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 To apply a specific torque to a fastener such as bolt and nuts
1.1.2 To heat and expand a bearing prior to installation
1.1.3 To provide a level surface between the motor and the pump
1.1.4 To clean the components of a pump
1.1.5 To install and remove snap rings
(5 × 1) (5)

1.2
- Check the components and replacement parts according to specifications.
- Visually and dimensionally examine the components to be replaced.
- Clean each component using a suitable cleaning agent. (3)

1.3 It will help to know the size of the parts to be replaced, which will save time. (2)

1.4 1.4.1 Vane compressor (1)

1.4.2 A: Air inlet
B: Sliding vanes
C: Casing or housing
D: Air outlet (4 × 1) (4)

1.4.3 Positive displacement (1)

1.5 1.5.1 Cools down the air that is under pressure before it enters the high-pressure cylinder

1.5.2 Cools down compressed air received from the high-pressure cylinder
(2 × 2) (4)
[20]

QUESTION 2: HYDRAULIC AND PNEUMATIC

2.1 2.1.1 True
2.1.2 False
2.1.3 True
2.1.4 True
2.1.5 True
(5 × 1) (5)

2.2
- Incorrect cleaning agents may be harmful to the skin and eyes of an operator.
- Incorrect lubricants can damage parts or components. It can also increase the problem of cavitation which is very costly in hydraulic maintenance.
(2 × 2) (4)

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2.3
- Housekeeping must be upheld at all costs as it is the only way to ensure safe work practices.
- Tools and equipment must be cleaned and stored in a responsible manner.
- All floors and the work area must be cleared after work.
- Ensure that tools and equipment are properly recorded and locked out.
- Ensure that the entrance to the tool and equipment area is controlled as tampering with tools and equipment is not allowed. (5)

2.4 2.4.1 To ensure that hydraulic fluid/air is available at all times/To store hydraulic fluid/air

2.4.2 To pressurise hydraulic fluid/air to produce linear motion and force

2.4.3 To ensure that no dirt/foreign elements enter the system

(3 × 2) (6)
[20]

QUESTION 3: SURFACE GRINDING

3.1 A cracked or damage grinding wheel can disintegrate and cause severe injuries to the operator or other workers in the working area. (2)

3.2 The lateral table speed and movement determine the finish as well as the amount of material removed per stroke. (2)

3.3 Surface grinding machines are equipped with a green ON button for starting up the machine and a red OFF button for stopping the machine. By pressing the red OFF button, the surface grinding machine will be switched off. (2)

3.4 3.4.1 The size, shape and type of work to be done determine the clamping method that can be used on the magnetic base.

3.4.2 If any adjustment is required, follow safety procedures by first switching the machine off and making sure the grinding wheel is clear of the workpiece. Do the required adjustments and resume the grinding process.

(2 × 2) (4)
[10]

QUESTION 4: CENTRE LATHE AND MILLING MACHINE

4.1
- When loading and unloading the workpiece onto the centre lathe or milling machine
- When taking measurements on the workpiece (2)

4.2
- Make sure that liquids, swarf or cuttings are cleaned/removed from the floor as soon as possible.
- Return centre lathe parts and workpieces to storage areas when they are not being used.
- Ensure that the work area is spacious enough for centre lathe operators and workers. This will prevent workers and centre lathe operators from bumping into one another or accidentally bumping the workpieces causing serious injuries/accidents. (3)

4.3
- Inspect the centre lathe to make sure that the lathe bed is oiled and that there is sufficient oil in the headstock.
- Make sure that the centre lathe or milling machine is anchored securely on the floor.
- Inspect the power supply cable and emergency stop to ensure that they are in good working condition.
- Inspect the guards to make sure that they are in position and in good working condition before operating.
- Inspect the levers on the centre lathe to make sure they are working properly. (5)

4.4
4.4.1 The turning is done internally to produce a hole/bore

4.4.2 The turning is done on the external surface of the workpiece to reduce its diameter.

(2 × 2) (4)

4.5
4.5.1 When working with a short workpiece the chuck should clamp it securely enough for machining operation.

4.5.2 When working with a very long workpiece, either a steady can be used to clamp it securely or the other end of the workpiece can be supported in the tailstock centre.

(2 × 2) (4)

4.6
- When mounting a workpiece in the vice make sure you protect it from scratching by placing a piece of protective material between the workpiece and the vice.
- If the workpiece needs to be above the vice jaws use a set of parallels of the same size to securely tighten the vice.
- After placing the same-sized parallels in the vice, tighten the vice and tap the workpiece with a soft hammer until the parallels cannot be moved by hand. (Any relevant 3 × 2) (6)

[24]

QUESTION 5: CNC CENTRE LATHE AND CNC MILLING MACHINE

5.1
- Increasing the cutting speed
- Reducing the feed rate
- Selecting a stronger chip breaker
- Selecting a tougher grade
- Minimising vibration (5)

5.2
- Inspect tool tips for any damage.
- Make sure that there are sufficient spare inserts for all the tools.
- Make sure that the correct size Allen keys are available for the tools being used.
- Make sure that the inside diameter tools are extended to the required length.
- Make sure that the inside diameter tools are positioned opposite each other in the turret and not side by side.
- Make sure that slides at the back of the turret are properly oiled.

(Any 4 × 1) (4)

5.3 Yes.✓ Quality checks should be carried out on all machined components to ensure that they meet specifications on the job card and engineering drawings.✓✓ (3)

5.4
5.4.1 To check if the tools are performing their function properly and are moving in the right direction

5.4.2 As six different program zeros can be set up, the program must reflect the correct one to measure from.

5.4.3 Too much production time can be wasted by resetting the parameters once they are lost.

5.4.4 There will be a great risk of a turret colliding into the material or jaws.

(4 × 2) (8)

5.5 When you want to locate the centre of the workpiece or the edge of the workpiece (2)

5.6
- Tolerance and allowance of the component must be adhered to
- Measurements made continuously to compensate for any tool wear (2 × 2) (4)

[26]

TOTAL: 100

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