higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 4

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This marking guideline consists of 5 pages.

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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
- Flexible impeller pump
- Vane pump
- Gear pump
- Helical-gear screw pump
- Lobe pump

(any 4 × 1) (4)

1.6 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.✓
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.✓ (5)

[20]

QUESTION 2: HYDRAULIC AND PNEUMATIC SYSTEMS

2.1
- 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)

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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 = ?

$$rpm = \frac{S \times 318{,}057}{D}$$

$$= \frac{30 \times 318{,}057}{25} \checkmark$$

$$= \frac{9541.71}{25} \checkmark$$

$$= 381{,}67 \checkmark$$

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

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