higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA
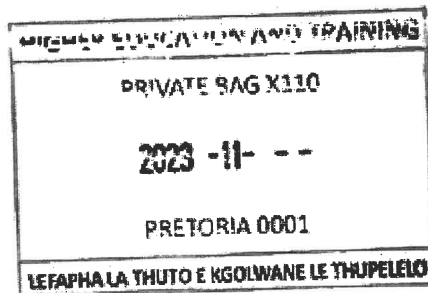
MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MACHINE MANUFACTURING
NQF LEVEL 3

23 November 2023

This marking guideline consists of 6 pages.

QUESTION 1

1.1   1.1.1   E
          1.1.2   C
          1.1.3   A
          1.1.4   F
          1.1.5   B

(5 × 1)   (5)

1.2
- An interlocking guard is moveable, with the moving part interconnected with the control system. The guard is closed manually, upon which the system will function.
- An automatic guard moves automatically into position when the machine cycle is started.

(2 × 2)   (4)

1.3   A✓ – His back is straight and he is in a squat position, so he will use his legs to lift the object so that he does not put strain on his back.✓✓

(3)

1.4
- Name of injured person
- Address of injured person
- Name of employer
- Address of employer
- Telephone number
- Details of the incident
- Names of witnesses

(Any 3 × 1)   (3)

[15]

QUESTION 2

2.1
- A freehand drawing is the simplest form of drawing and the quickest way to express ideas. It can help with technical discussions, after which further ideas can develop.
- An engineering drawing is more technical by nature, as the drawing has to have a scale, dimensions and different views and must be done neatly according to ISO standards.

(2 × 2)   (4)

2.2   2.2.1   True
          2.2.2   False
          2.2.3   True
          2.2.4   True
          2.2.5   False

(5 × 1)   (5)

2.3   2.3.1   Case-hardened
          2.3.2   Cadmium-plated

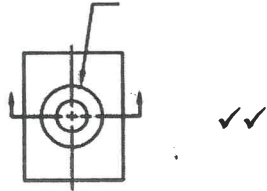(2 × 1)   (2)

2.4   2.4.1

 ✓✓
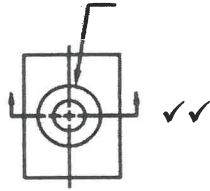
Counterbore

2.4.2

 ✓✓

Countersink

(2 × 2)   (4)
[15]

QUESTION 3

3.1   A✓ – This is incorrect, because the bolt and nut are positioned away from the workpiece and closer to the supporting block. This will cause the workpiece to move when machining takes place.✓✓   (3)

3.2

 ✓✓   ✓✓   (4)

3.3 $V = 3,142 \times D \times N$ ($\pi = 3,142$)
$N = V/(3,142 \times D)$✓
$N = 60/(3,142 \times 0,03)$
$N = \underline{636,53 \text{ rpm}}$✓✓

Feed rate $= f \times T \times N$✓
$= 0,05 \times 4 \times 636,53$
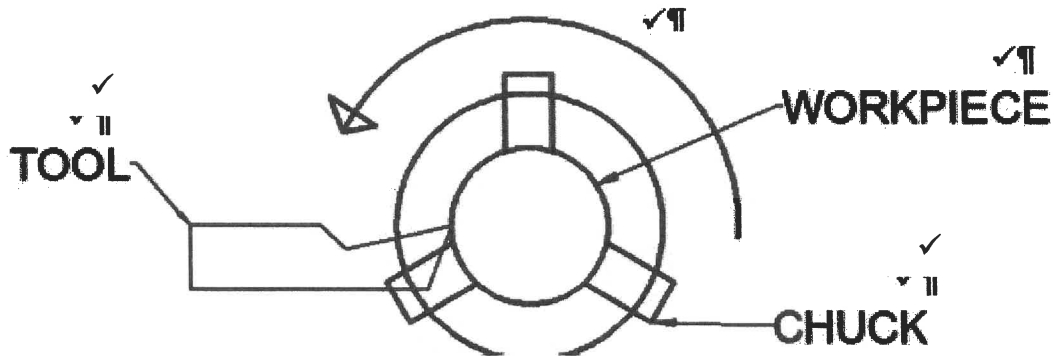$= \underline{127,3 \text{ mm/min}}$✓   (5)

3.4   T
      F
      T

3.4	3.4.1	True
	3.4.2	False
	3.4.3	True

(3 × 1)   (3)

[15]

QUESTION 4

4.1	4.1.1	B
	4.1.2	B
	4.1.3	A
	4.1.4	A

(4 × 1)   (4)

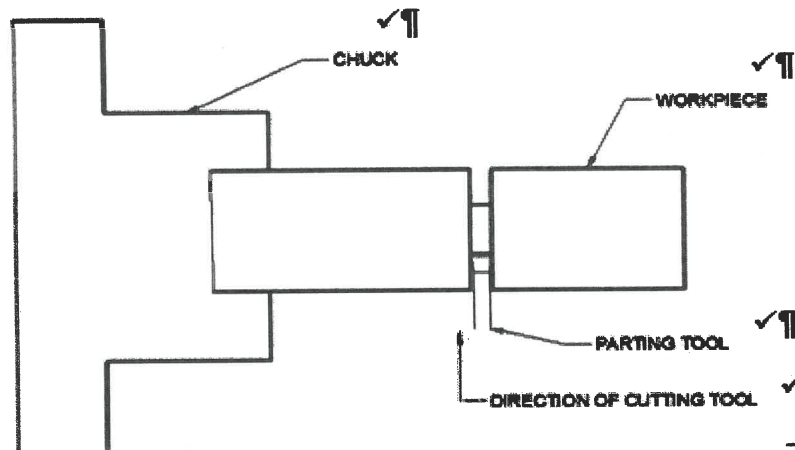| 4.2 | 4.2.1 | True |
	4.2.2	False
	4.2.3	False
	4.2.4	True

(4 × 1)   (4)

4.3

(4)

4.4
- Use the correct lubricant, if required.
- The tip of the tool should be rounded.
- The tip should be polished after grinding.
- A small cut should be used for the final cut.
- The correct cutting speed should be used.
- The correct feed rate should be used – preferably a slow speed.
- The feed rate should be constant.

(Any 4 × 1)   (4)

QUESTION 5

5.1   5.1.1   True
        5.1.2   True
        5.1.3   True
        5.1.4   False

            (4 × 1)   (4)

5.2
- Computer
- Mouse
- Keyboard
- Printer
- Screen
- Light pen
- Plotter   (Any 6 × 1)   (6)

5.3   5.3.1   This command lets you draw precise vertical (90°) or horizontal (180°) lines.

        5.3.2   This allows an object such as a circle to be added to a drawing at a precise position, such as the intersection of two lines.

            (2 × 2)   (4)

5.4   ⌀

            (1)
            [15]

            TOTAL: **100**

4.5

CHUCK ✓¶

WORKPIECE ✓¶

PARTING TOOL ✓¶

DIRECTION OF CUTTING TOOL ✓

(TWO marks for the drawing)   (6)

4.6   1 – Column
        2 – Knee
        3 – Base
        4 – Saddle
        5 – Tilting head /SPINDLE/DRAW BOLT   (5 × 1)   (5)

4.7   Indexing = N/9 degrees✓
                 = 120/9
                 = 13 3/9✓

        therefore {(3/9) × (2/2)}
                 = 13 6/18✓
                 = 13 full turns and six holes on an 18-hole circle plate✓✓

OR

        Indexing = N/9 degrees
                 = 120/9
                 = 13 3/9
        therefore {(3/9) × (3/3)}
                 = 13 9/27
                 = 13 full turns and 18 holes on a 27-hole circle plate   (5)

4.8   • Decide which operation must be started first and how the workpiece is to be
          held
        • Decide on the type of material to be used
        • Decide on the type of cutter to be used
        • If grinding is involved, determine how much provision must be made for
          excess material
        • Select all measuring tools
        • Do calculations and work out the required speeds and feeds
                                      (Any relevant answer) (Any 6 × 1)   (6)

4.9   Side and face cutter   (2)
                                                                         [40]

Please turn over