



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

SUPPLEMENTARY EXAMINATION 2015

**MACHINE MANUFACTURING
NQF LEVEL 3**

2 March 2015

This marking guideline consists of 8 pages.

SECTION A

QUESTION 1

- 1.1 Interlocking guards
Fixed guards
Automatic guards
Distance guards
Trip guards (Any 4 x 1) (4)

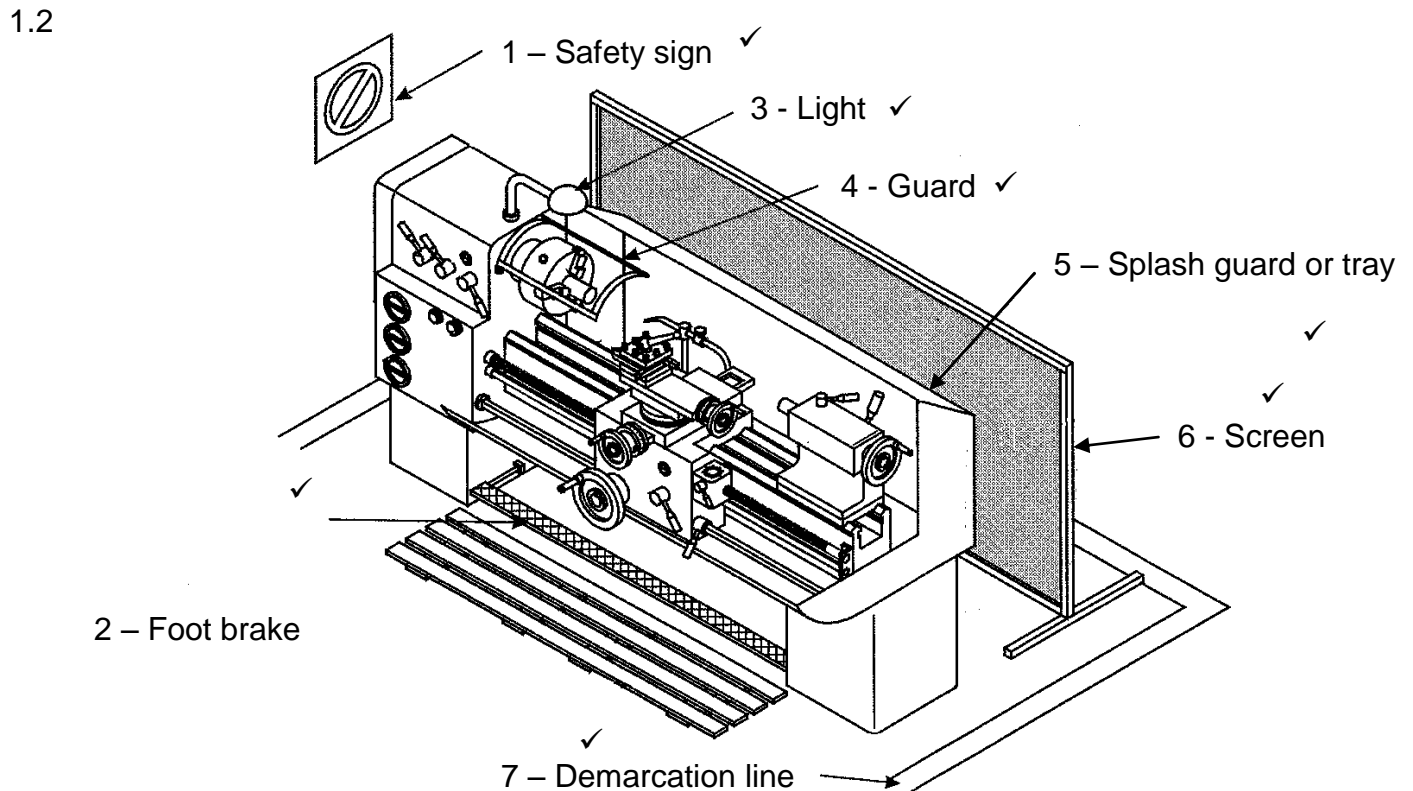


FIGURE 1

- (7)
- 1.3 Unsafe condition includes housekeeping where the place is not conducive to work and unsafe act are wrong things that one is not supposed to do. (2)
- 1.4 One can cause an accident because he or she does not see clearly and/or high or low temperatures may affect one's concentration to drop. (2)

[15]

QUESTION 2

2.1

Input device	Output device
2.1.1 Keyboard	2.1.4 Plotter
2.1.2 Scanner	2.1.5 Screen
2.1.3 Microphone	2.1.6 Printers
2.1.7 Digital camera	

(7)

2.2 Layers are required so that the object's visibility (that is ON and OFF) and accessibility can be controlled. (1)

2.3 2.3.1 False

2.3.2 True

2.3.3 False

2.3.4 True

2.3.5 True

2.3.6 True

2.3.7 True

(7 x 1) (7)

TOTAL: [15]**TOTAL SECTION A: 30**

SECTION B**QUESTION 3**

3.1
3.1.1 *Hole basis system* is one in which the hole is given basic size and the variation is done on the shaft to obtain the best fit. (1)

3.1.2 *Basic size* is the size of a shaft or hole which is measured with a steel ruler to the nearest millimetres. (1)

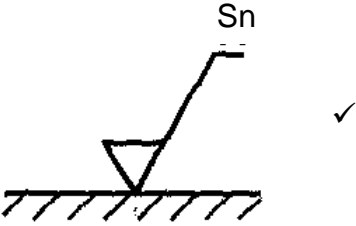
3.1.3 *Clearance fit* is a fit obtained when a shaft is smaller than a hole. (1)

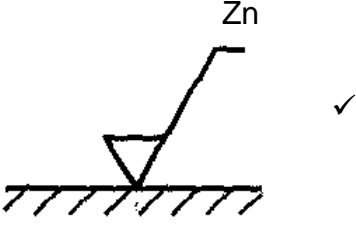
3.1.4 *Tolerance* is the difference between the biggest possible size for a part and the smallest possible size. (1)

3.2
Upper limit (Hole) = $100 + 0.035$
= 100.035 mm (2)

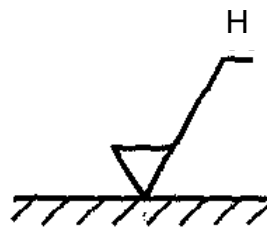
Lower limit (Hole) = $100 - 0.00$
= 100 mm (2)

3.2
Tolerance (Shaft) = $0.036 - (-0.071)$
= $0.036 + 0.071$
= 0.107 mm (2)

3.4
3.4.1 Tinned
 (1)

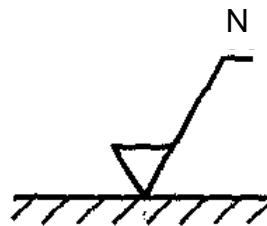
3.4.2 Galvanized
 (1)

3.4.3 Case hardening



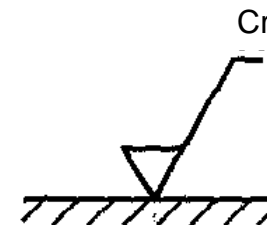
(1)

3.4.4 Nitriding



(1)

3.4.5 Chrome plated

(1)
[15]**QUESTION 4**

4.1

$$V = 3.142 * D * N \quad (\pi = 3.142)$$

$$N = V / (3.142 * D) \quad \checkmark$$

$$N = 24 / (3.142 * 0.1) \quad \checkmark$$

$$N = \underline{76.394 \text{ r/min}} \quad \checkmark$$

$$\text{Feed rate} = f * T * N \quad \checkmark$$

$$= 0.051 * 14 * 76.394$$

$$= \underline{54.55 \text{ mm/min}} \quad \checkmark \quad (5)$$

4.2

The purpose of the rake angle is to guide the direction of the chip flow and to protect the point of the cutter.

(2)

4.3

	COLUMN A	COLUMN B
4.3.1	Cast iron.	B – 0 degrees
4.3.2	Aluminium.	D – 30 degrees
4.3.3	Brass.	A – 14 degrees
4.3.4	Copper	C – 20 degrees

(4)

TABLE 1

4.4

- Keeps the cutting tool and work piece cool.
- Allows higher cutting speed.
- Increase the life of the tool.
- Washes away chips and cuttings.
- Imparts a smooth finish.
- Production rates are increased.

(Any 4 x 1)

(4)

[15]

QUESTION 5

5.1

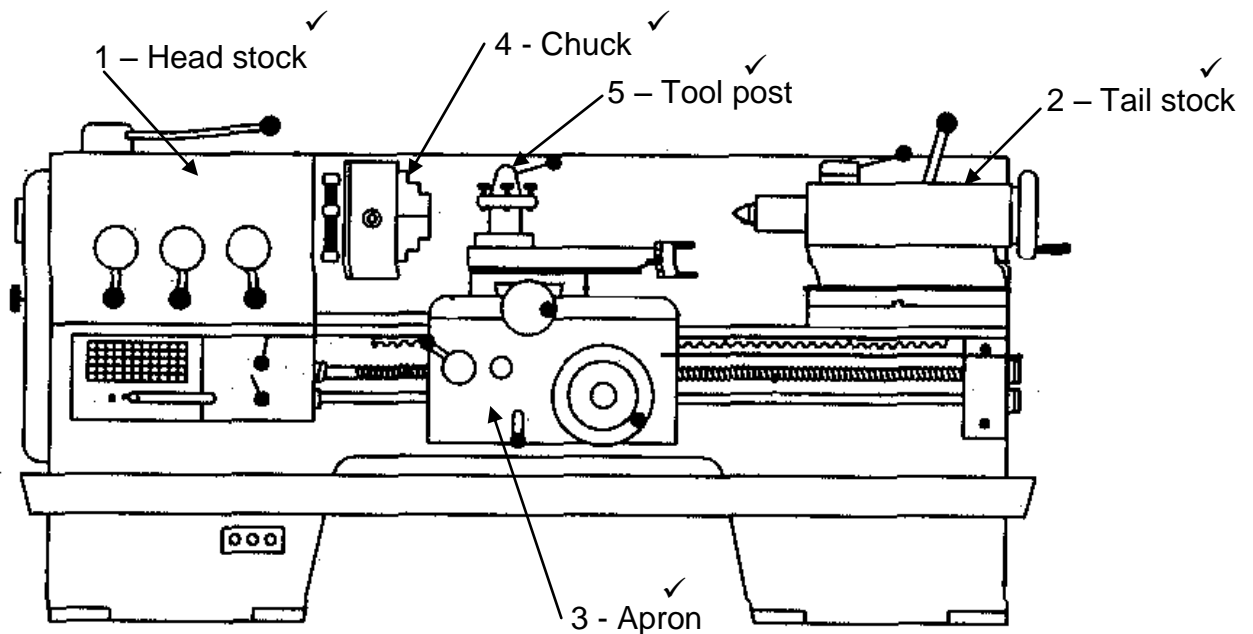
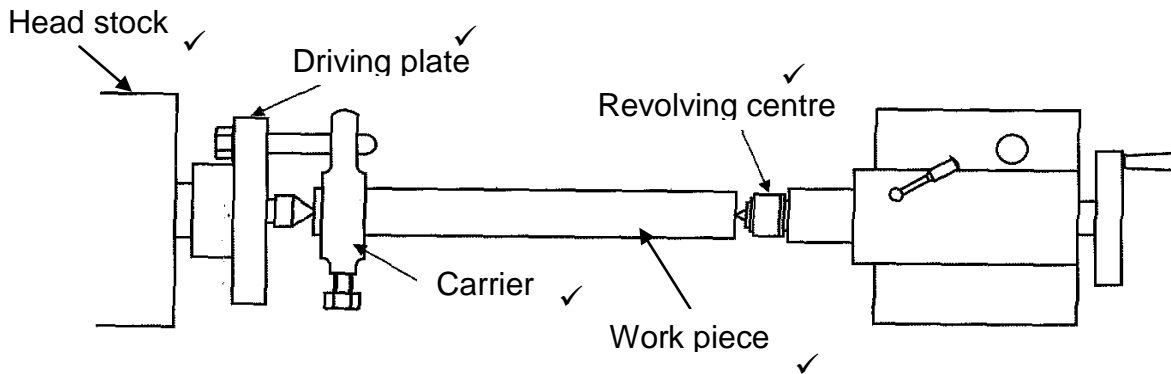


FIGURE 2

(5)

5.2



(5)

5.3

Advantages:

- Long work pieces can be turned
- Easy to setup
- Can be used for taper turning
- Easy to remove and replace accurately
- Whole length can be turned

(Any 4 x 1)

Disadvantages:

- Difficult to get the correct taper when taper turning
- If the tail stock is not set correctly there is a possibility of the work piece being tapered.

(Any 2 x 1)

(6)

5.4

Dividing head is used to divide the circumference of a work piece into number of sides or it holds the work piece in position while indexing.

(1)

5.5

Loose machine vice.
Loose dividing head.
Loose footstock.
Broken or blunt cutter.
Play between the arbour and the spindle.
Play between the arbour and the arbour support.

(Any 3 x 1)

(3)

5.6

5.6.1 *Dovetail cutter* is used to cut dovetail slides. (1)

5.6.2 *Roughing milling cutter* is used to remove a large amount of material and leaves a rough finish. (1)

5.6.3 *Ball nose cutter* is used to mill inside radii and for round shaped milling. (1)

5.6.4 *T-slot cutter* is used to cut slots, grooves and keyways. (1)

5.7

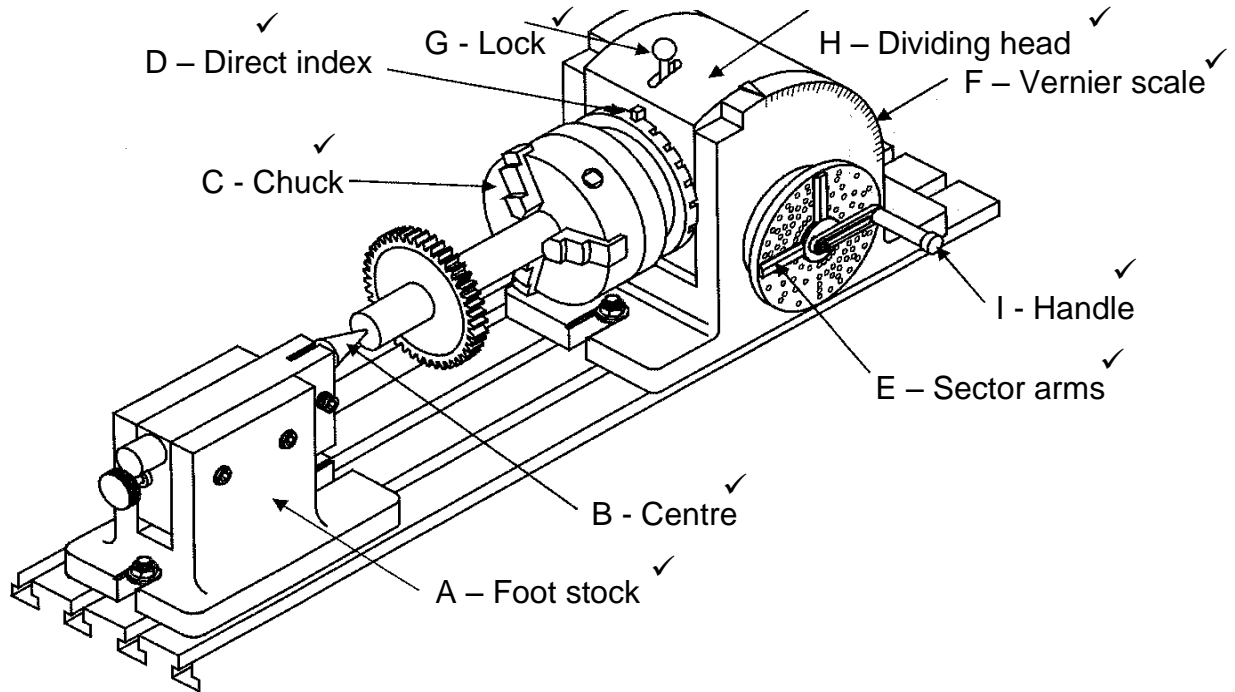


FIGURE 3

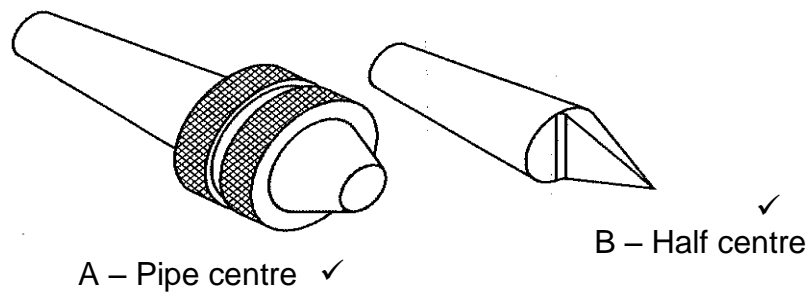
(9)

5.8

Indexing = $40/N$
 = $40/23$
 = 1 and $17/23$ but $\{(17/23) * (2/2)\} = 34/46$
 = 1 Full turn and 17 holes on a 23 hole circle plate **OR**
 = 1 Full turn and 34 holes on a 46 hole circle plate

(5)

5.9



A - Pipe centre

B - Half centre

FIGURE 4

(2)

[40]

TOTAL FOR SECTION B: 70
 GRAND TOTAL: 100