



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

# **MARKING GUIDELINE**

## **NATIONAL CERTIFICATE METAL WORKERS' THEORY N1**

**12 April 2021**

**This marking guideline consists of 6 pages and 1 addendum.**

**QUESTION 1: SAFETY AND HOUSEKEEPING**

- Ladders should not be painted as the paint may hide cracks, weak joints or other defects in the ladder.
- A ladder should stand ONE unit away from the wall/resting point for every FOUR units it rises up.
- The feet of the ladder should be fitted with non-slip or non-skid pads.
- The area under the worker on die ladder should be roped off to prevent an injury to anyone on the ground should the worker drop anything.
- Only one person is to use the ladder at any given time.
- Never use a ladder in front of a window or doorway.
- Hand tools must be placed in pouches, on a belt, in a bucket or tied to a rope and not carried in the hand when going up or down the ladder.
- A ladder must be of strong construction and adequate strength for the purpose for which it was manufactured.
- The ladder should be secured or lashed to the top of the construction or building when in use. If this is not possible, then a co-worker should hold it steady at the bottom.
- The ladder can be fastened or lashed to anchors at the base of the ladder.
- A ladder must not be used in a horizontal position as scaffolding.
- When ascending or descending a ladder, the three points rule must be adhered to (two feet and one hand or two hands and one foot in contact). (Any 5 × 1)

**[5]****QUESTION 2: CARE FOR AND USE OF TOOLS**

- 2.1
- The hammer head must be filed to a gradual taper as this eliminates a shoulder, enabling the shaft to be driven firmly into the hammer head.
  - A slit must be cut down the centre across the oval length of the oval shaft.
  - After fitting the head, drive a wedge made of hard wood or steel into the slit.
  - This expands the shaft into the double taper of the eye, and prevents it from working loose when in use.
  - The shaft is made of a well-seasoned, straight-grained ash or hickory wood without knots.

**(5)**

- 2.2
- 2.2.1 It is used to cut all types of steel plates and steel sections.
- 2.2.2 It is used for striking the centre punch, chisel, punches or the work itself and for general hammering in the workshop.
- 2.2.3 The cross-cut chisel is used to cut out narrow grooves in steel.
- 2.2.4 It can be used to enlarge round holes, round off the corners of holes in metals and to file curves in metals.
- 2.2.5 They are used to draw large circles or arcs.

**(5 × 1)****(5)**

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- |     |       |  |           |             |
|-----|-------|--|-----------|-------------|
| 2.3 | 2.3.1 | <ul style="list-style-type: none"> <li>• It is used to mark off bevels or mitres on steel sections.</li> <li>• It is used for laying out angles and testing the accuracy of surfaces worked to a slope.</li> <li>• They can be used to transfer angles to the material to be cut.</li> </ul> | (Any ONE) |             |
|     | 2.3.2 | It is used to scribe permanent marks on the mild steel plates.   |           |             |
|     | 2.3.3 | It is used to check the squareness or accuracy of two small jobs at right angles.  |           |             |
|     | 2.3.4 | It is used to take the inside measurements of pipes, holes, cavities, etc.   |           |             |
|     | 2.3.5 | It is used to measure the outside measurements of rods and the thickness of materials or objects.  |           |             |
|     |       |  | (5 × 1)   | (5)         |
|     |       |  |           | <b>[15]</b> |

**QUESTION 3: DEVELOPMENTS (PARALLEL LINE METHOD)**

- |     |   |             |
|-----|---|-------------|
| 3.1 | See addendum  | (2)         |
| 3.2 | See addendum✓   | (2)         |
| 3.3 | $C = \pi \times D$ $= 3,142 \times 42 \checkmark$ $= 131,964 \text{ mm} \checkmark$ | (2)         |
| 3.4 | See ADDENDUM.   | (4)         |
|     |   | <b>[10]</b> |

**QUESTION 4: METALS, PLATES AND SECTIONS**

- |     |       |  |         |
|-----|-------|--|---------|
| 4.1 | 4.1.1 | The material's ability to withstand impact, sudden forces or shocks,✓ such as hammering loads or blows, without cracking or breaking.✓ |         |
|     | 4.1.2 | The ability of metal to return to its original shape after being stretched,✓ bent, compressed or deformed.✓                            |         |
|     | 4.1.3 | It refers to the material's ability to resist wear,✓ scratching or damage to the surface of the material.✓                             |         |
|     |       |  | (3 × 2) |
|     |       |  | (6)     |

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4.2	4.2.1	Setting out point		
	4.2.2	Drawing		
	4.2.3	Outside diameter		
	4.2.4	Centre line		
			(4 × 1)	(6)
4.3	4.3.1	True		
	4.3.2	True		
			(2 × 1)	(2)
				<b>[12]</b>

**QUESTION 5: MACHINES**

- 5.1
- Ensure that the job to be drilled is firmly clamped before starting the drilling machine.
  - Make sure that the RPM of the drilling machine is correct before starting to drill.
  - Do not try to hold the job to be drilled with your hand.
  - Use a wooden stick or a paint brush to remove the shavings from the drill bits or work bench.
  - Wear safety goggles.
  - No loose clothing or jewellery is to be worn, and long hair is to be fastened.
  - Ensure the area around the machine is clean and free of any ripping hazards.
  - Allow the machine to stop on its own. Do not attempt to stop it by hand.
  - Ensure the drill chuck is removed before starting up the drill.
- (Any other appropriate answer 5 × 1) (5)
- 5.2
- Ensure that the steel section to be cut is firmly secured before starting the machine.
  - Make sure that the cutting speed of the machine is correct before starting the cut.
  - Do not leave the machine unattended at any time during the cutting operation.
  - Wear appropriate safety clothing, such as goggles, leather gloves, etc.
  - Use a paint brush to clear away the shavings on the machine.
  - Keep hands clear of blade and holding down clamps.
- (5)  
**[10]**

**QUESTION 6: JOINTS (RIVETED OR BOLTED)**

- 6.1 Countersunk head  
Pan head  
Conical head  
Cup or snap head (4)
- 6.2 6.2.1 Pitch is the distance between two centre holes on the same line
- 6.2.2 Landing is the distance measured from the centre of the hole to the edge of the plate. (2 × 1) (2)
- 6.3 6.3.1 It is used where the bolt head must be in line with the plate✓ and where excessive vibration is experienced.✓
- 6.3.2 It is used in general assembly work✓ and where less stress is experienced.✓ (2 × 2) (4)
- [10]**

**QUESTION 7: OXYACETYLENE AND LPG CUTTING AND WELDING**

- 7.1 7.1.1 Maroon  
7.1.2 Black  
7.1.3 Oxygen  
7.1.4 Acetylene  
7.1.5 Upright/vertical (5 × 1) (5)
- 7.2
- Leather gloves for hand protection
  - Leather apron for body protection
  - Overall for body protection
  - Leather boots/safety shoes for foot protection
  - Welding goggles for eye protection
  - Spats to protect the feet from sparks, molten metal and slag (Any 5 × 1) (5)
- 7.3
- An over-sized nozzle or wrong-size nozzle
  - Holding the nozzle too close to the work piece
  - Unequal amounts of gas setting
  - One of the gas bottles is empty
  - Dirty nozzle
  - Dirty material or galvanised material
  - Using a cutting speed that is too high or too low (Any 4 × 1) (4)
- 7.4 Close the acetylene valve first, then oxygen. (1)
- [15]**



**ADDENDUM**

