higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 3

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This marking guideline consists of 6 pages.

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QUESTION 1

1.1 When working with bearings, cleanliness is of the utmost importance because even the slightest contamination of a bearing will reduce its life span. (1)

1.2
- Inform all relevant persons that maintenance is to be carried out on the machine.
- Switch off the main circuit breaker that feeds the machine.
- Switch off the isolator to the machine and lock it down with a lock-out device and keep the key away.
- Place a sign at a point of isolation informing everyone about the maintenance taking place.
- Double-check the isolation by attempting to switch on the machine.

(Any 3 × 1) (3)

1.3
- Bearing removal with a hammer
- Bearing removal with a screw puller
- Bearing removal with a hydraulic puller
- Bearing removal with an impact puller
- Bearing removal with a hydraulic press (Any 3 × 1) (3)

1.4
- They are noisier than plain bearings
- The initial cost is high
- They require a larger space to work in
- They are only available from certain suppliers
- Higher accuracy is required when machining shafts and hubs
- Bearings cannot be repaired, only replaced
- They consist of many moving parts (Any 3 × 1) (3)

1.5 1.5.1 In order to ensure that one has done everything according to the manufacturer's manual and standard of working.

1.5.2 This will help for the future planning of maintenance and predict when bearings might fail.

(2 × 1) (2)
[12]

QUESTION 2

2.1 Self-aligning couplings (1)

2.2
- Ensure that all parts are present and they fit together properly.
- Check that the hub bore and shaft are clean and free of any burrs.
- Measure and document the bore of each hub and the diameter of each shaft.
- Check that the keyways on the machine and the driver are completely filled.

(Any 3 × 1) (3)

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2.3
- Excess noise on the machine.
- Excess vibration on the machine.
- Signs of wear or looseness in fasteners.
- Lubricant leakage or contamination, which may point to a failed seal. (4)

2.4
- Misalignment of the shafts is the most common fault associated with couplings.
- Using the incorrect coupling for the application.
- Incorrect or inadequate lubrication.
- Excessive build-up of dirt in the coupling that may prevent it from adjusting to any misalignment and can cause failure.
- Overloading of coupling by applying excess torque will cause rapid wear and failure. (Any 2 × 1) (2)

[10]

QUESTION 3

3.1 A brake system is used to stop or hold motion whereas a coupling is used to connect two shafts together so that they can transmit motion. (2)

3.2 In a thruster brake, a braking force is applied to the brake shoes by a spring.✓ The brake shoes presses on the rotating brake drum✓ to slow the machine down and finally stop it✓. The release of the brake drum and the compression of the spring is done by the thruster.✓ (4)

3.3
- Noise
- Shudder
- Slipping
- Overheating
- Non-engagement (Any 2 × 1) (2)

[8]

QUESTION 4

4.1
- It should enclosing the drive completely.
- It should have grills or vents for good ventilation.
- It should have an inspection door or panels or provide some form of access.
- It should be easy to remove and replace if damaged.
- Where necessary, it should protect the drive from the weather, debris and damage. (Any 4 × 1) (4)

4.2
- To provide take-up for fixed drives.
- To clear obstructions.
- Angular misalignment. (3)

4.3
- Single chain
- Duplex chain
- Triplex chain (3)

4.4
- It is easy to find tools, equipment and spare parts.
- The chances of accidents are less.
- There is less risk of damage to the machine, or dirt contaminating parts of the machine.
- Workers are more productive. (4)

4.5
- The single most common cause of gear failure is inadequate or incorrect lubrication.
- The bearing in which the shafts rotates can also be a source of problems that result in wear.
- The environment in which a gear unit operates also influences its life span.
- Misalignment may cause wear in gears. (4)

4.6 Gear backlash is the small amount of clearance in the meshing of teeth. (2)
[20]

QUESTION 5

5.1 5.1.1 Couplings and sockets are the usual way to connect two pieces of pipe of similar material.

5.1.2 Bends and elbows are used to change the direction of a pipe.

5.1.3 A reducing socket allows a pipe with a lager diameter to join a pipe with a smaller diameter.

(3 × 1) (3)

5.2
- A damaged gasket
- The flange face is not flat
- Poor finish of flange mating surface
- Bolts and nuts not torqued to correct tightness
- Flanges are cracked or corroded (Any 2 × 1) (2)

5.3
- Vibration
- Excessive noise
- Whipping or increase in temperature
- Check for leaks (Any 3 × 1) (3)

5.4 A non-return valve allows flow only in one direction. (2)
[10]

QUESTION 6

6.1
6.1.1 False
6.1.2 False
6.1.3 True
6.1.4 True
6.1.5 False
(5 × 1) (5)

6.2 The advantage of using brazed tip tools is that once blunt, they can be sharpened and re-sharpened again and again. (2)

6.3
STEP 1: Using handles, advance the tool until it touches the face and make a very fine cut on the workpiece.
STEP 2: Withdraw the tool by using the cross-slide handle.
STEP 3: Set the compound slide dial to zero, ensuring that that no backlash is present.
STEP 4: Advance the tool by the calculated cutting depth.
STEP 5: The centre lathe is now set up and ready to be used (5)

6.4
6.4.1 GO and NO-GO gauges can be used to measure the size of a tapered hole.

6.4.2 Prussian blue can be used by applying a thin layer along its length to see if a uniform amount of blue is present along the entire length.
(2 × 1) (2)

6.5
- By touching using a device called a surface texture comparison plate
- By using the scratch block (2)

6.6
- Recognising and reporting malfunctions is an effective way of preventing them from happening again.
- This helps to establish whether danger has been identified and safety precautions and controls are effective.
- It also helps to prevent or control many situations or activities that could have an adverse effect on production and quality. (Any 2 × 2) (4)

[20]

QUESTION 7

7.1
- Ensure that the area around the milling machine is free of all obstacles such as tools and equipment.
- Do not work on dirty or wet floors.
- Stand on the wooden or rubber duckboards and not on the concrete floor.
- En sure that there is no oil or grease on the floor around the milling machine. (4)

7.2
- Lock
- Index handle
- Crank handle
- Sector arm
- Chuck
- Rapid index plate
- Rapid index pin
- Rapid index lever
- Vernier degree scale (Any 5 × 1) (5)

7.3 When using a square one presses the stock against one surface while slowly bringing down the blade so that it just makes contact with the other surface of the block.✓✓ Do this while holding the workpiece up to a light source; if one observes any light between the surface and the blade, the workpiece is out of square.✓✓ If no light is seen, the workpiece is in square.✓✓ (3 × 2) (6)

7.4 7.4.1 Micrometres are used to check the outside diameter of a workpiece.

7.4.2 Vernier callipers are used to check the depth, inside and outside dimensions of a machined component.

7.4.3 Precision squares are used to check the squareness of a workpiece.

7.4.4 A scratch block is used to check the quality of a machined surface.

7.4.5 An edge finder is used to find the centre of a machined block or shaft.
(5 × 1) (5)
[20]

TOTAL: 100

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