higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

SUPPLEMENTARY EXAMINATION

FITTING AND TURNING
NQF LEVEL 3

20 FEBRUARY 2014

This marking guideline consists of 6 pages.

QUESTION 1: GRINDING TOOLS AND BITS

1.1 The drill bit is correctly positioned on the tool rest in order to sharpen the angles to the correct size. (1)

1.2
- Hardness of the material
- Area of contact
- Condition of the machine
- The speed of the grinding wheel
- Rate of feed
- Operator characteristics (Any 4 × 1) (4)

1.3
A - The abrasive. In this case it is aluminium oxide.
80 - The grit size. In this case, the wheel has a fine grit.
G - The grade. In this case it is soft.
7 - The structure. In this case it is open. (4)

1.4
- To cool the grinding surface of the wheel and the cutting tool during grinding.
- Wash away the metal dust and particles during grinding so that they don't clog the wheel and cause loading or glazing. (Any 1 × 1) (1)

[10]

QUESTION 2: BEARINGS

2.1 Needle roller bearing (1)

2.2 They have a greater contact area called line contact compared to the ball bearing. (1)

2.3
- Is the bearing tight in its housing?
- Is the reference number on the bearing the same as the bearing recommended by the manufacturer?
- If the bearing has a cooling system, is it working properly?
- If the bearing has a lubricating system, is it working properly?
- If it is a ball or roller bearing, is the cage firm and not loose? (Any 4 × 1) (4)

2.4
- A mounting tube
- Spanner
- Ball peen hammer
- Bearing heater (4)

2.5 2.5.1 Cast iron

2.5.2 Bronze

2.5.3 White metal is either lead-based or tin-based, with copper and antimony

2.5.4 Low friction, corrosion-resistant, no lubrication required

2.5.5 Nylon

(5 × 1) (5)
[15]

QUESTION 3: BRAKES AND CLUTCHES

3.1 3.1.1 Cam-operated mechanical brake drum

3.1.2 Disc brake system (2)

3.2 Clearing the surface helps to determine the damage(1). Score marks on the friction surface allow you to see where the problem areas are(1). (2)

3.3
- The master cylinder
- The slave cylinder
- The clutch fluid lines (3 × 1) (3)

3.4
- It must be in place to ensure proper procedures and implementing preventative maintenance plans.
- To do planned maintenance to ensure smooth running of plant.
- Early failure is attributed to inadequate handling or maintenance. (3 × 1) (3)

3.5 There will be too much strain on the affected components which will make it difficult and unsafe to work with. (1)

3.6 3.6.1
- Square claw
- Spiral claw (Any 1 × 1) (1)

3.6.2
- Single disk
- Multi-disk
- Cone (Any 1 × 1) (1)

3.6.3
- Loose weight
- Fixed weight (Any 1 × 1) (1)

3.7 To keep components in position (1)
[15]

QUESTION 4: DIRECT DRIVE

4.1
- Flexible couplings
- Self-aligning couplings
- Permanent or fixed couplings (3 × 1) (3)

4.2 After completion of the maintenance process, the operator needs to make sure every task was done according to the schedule and confirm that all is in order. (1)

4.3 4.3.1 It is the positioning of the faces of two coupling halves so that they are exactly the same distances apart at all the points on their surfaces.

4.3.2 It is the space between the two halves of the coupling that is specified by the manufacturer.
(2 × 1) (2)

4.4 4.4.1 Driving hub
4.4.2 Moulded rubber spider
4.4.3 Driven hub
(3 × 1) (3)

4.5 4.5.1 Movement
4.5.2 Misalignment
4.5.3 End float
(3 × 1) (3)

4.6
- Services and maintenance completed
- The condition of the direct drive and components (2)

4.7 Radial alignment (1)
[15]

QUESTION 5: DINAMIC SEALS IN MACHINES AND EQUIPMENT

5.1
- Put the seal assembly together again, using new parts where necessary.
- Apply a film of silicon oil to the shaft and the seal.
- Once the seal has been assembled, put the seal assembly back into the machine, following the method given in the instruction book.
- Ensure that the seal is fitted into the same position as before. (4)

5.2
- Reciprocating seals – are used on parts that move up and down or side-ways.
- Rotary seals – are used for equipment in which one part moves and the other remains stationary.
- Compressing seals – are used between two parts on assemblies when one part is stationary and the other part both rotates and moves axially. (3 × 2) (6)

5.3 Oil or grease
Make sure it is the right lubricant according to the manufacturer's specifications. (2)

5.4
- To prevent spillage of the oil when the seal is being repaired.
- Seals can contain fluids or gases which under pressure is very dangerous and therefore the pressure must be removed before you can start work. (2)

5.5 Once it has been cleaned, a light layer of clean oil should be applied to prevent corrosion. (1)

[15]

QUESTION 6: HEAT EXCHANGERS AND PRESSURE VESSELS

6.1
- Valves
- Cracks in the pressure vessel or heat exchanger shell
- Gauges
- Control instruments (Any 3 × 1) (3)

6.2
- Incorrect readings may lead to unsafe conditions
- The readings taken on gauges must be correct at all times (2)

6.3 6.3.1 C
6.3.2 A
6.3.3 B
(3 × 1) (3)

6.4
- A heat exchanger is supplied with a liquid that is normally under pressure in a sealed unit.(1)
- The unit consists of a series of tubes that are cooled down by a fluid that passes over them at a much lower temperature.(1)
- In these units the cooling fluid's temperature is regulated so as not to lower temperature of the fluids in the tubes too much.(1)
- Heat exchangers are used to transfer heat energy from one fluid to another without mixing the two fluids.(1) (4)

6.5 6.5.1 Is caused when introducing hot fluid suddenly when a heat exchanger is empty or cold, or causing temperature shock to the unit with a cold fluid when the heat exchanger is hot. (1)

6.5.2
- Is when the flow rate is critical to the efficient maintenance and operation of the heat exchanger.(1)
- Operating heat exchanger at a flow rate greater than shown on the manufacturers plate or in the operating instructions, can cause vibration and severely damage the heat exchanger tube bundle.(1) (2)

[15]

QUESTION 7: LUBRICATION

7.1 7.1.1
- Incorrect lubricants
- Lubricants that have broken down chemically
- Dirty lubricants
- Abnormal friction or wear (Any 2 × 1) (2)

7.1.2
- Oil has overheated
- Dirt and impurities in the oil
- Wrong lubricants have been used (Any 2 × 1) (2)

7.2
- The shaft rotates
- The splash ring rolls on the rotating shaft
- The ring picks up the oil from the oil tank or reservoir
- The oil is led to the bearing and lubricated via the oil ring (4X1) (4)

7.3 7.3.1 An instrument with which one can measure the quantities and types of metallic elements in a sample of oil.

7.3.2 Most centralised lubrication systems are designed to have an audible or visual check mechanism incorporated into the system.
(2 × 1) (2)

7.4 7.4.1 C
7.4.2 D
7.4.3 A
7.4.4 E
7.4.5 B (5X1) (5)
[15]

TOTAL: 100