

# higher education & training

Department: Higher Education and Training REPUBLIC OF SOUTH AFRICA

# **MARKING GUIDELINE**

NATIONAL CERTIFICATE (VOCATIONAL)

# MACHINE MANUFACTURING NQF LEVEL 3

# **19 NOVEMBER 2019**

This marking guideline consists of 6 pages.

Please turn over

# -2-MACHINE MANUFACTURING L3

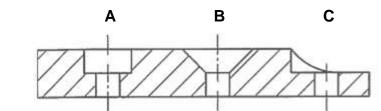
# **QUESTION 1**

- 1.1 Select the correct wheel for a particular operation.
  - Ring test the wheel for any possible cracks.
  - Compare the spindle speed of the machine with that of the grinding wheel.
  - Never alter the holes of the grinding wheels.
  - Use clean blotters on either side of the wheel.
  - Tighten the nut just sufficiently enough. Do not overtighten.
  - Stand clear on one side when starting the wheel and let it run for a few seconds. (Any 5 × 1) (5)
- 1.2 The operator does not wear safety goggles.
  - Measuring tools lie on top of the machine, for example, a jenny calliper (2)
- 1.3 1.3.1 C 1.3.2 B 1.3.3 A
  - 1.3.4 C
  - 1.3.5 A

(5	×	1)	(5)

(3) [**15**]

(4)



- A Counter bore
- B Countersink
- C Spot facing

# **QUESTION 2**

1.4

- 2.1 2.1.1 E 2.1.2 D 2.1.3 B 2.1.4 C
  - 2.1.5 A

 $(5 \times 1)$  (5)

- 2.2 Transmission guards ✓ guards for pulleys and gears.✓ Point-of-operation guards✓ – guards around circular saws, dies and punches, and presses.✓
- Danger posed by machines can be reduced or removed altogether.
  - They promote safe working habits.
    - Injuries and accidents caused by machines can be prevented. (Any 1 × 1) (1)

# -3-MACHINE MANUFACTURING L3

2.4	2.4.1 2.4.2 2.4.3 2.4.4	Housed Press Enter Plan; Space	(1) (1) (1) (2) [15]
QUES	TION 3		
3.1	3.1.1 3.1.2 3.1.3	Clearance fit Transition fit Interference fit (3 × 1)	(3)
3.2	It is when the shaft size is made standard and when any adjustments are made on the hole.		(2)
3.3	3.3.1 3.3.2 3.3.3 3.3.4 3.3.5	Nominal diameter size of the hole and the shaft Tolerance on the hole Degree of tolerance on the hole Tolerance on the shaft Degree of tolerance on the shaft $(5 \times 1)$	(5)
3.4	3.4.1 3.4.2 3.4.3	100,00 mm 100,01 mm 99,99 mm (3 × 1)	(3)
3.5	<ul> <li>Allowance – refers to the difference between the size of the hole and the size shaft in a fit.</li> <li>Tolerance – the variation in the size of the shaft and the hole that is accepted.</li> </ul>		(2) <b>[15]</b>
QUES	TION 4		
4.1	4.1.1	Surface grinder $\checkmark$ – It is used to grind surfaces smooth to microfinish sizes. $\checkmark$	(2)
	4.1.2	<ul> <li>A – Feed handle (up and down table movement)</li> <li>B – Magnetic table</li> <li>C – Cross traverse handle</li> <li>D – To-and-fro table traverse</li> <li>E – Grinding wheel</li> </ul>	(5)

#### -4-MACHINE MANUFACTURING L3

4.2	4.2.1 4.2.2 4.2.3 4.2.4 4.2.5	Drive plate Travelling/Moving steady Work piece Carriage Bed (5 × 1)	(5)
4.3	<ul> <li>Taper turning</li> <li>Parallel turning</li> <li>Screw cutting</li> <li>Drilling</li> <li>Boring</li> <li>Reaming (Any 5 × 1)</li> </ul>		(5)
4.4	4.4.1 4.4.2 4.4.3	End mill cutter Ball nose cutter T-slot (3 × 1)	(3) <b>[20]</b>
QUEST	ION 5		
5.1	5.1.1 5.1.2 5.1.3 5.1.4	Arbor support Machine table Arbor Overarm (4 × 1)	(4)
5.2	Horizontal milling machine		
5.3	STEP 1: STEP 2: STEP 3: STEP 4: STEP 5:	screwed on. Clean the chuck jaws with the paint brush.	(5)
5.4	<ul> <li>Gear of</li> <li>Indexin</li> <li>Drilling</li> <li>Slotting</li> <li>Slab m</li> <li>Gang i</li> </ul>	ng g nilling	

- Straddle milling
- Down cut milling
- Up cut milling

#### -5-MACHINE MANUFACTURING L3

5.5 Indexing =  $40/N \checkmark$ 

= 40/44 ✓ = 10/11 × 3/3 ✓ = 30/33 ✓

Indexing = No complete turns but 30 holes on 33 hole circle.  $\checkmark$ 

5.6 Given: Diameter (D) = 40 mm = 0.04 mLength (L) = 250 mm = 0.25 mCutting speed (S) = 25 m/minuteFeed rate (f) = 0.5 mm/revRequired to calc. (T) = TIME in minutes and seconds

$$S = \frac{\pi \times D \times N}{60}$$

$$N = \frac{S \times 60}{\pi \times D}$$

$$N = \frac{0,417 \times 60}{3,142 \times 0,04}$$

$$N = \frac{25,02}{0,126}$$

$$N = 198,57 \checkmark$$
But T =  $\frac{L}{f \times N}$ 

$$= \frac{250}{0,5 \times 198,57}$$

$$= \frac{250}{99,29}$$

$$= 2,518 \checkmark$$

Answer = 2 min 31 sec✓

(5)

(5)

## -6-MACHINE MANUFACTURING L3

5.7	5.7.1	Turret milling machine		(1)
	5.7.2	<ul><li>Indexing</li><li>Slotting</li><li>Keyways</li></ul>	(Any 2 × 1)	(2)
	5.7.3	A – Motor B – Head C – Machine table D – Saddle E – Knee F – Column		
		G – Base		(7) <b>[35]</b>
			TOTAL	100