



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

**FITTING AND TURNING
NQF LEVEL 4**

17 November 2022

This marking guideline consists of 5 pages.

QUESTION 1: PUMPS AND COMPRESSORS

- | | | | | |
|-----|-------|--|-------------|-------------|
| 1.1 | 1.1.1 | False | | |
| | 1.1.2 | True | | |
| | 1.1.3 | True | | |
| | 1.1.4 | False | | |
| | 1.1.5 | True | | |
| | | | (5 × 1) | (5) |
| 1.2 | | By ensuring that the power supply is switched off at the main switch and locked with the lock-out device. | | (2) |
| 1.3 | | To trace information as and when required for overall effectiveness and efficiency. | | (2) |
| 1.4 | | This will help in identifying the defective parts and those that can be used again. | | (2) |
| 1.5 | | <ul style="list-style-type: none"> • Flexible impeller pump • Vane pump • Gear pump • Helical-gear screw pump • Lobe pump | (any 4 × 1) | (4) |
| 1.6 | | <p>As piston moves down (the suction stroke), the one-way valve on the inlet side is forced open.✓ Air is sucked into the cylinder as the piston continues to move down.✓</p> <p>When the piston moves up (the compression stroke),✓ the one-way valve on the discharge side is forced open,✓ and air leaves the cylinder under pressure.✓</p> | | (5) |
| | | | | [20] |

QUESTION 2: HYDRAULIC AND PNEUMATIC SYSTEMS

- | | | | | |
|-----|-------|---|---------|-----|
| 2.1 | | <ul style="list-style-type: none"> • Actuator • Piping • Valve • Service unit • Pressure source (Compressor) | | (5) |
| 2.2 | 2.2.1 | To make sure that all defective tools and equipment are replaced | | |
| | 2.2.2 | To make the report easy and simple to interpret | | |
| | 2.2.3 | To make it easier to find the equipment when you want to use them | | |
| | 2.2.4 | To check if the system still functions in accordance with the prescripts and regulations | | |
| | | | (4 × 1) | (4) |

- 2.3
- Hydraulic system uses compressed fluid for power transmission.
 - Pneumatic system uses compressed air for power transmission. (2)
- 2.4
- 2.4.1 Correct, safe and non-toxic cleaning agent must be utilised for the cleaning of parts.
- 2.4.2 Filter mask and safety glasses must be used for protection of eyes and face against spillage.
- 2.4.3 Recommended tools and equipment must be used for maintenance and repair activities as accidents can occur if incorrect tools are used.
- 2.4.4 Protective equipment should be in line with the workshop requirements. It ensures the safety of all workers at all times. (4 × 1) (4)
- 2.5
- Do not blow compressed air on anyone.
 - Use the shortest length of tubing possible.
 - Turn off the air supply if there is a leak.
 - Do not switch on air supply until all the tubing connections are secured.
 - Ensure that the work area is clean.
 - Switch the pneumatic system off before attempting any repairs. (Any 5 × 1) (5)
- [20]**

QUESTION 3: SURFACE GRINDING MACHINES

- 3.1
- Flaring-cup grinding wheel is used for sharpening milling cutters and reamers.
 - Dish-cup grinding wheel is used for grinding narrow slots. (2 × 2) (4)
- 3.2
- To ensure that the dimensions of the components are correct.
 - To check if the machined surfaces are within the tolerance limit indicated on the drawing.
 - To check if the finishing of the component is of the required standard. (Any 2 × 1) (2)
- 3.3
- Mount the work piece on the cleaned magnetic base.
 - Place a piece of paper between the work piece and the magnetic base to prevent the work piece or magnetic base surface from getting damaged. (2 × 2) (4)
- [10]**

QUESTION 4: CENTRE LATHES AND MILLING MACHINES

- 4.1 4.1.1 A face plate is used for holding workpieces that have regular or irregular shapes on the centre lathe.
- 4.1.2 It is used to hold the workpiece that cannot be held between centres because its axis has been bored or drilled
- (2 × 2) (4)
- 4.2 The operator can get injured or entangled in the moving parts of the machine if they try to load or unload a work piece while the centre lathe is in operation. (2)
- 4.3 • Select the correct speed and feed in accordance with the material to be machined and the cutting tool to be used.
 • Set the speed according to the diameter and type of material to be used.
 • Set the automatic feed for larger diameter work pieces to enable a nice surface finish. (3 × 2) (6)
- 4.4 • When the cutting tool becomes too blunt
 • When the cutting tool becomes too hot
 • When the machining process becomes too long (3 × 2) (6)
- 4.5 • Face cutter
 • Slab cutter
 • Plain milling cutter
 • Helical milling cutter (any 2 × 1) (2)
- 4.6 A set of parallels used to lift the work piece, or to put the work piece horizontally flat and to prevent the cutting tool from damaging the table. (2)
- 4.7 Tolerance means the allowable size over or under the specified dimensions in the drawing specification. (2)
- [24]**

QUESTION 5: CNC CENTRE LATHES AND CNC MILLING MACHINES

- 5.1 • Soundproof buds
 • Headphones
 • Ear plugs
 • Ear muffs (4)
- 5.2 Safety guards ensure that chips/shavings flying off from the workpiece do not injure the operator and passers-by, and it also prevents chips/shavings from scattering everywhere. (2)
- 5.3 It is far easier and less time consuming to change one or two numbers in the program than to change the position in which a tool has been set up. (2)

- 5.4
- Have a good understanding of the material characteristics before selecting the cutting tool and inserts.
 - Have a clear understanding of the different types of cutting processes needed to machine the work piece and what type of tools are needed to carry them out.
 - Make sure that the tool bits do not come into contact with one another to prevent damaging their sharp edges.
 - Ensure correct tool selection for its intended use.
 - Reset all safety switches and associated components during tool selection.
- (Any 5 × 1) (5)
- 5.5
- The quantity of the component that must be manufactured or machined
 - The tolerance needed for the component
 - The type of surface finish
 - The dimension variation that can influence the tool selection
- (4)
- 5.6
- The reason is that, instead of recalculating all the measurements to originate from the program zero, ✓✓ it will be far easier to set up a new program zero in the centre of the product. ✓✓
- (2 × 2) (4)
- 5.7
- Solution:
- D = 25 mm
S = 30 m/min
rpm = ?
- $$\text{rpm} = \frac{S \times 318,057}{D}$$
- $$= \frac{30 \times 318,057}{25} \checkmark$$
- $$= \frac{9541.71}{25} \checkmark$$
- $$= 381,67 \checkmark$$
- Round off to 382 rpm. (3)
- 5.8
- The condition of the tools and equipment determines the accuracy of the machined components in terms of dimensions and finish (2)

[26]**TOTAL: 100**