higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 4

10 March 2022

This marking guideline consists of 5 pages.

QUESTION 1

1.1
1.1.1 C
1.1.2 D
1.1.3 A
1.1.4 B
1.1.5 B
(5 × 1) (5)

1.2 A piston pump works by moving a piston backwards and forwards in a single line, while a plunger pump works by using a reciprocal motion to build pressure in a pumping chamber. (2 + 2) (4)

1.3 An intercooler cools down compressed air under pressure before entering a high-pressure cylinder. (2)

1.4
- Soft cloth
- Cleaning liquid (2)

1.5 1.5.1 Lobe compressor (1)

1.5.2 A – Housing/Casing
B – Lobe (2 × 1) (2)

1.6
- Compressor
- After-cooler
- Air receiver
- Service unit (4)

[20]

QUESTION 2

2.1
- Inspect any parts that are subjected to high pressure.
- Ensure that the drive coupling fits properly on the drive.
- Fill the cylinder with clean hydraulic fluid before connecting it to the service lines.
- Correctly fill the motor with hydraulic fluid and lubrication.
- Take the required steps to allow trapped air to escape the system and to lubricate the system. (Any 3 × 1) (3)

2.2 2.2.1 Throttle valve
2.2.2 Safety valve
2.2.3 Pressure-relief valve
(3 × 1) (3)

2.3 To make it easy and simple to interpret (2)

2.4 2.4.1 Pneumatic service unit (1)

2.4.2 A – Filter
B – Pressure regulator
C – Lubricator (3 × 1) (3)

2.5 The purpose is to promote the health and safety of all workers as well as other people that may be affected as a result of work-related activities. It also protects the right of employees to a safe and healthy working environment. (3)

2.6 Air serves as the main source for operation, therefore without air or sufficient air under controlled pressure the operator will not be able to complete the work efficiently and effectively. (2)

2.7 2.7.1 Oil serves as a coolant and also lubricates components to prevent corrosion.

2.7.2 A cleaning agent is used to remove any excess oil on the used components so that it can be clean.

(2 × 1) (2)
[19]

QUESTION 3

3.1 3.1.1 Horizontal spindle reciprocating table (1)

3.1.2 A – Worktable
B – Grinding wheel
C – Wheel spindle
D – Coolant supply
E – Workpiece (5 × 1) (5)

3.2 Peripheral (1)

3.3 The surface grinder automatic feed is adjusted according to the length of the workpiece. (2)

3.4 The operator must make sure that the wheel clears the front and back of the workpiece before the next movement starts. (2)
[11]

QUESTION 4

4.1
- Make sure that the centre lathe is switched off before loading and unloading the workpiece.
- Never attempt to stop the centre lathe or make any adjustments to the lathe before it is in a still position.
- Never leave the chuck key in the chuck when loading and unloading the workpiece. (Any 2 × 1) (2)

4.2 By making sure that the machine has guards or shields to deflect chips (2)

4.3
- Proper machining sequence is the routine of machining processes required to meet the final measurement requirements indicated in the specification.
- Proper machining sequence is the sequence of machining action taken to fulfil the specific dimensions of the workpiece. (Any 1 × 2) (2)

4.4 The type and grade of the material determines the cutting speed and finishing to be achieved. (2)

4.5 The working tolerance is the degree of oversized and undersized dimensions accepted for the component. (2)

4.6 Data given:

Cutting speed = 25 m/min
Diameter = 0,07 m
Rotational speed = ?

Solution:

$$S = \pi \times D \times N$$

$$N = \frac{S}{\pi \times D}$$

$$N = \frac{25\ \text{m/min}}{3{,}142 \times 0{,}07\ \text{m}} \checkmark$$

$$N = 113{,}667\ \text{r/min} \checkmark\checkmark$$ (3)

4.7
- Lack of lubrication can lead to mechanical breakdown, resulting in injury to the operator.
- It can also damage workpieces. (2 × 2) (4)

4.8
- All dimensions must be recorded timeously and correctly.
- All components must be recorded for future reference. (2)

4.9 Incorrect speeds and feeds may result in machine failure as well as damages to tool bits.and cutters (2)

4.10
- Move the coolant pipe to the side.
- Remove all attachments, tools and related equipment from the machine.
- Clear all cutting or shavings from the top of the machine.
- After all cleaning has been done, brush the table bed and slide and then wipe it with a cloth. (Any 3 × 1) (3)

[24]

QUESTION 5

5.1
- It allows one to spot any potential issues or damage early.
- It extends the life of the machine.
- It allows the next user to get the machine in a good working condition.

(Any 2 × 1) (2)

5.2 The boring bar will collide into the product rotating at high speed. (2)

5.3 To ensure that the machine is able to operate at optimum level every day (2)

5.4
5.4.1 Tool number
5.4.2 Rotate material clockwise
5.4.3 Maximum spindle speed
5.4.4 End of program
5.4.5 Set feed rate (cutting speed)

(5 × 1) (5)

5.5
- It allows one to make some changes on the drawing.
- The sequence of some operations may have to be changed. (2 × 2) (4)

5.6 Data given: Diameter = 25 mm
Number of flutes = 4
MMPT = ?

Solution:

$$\text{MMPT} = \frac{\text{m/min}}{\text{RPM} \times \#\text{FL}}$$

$$\text{MMPT} = \frac{20 \text{ mm/min}}{700 \times 4}\checkmark$$

$$= 0{,}007 \text{ mm}\checkmark\checkmark$$

(3)

5.7 It helps to pinpoint exactly which line contains errors. (2)

5.8
- Turn on the machine and dry run.
- Select the maximum feed rate.
- Tool and work offsets need not be set. (3 × 2) (6)

[26]

TOTAL: 100