



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

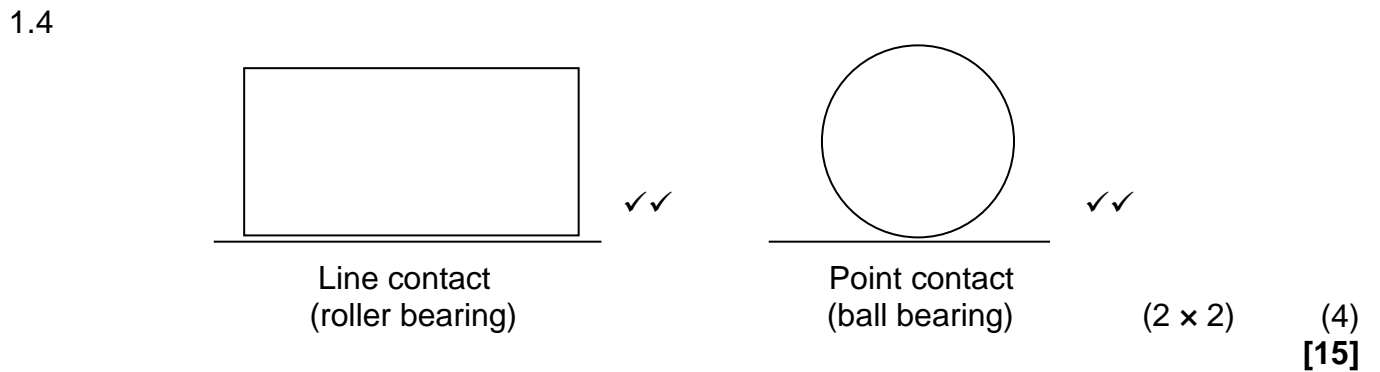
NATIONAL CERTIFICATE FITTING AND TURNING L3

7 December 2020

This marking guideline consists of 6 pages.

QUESTION 1: BEARINGS

- 1.1
- Friction/Plain/Journal bearing
 - Antifriction/Rolling bearing
- (2 x 1) (2)
- 1.2
- Contamination with dirt and foreign matter
 - Abnormal load due to improper assembly
 - Shaft and housing fits are too large or too small
 - Improper lubricant or lubrication method
 - Improper design or poor quality of shaft and housing
 - Errors in selection of bearings
- (Any 5 x 1) (5)
- 1.3
- 1.3.1 Radial
- 1.3.2 Axial and radial
- 1.3.3 Axial and radial
- 1.3.4 Axial
- (4 x 1) (4)



QUESTION 2: COUPLINGS

- 2.1. Universal coupling (1)
- 2.2
- A – Shaft A
 - B – Yoke
 - C – Key
 - D – Shaft B
 - E – Cross piece
- (5)
- 2.3
- Misalignment of shafts
 - Use of incorrect coupling
 - Incorrect or inadequate lubrication
 - Excessive build-up of dirt may prevent it from adjusting
 - Overloading
 - Incorrect assembly
- (Any 4 x 1) (4)
- [10]**

QUESTION 3: BRAKES AND CLUTCHES

- 3.1
- Brake applies immediately and automatically in case of power failure
 - Fast response system
- (2)

3.2

CAUSE	SOLUTION
• Worn linings	• Replace the clutch unit
• Dirt or oil on the friction surface	• Clean the surface
• Faulty unit (Any TWO)	• Replace unit (Any TWO)

(2 + 2) (4)

- 3.3
- Noise
 - Shudder
 - Slipping
 - Overheating
 - Nonengagement
- (Any 3 × 1) (3)

- 3.4 Protects mechanical equipment from damage through overload (1)
[10]

QUESTION 4: BELT, CHAIN AND GEAR DRIVES

- 4.1
- 4.1.1 False
 - 4.1.2 True
 - 4.1.3 True
 - 4.1.4 False
 - 4.1.5 True
- (5 × 1) (5)

- 4.2
- Better power transmission
 - Availability of limited space
 - Greater speeds
 - In case of single strand failing, drive still takes place
- (4 × 1) (4)

- 4.3
- Driven gear can rotate in same direction as driver gear
 - Distances of gears can be varied
- (2)

- 4.4
- More efficient
 - Higher speed ratios
 - More compact
 - Longer life span
 - Less likely to break down
 - Less friction resistance
 - Transmits high loads
 - Direct power transmission
 - Low radial loads on bearings of gear trains
 - Positive drive, without any slip
- (Any 4 × 1) (4)
[15]

QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

- 5.1
- Use correct tools
 - Make sure tools and equipment are in a good working condition
 - No excessive force to connect a pipe fitting
 - Use the correct size of pipe
 - Ensure no leakages after completion of work
 - Use personal protective equipment
- (Any relevant 5 × 1) (5)
- 5.2
- Controls flow rates
 - Controls direction of flow
 - Controls pressure and volume
 - Acts as an ON/OFF device
- (Any 2 × 1) (2)
- 5.3
- Gate valve
 - Diaphragm valve
 - Pressure relief valve
 - Non-return valve
 - Butterfly valve
 - Ball valve
 - Foot valve
- (Any 3 × 1) (3)
[10]

QUESTION 6: CENTRE LATHE

- 6.1
- Finish required
 - Type of material
 - Type of tool used
 - Diameter of work
- (4 × 1) (4)
- 6.2
- $S = \pi \times D \times N$
 $= \pi \times 0.01 \times 1800 \checkmark \checkmark$
 $= 56,55 \text{ m/min} \checkmark$
- (3)

	ADVANTAGES	DISADVANTAGES
6.3	<ul style="list-style-type: none"> • The chuck can hold a wide range of hexagonal and cylindrical workpieces. 	<ul style="list-style-type: none"> • Chuck becomes inaccurate as the jaws become worn.
	<ul style="list-style-type: none"> • Jaws are available for internal and external work. 	<ul style="list-style-type: none"> • Chuck can only hold hexagonal and cylindrical workpieces.
	<ul style="list-style-type: none"> • Work can be done on the end face of the workpiece. 	<ul style="list-style-type: none"> • Not possible to correct any run out.
	<ul style="list-style-type: none"> • Easy to mount the workpiece. 	<ul style="list-style-type: none"> • Chuck is heavy to handle.
	<ul style="list-style-type: none"> • Work can be bored • (Any TWO) 	<ul style="list-style-type: none"> • Gripping power of the chuck can damage the workpiece.
		<ul style="list-style-type: none"> • Concentric accuracy is limited when you reverse the workpiece. (Any THREE)

(2 + 3) (5)

- 6.4
- Workpiece coming loose in the chuck
 - Cutting tool becoming blunt or breaks
 - Play between the slides on the lathe bed, cross slide or compound slide
 - Lack of coolant which results in overheating
 - Centre hole wearing out
 - Backlash on the spindles
- (Any 5 × 1) (5)

- 6.5
- Facing
 - Parallel turning
 - Grooving or parting off
 - Taper turning
 - Drilling
 - Thread cutting
- (Any 3 × 1) (3)
[20]

QUESTION 7: MILLING MACHINES

- 7.1
- Reduces friction and wear
 - Washes away chips and filings
 - Keeps the cutting tool and workpiece cool
 - Provides a good finish
 - Protects against corrosion
 - Longer life of the cutting tool
- (Any 5 × 1) (5)

- 7.2
- Wear goggles and protective clothing
 - Clamp workpiece securely
 - Never leave machine unattended
 - Ensure cutting tool is secured
 - Do not make adjustments on running machine
- (Any relevant 4 × 1) (4)

7.3	<ul style="list-style-type: none">• Rapid (Direct) indexing• Simple indexing• Angular indexing• Differential indexing	(4 × 1)	(4)
7.4	$N = S / \pi \times D$ $= 45 / \pi \times 0.025 \checkmark \checkmark$ $= 572,96 \text{ r/min} \checkmark$ $f = f_t \times T \times N$ $= 0.18 \times 4 \times 572,96 \checkmark \checkmark$ $= 412,53 \text{ mm/min} \checkmark$		(6)
7.5	Soluble oil		(1)
			[20]
		TOTAL:	100