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071506T4MTP**MECHANICAL TECHNOLOGY LEVEL 6****ENG/OS/ME/CR/04/ 6**

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Perform Lathe Work

Date: 31.07.2025 10:34 AM

July/August 2025

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

WRITTEN ASSESSMENT

Printed Technical And Vocational College Date: 31.07.2025 10:34

AM

Time: 3 HOURS

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 question paper.
6. You should have the following for this exam:

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- Non-programmable scientific calculator

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

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

1. In a lathe machine shop, every aspect of lathe operation. List FOUR of these precautions to be observed. (4 Marks)
2. After performing threading operation, it is important to measure the threads to ensure they are not too loose or too tight for the intended purpose. Identify TWO instruments used to take these measurements. (2 Marks)
3. The lathe bed is made of cast iron which possesses certain properties that makes it suitable. List THREE advantages of using cast iron. (3 Marks)
4. The guideways on a lathe machine bed determines the size of workpiece and power of the machine. State THREE types commonly used. (3 Marks)
5. As a technician you have been tasked to inspect a new lathe machine and also determine its size. List FOUR specifications you would use to categorize the machine. (4 Marks)
6. When performing lathe machine operations, several accessories may be mounted on the head stock depending on the job specifications. Identify THREE accessories that can be mounted. (3 Marks)
7. The cutting speed selection during lathe operations is dependent on several factors. Give FOUR factors to be considered. (4 Marks).
8. Different types of chips are formed during material removal. Identify THREE types. (3 Marks)
9. After any machine operation the product has to undergo non-destructive test to ascertain the quality of the product. List THREE types of tests done under this. (3 Marks)
10. Workshop regulations require that clean and safe working conditions be observed during and after a machining operation. Identify FOUR housekeeping practices that can be carried out. (4 Marks)
11. During any machine operation various reasons. Give THREE of these reasons. (3 Marks)
12. When performing taper turning on a lathe machine, different methods are used to achieve the desired methods that can be used to achieve this. (4 Marks)

SECTION B (60 MARKS)**Attempt any THREE questions in this section**

13.

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- a. A mild steel rod having 40 mm diameter and 450 mm length is to be turned on a lathe.

Determine the machining time needed to reduce the rod to 35 mm in one pass when cutting speed is 28 m/min and a feed rate of 0.8 mm/rev is used. (4 Marks).

- b. A lathe machine is to be used for performing many operations.

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Explain the following operations:

(6 Marks).

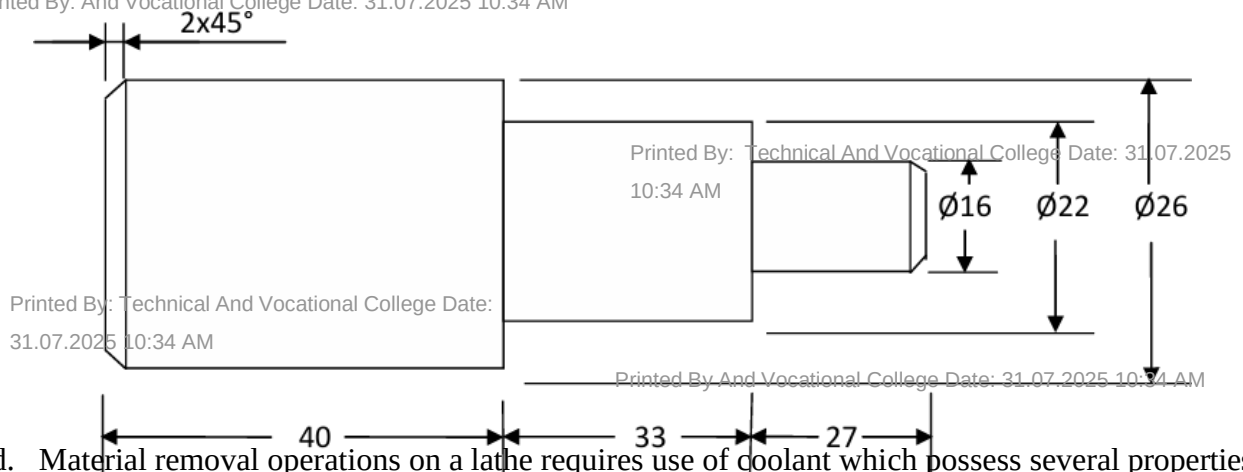
- Facing;
- Parting;
- Boring,

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- c. While working on a lathe machine, job planning is important to gauge the amount of time required for machining a component. Given the drawing below write the operation procedure you would follow to machine the component. Take the initial stock length to be 120mm

(6 Marks)

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- d. Material removal operations on a lathe requires use of coolant which possess several properties that facilitate the cutting action. State FOUR properties. (4 Marks)

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14.

- a. On a lathe, a cylindrical workpiece of 100 mm diameter is being turned. Given the following parameters:

The Revolutions per minute = 100 rpm

length of the workpiece = 200 mm.

the feed rate = 0.2 mm/rev.

Depth of the cut = 2 mm

Determine the material removal rate. (4 Marks).

- b. Find the angle at which the compound rest should be set to turn a workpiece having a length of 200 mm, larger diameter 45 mm and smaller diameter 30 mm. (3 Marks)

- c. The advancements of lathe machine have seen an introduction of CNC Lathe machine which has improved on many factors of production. List FIVE of its benefits in engineering. (5 Marks)

- d. When setting up lathe machine for operation, a cutting tool has to be set at the right position to better tool life. Describe the procedure for setting the tool. (8 Marks)

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- a. After lathe machining in the workshop, waste management has to be done in the right manner. Explain THREE methods that can be used (6 Marks)

- b. Use of right hand and left hand tools depend upon the operation performed on a lathe machine. Give TWO differences between the two. (4 Marks)

- c. With the aid of sketches describe each of the following operations performed on a lathe machine (8 Marks)

i. Straight turning

ii. Knurling

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- d. Safety is key in any engineering field. List TWO PPEs worn when performing lathe machine operations. (2 Marks)

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15.

- a. A lathe machine comprises of different parts that serve different purpose. Give ONE function of the following parts on a lathe machine (5 Marks)

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i. Tail stock

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ii. Compound slide

iii. Feed rod

iv. Head stock

v. Half nut

b. In machining, to produce components of desirable finish, several parameters have to be taken into consideration, explain the following in relation to lathe machine operations. (8 Marks)

i. Feed rate

ii. Depth of cut

iii. Cutting speed

iv. Backlash

c. When preparing a lathe cutting tool, several angles have to be ground on the tool faces. Give the importance of the following lathe tool angles (4 Marks)

i. Positive rake angle

ii. Relief angle

d. As a lathe machine operator, the choice of a lathe machine to perform a given task will depend upon several factors. State THREE factors to considered. (3 Marks)