and cutting speed is 30 m/min, calculate the machining time. (8 marks)
- c. Lathe machine parts and accessories play different roles in machining. Explain the function and working principle of each of the following accessories; (8 marks)
- Mandrel,
 - Chuck.