



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

# **MARKING GUIDELINE**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**SUPPLEMENTARY EXAMINATION**

**MACHINE MANUFACTURING  
NQF LEVEL 3**

**3 MARCH 2014**

**This marking guideline consists of 6 pages.**

**QUESTION 1**

- 1.1 A place for everything and everything on its place all the time. (1)
- 1.2
- Contact with moving parts.
  - Contact with electricity, heat and fire.
  - Contact with pressurized gas or liquid. (Any 2 × 1) (2)
- 1.3
- 1 Health and Safety sign
  - 2 Foot brake
  - 3 Light
  - 4 Clear plastic guard or shield
  - 5 Splash guard and tray
  - 6 Screen
  - 7 Demarcation lines
- (7 × 1) (7)
- 1.4
- Step 1 Before starting a drawing you should plan how you are going to make best use of the space.
- Step 2 Select size, scale and orientation of the drawing on a newly created document to suit the task.
- Step 3 Try to make maximum use of the available space.
- Step 4 A view with lots of detail, try to make as large as possible. If necessary draw that view on a separate page.
- Step 5 Leave enough space around the drawing for extra information to be added later. (5 × 1) (5)
- 1.5
- Step 1 – Identify the hazards.  
 Step 2 – Decide who might be harmed and how.  
 Step 3 – Evaluate the risk and decide on precaution.  
 Step 4 – Record your findings and implement them.  
 Step 5 – Review assessment and update it if necessary (Any 3 × 1) (3)
- 1.6
- 1.6.1 It allows you to draw a line between any two points.
- 1.6.2 It allows you to trim or cut an object.
- 1.6.3 It produces a line that passes through two points and has infinite length (3 × 1) (3)

1.7 1.7.1 Milling  
Machine vice with parallels is used for clamping.  
Also by means of dividing head. Depending on type of machining to be done, a set of clamps with bolts and nuts is also used.

Centre lathe  
Clamping is by means of a chuck and a chuck key, either in four or three jaw chucks.

1.7.2 Milling  
There are different types of cutters eg. end mill, slot drill and rose cutter to mention but a few. Coolant is used with slot drills.

Centre lathe  
High speed steel is ground to correct angles and is used with lots of coolant. Also pilot tools with inserts are used.

1.7.3 Milling  
A hand brake is used for emergency

Centre lathe  
A footbrake is used for emergency stop.

(3X2) (6)  
**[27]**

**QUESTION 2**

2.1

OUTPUT	INPUT
Screen	Keyboards
Printers	Microphone
Plotters	Digital camera
	Scanners

(7)

2.2 2.2.1 120,03  
2.2.2 0,06  
2.2.3 0.03  
2.2.4 119,97  
2.2.5 120,00  
(5 × 1) (5)

2.3 A Tang  
B Taper shank  
C Flute length  
D Helix angle  
E Overall length  
(5 × 1) (5)

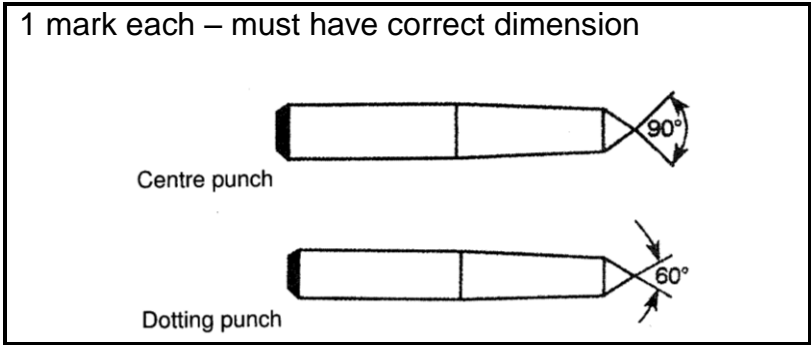
2.4 2.4.1 FIGURE 3(a) – Drilling ( 2)  
 FIGURE 3(b) – Boring

2.4.2 Drilling – First a centre drill is placed in the tailstock to drill a pilot hole. Then it is replaced with a correct size drill bit(1). You either drill right through or to the required depth(1).

Boring – A hole is first drilled into the work piece(1) and then it is enlarged by using a boring bar which is mounted on the tool post(1). (4)

2.5

1 mark each – must have correct dimension



The diagram shows two punches. The top one is labeled 'Centre punch' and has a double-flute design with a 90-degree tip. The bottom one is labeled 'Dotting punch' and has a single-flute design with a 60-degree tip. Arrows indicate the angles at the tips.

(2)  
**[25]**

**QUESTION 3**

3.1 3.1.1 A  
 3.1.2 C  
 3.1.3 B  
 3.1.4 A  
(4 × 1) (4)

3.2

- Wide range of regular and irregular shapes can be held.
- There is no loss of accuracy if the chuck becomes worn.
- Has considerable gripping power.
- Jaws are reversible for internal and external work.

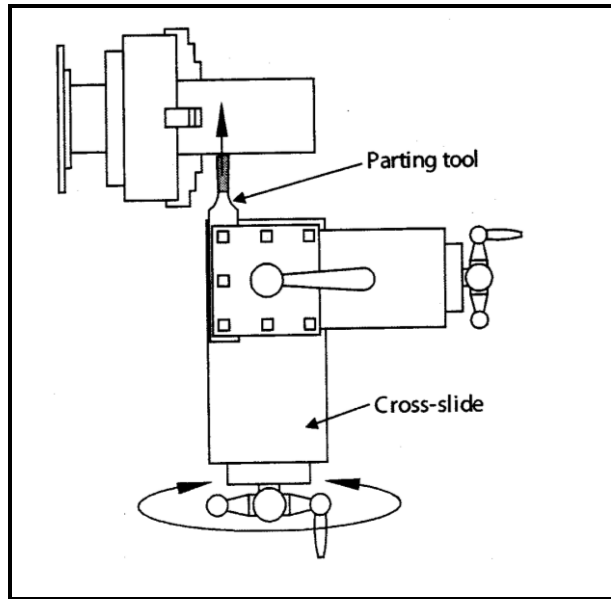
(Any 2 × 1) (2)

3.3

- Study the drawing and instructions.
- Check the tools and equipment needed.
- Do calculations.
- Do the machining process
- Inspect the job quality
- Keep records.

(Any 5 × 1) (5)

3.4



(3)

- 3.5
- Coolant level must be checked.
  - Oil level must be checked.
  - Machine slides must be oiled.
  - Be familiar with manufacturer's manual.
  - Machine spirit levels.

(Any 4 x 1) (4)

3.6  $V = \pi DN$

$$N = V/\pi D$$

$$= 24/\pi \times 0.1(1)$$

$$= 76,394 \text{ r/min}(1)$$

$$F = f \times T \times N$$

$$= 0,051 \times 14 \times 76,394(1)$$

$$= 54,55 \text{ mm/min}(1)$$

(4)

- 3.7
- Keeps the cutting tool and the work piece cool.
  - Increases the life span of the cutter.
  - Allows higher cutting speed.
  - Increases productivity.
  - Imparts a smooth finish.

(Any 3 x 1) (3)

- 3.8
- Tapping
  - Drilling
  - Boring
  - Chamfering

(Any 3 x 1) (3)

[28]

**QUESTION 4**

4.1  $40/N = 40/19$  (1)  
 $= 2 \frac{2}{19}$  (1)  
 $= 2 \frac{2}{19} \times \frac{3}{3}$  OR  $\frac{2}{19} \times \frac{2}{2}$  (1)  
 $= \frac{6}{57}$  OR  $\frac{4}{38}$  (1)

Answer = 2 complete turns + 6 holes on a 57 hole circle (1)

OR

= 2 complete turns + 4 holes on a 38 hole circle (5)

4.2 4(a) Machining process – Slotting; Cutting tool – slot drill (2)

4(b) Machining process – Side milling; Cutting tool – multi-flute end mill (2)

4.3 4.3.1 Work piece

4.3.2 Stationary

4.3.3 Fed

4.3.4 Hand wheel

(4 × 1) (4)

4.4 Pillar-type drilling machine (1)

1 Pillar

2 Hand feed lever

3 Spindle speed gearbox

4 Motor

5 Spindle

6 Work table

(6 × 1) (6)

**[20]**

**TOTAL: 100**