



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLATERS' THEORY N2

9 April 2020

This marking guideline consists of 5 pages.

QUESTION 1: MACHINES

- 1.1 The bottom cutting blade is fixed horizontally,✓ and the top cutting blade member is inclined to it✓ and fixed to a moving beam, which is working in slides✓ and moves parallel. In this way plates can be cut.✓ (4)
- 1.2 A clamping beam is made up in segments of various widths✓ which can be removed or rearranged✓ to give a clearance for a previously folded edge,✓ enabling boxes or pans to be formed.✓ (4)
- 1.3
- Always wear safety grinding goggles when grinding.
 - Do not bump the material against the grinding wheel while it is rotating.
 - Make sure that the gap between the wheel and the rest is not more than 3 mm.
 - Allow the grinding wheel to reach the working speed before use.
 - Do not grind on the side of the wheel.
 - Never force grind so that the sparks fly away from people. (Any 2 × 1) (2)

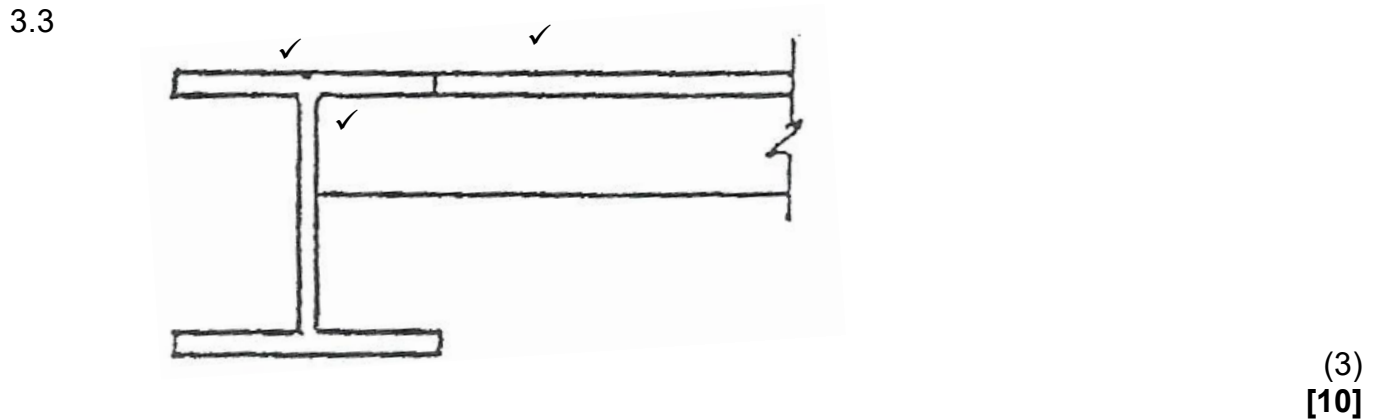
[10]**QUESTION 2: ROLLING AND BENDING**

- 2.1
- $$L = [D + T + (T \div 3)] \pi$$
- $$= [800 + 4 + (4 \div 3)] \pi$$
- $$= (805,33)\pi \checkmark \quad \text{OR} \quad (805,33)3,142$$
- $$= 2\,530,029 \text{ mm} \checkmark \checkmark \quad = 2\,530,347 \text{ mm} \quad (5)$$
- 2.2 These machines have three rolls arranged in a pyramid formation.✓ The bottom rolls usually driven, work on fixed centres,✓ while the top roll of a larger diameter is adjustable up and down to suit the metal thickness and the radius of curvature to be rolled.✓ A plate with pre-bent ends to approximately the radius required, is fed forward onto the rear roll and the top roll is lowered before bending can take place.✓ When progressive bending takes place a cylinder is formed.✓ (5)

[10]**QUESTION 3: JOINING OF STEEL PROFILES**

- 3.1
- Assembly items are identical.
 - Assembly time is reduced.
 - Workers can do the work alone.
 - It saves unnecessary measuring.
 - It enables untrained workers to do the work.
 - Jigs can be stored for long periods of time and used again.
 - It reduces distortion.
 - It reduces production cost. (Any 4 × 1) (4)

- 3.2
- It must be easily understood.
 - It must be rigid.
 - It must be light and easy to handle.
 - It must be accurate.
 - It must not be expensive to make.
 - It must hold the parts to be assembled and allow them to be easily removed from the jig.
- (Any 3 × 1) (3)



QUESTION 4: GENERAL PIPEWORK

- 4.1
- Striking point/Centre punch
 - Spirit level
 - Calibrated protractor
 - V-shaped frame
- (4)
- 4.2
- Determine the centre line on the pipe and draw line P, Q, R and O 90° to the centre line.
 - Measure the circumference of the pipe, divide it by 6 and mark the sizes parallel to the centre line.
 - Determine the circumference of the small pipe, subtract it from the circumference of the large pipe and divide it by 12 to obtain size S.
 - Use size S to mark off both sides of the six parallel lines and draw lines from O to R diagonal from A to Z.
 - Cut the v's and heat along line R and bend the ends outwards.
 - Heat along line Q and use a hammer to knock each of the six segments until they form a diameter equal to that of the smaller pipe.
- (6)
[10]

QUESTION 5: STEEL STRUCTURE

5.1

$$(\text{RISE})^2 = (\text{RAFTER})^2 - (\text{SPAN} \div 2)^2 \checkmark$$

$$= (4,472)^2 - 4^2 \checkmark$$

$$\text{RISE} = 2 \text{ m} \checkmark$$

5.2

$$\text{PITCH} = \text{RISE} \div \text{SPAN} \checkmark$$

$$= 2 \div 8 \checkmark$$

$$= 1:4 \checkmark$$

6.1	6.1.1	The outline for small bent shapes such as brackets, small pipe bends and bevelled cleats may be set out on template paper.✓ It is used for developing patterns for sheet metalwork.✓		
	6.1.2	Used in considerable quantities for steelwork templates.✓ It can be used for making templates for use with oxy-fuel gas profiling machines.✓	(2 × 2)	(4)
6.2	•	To avoid unnecessary wastage of material		
	•	To avoid repetitive measuring and marking-off the same dimensions, where a number of identical parts are required		(2)
				[6]

7.1	To soften the metal, refine the grain size✓ and remove any stress that may be present✓		(2)
7.2	7.2.1	<ul style="list-style-type: none"> • Makes steel strong and tough. • Increases impact resistance. • Increases resistance to corrosion. • Improves the ability to resist fatigue. 	
	7.2.2	<ul style="list-style-type: none"> • Increases hardness depth. • Increases magnetic properties. • Increases resistance to high temperatures. • Increases resistance to wear and corrosion. 	
			(2 × 4) (8)
			[10]

8.1	8.1.1	Plates with open laminations will not cut well.✓ Tight laminations will not affect the cut provided there is no appreciable slag inclusion.✓
	8.1.2	Heavy scales render starting difficult✓ and may prevent cutting all together.✓
	8.1.3	Rusty, painted or scaled surfaces create difficulties which may interfere with the quality of a cut✓ and retard the cutting speed.✓
	8.1.4	The oxide melting point is normally higher than that of metal✓ and as a result the metal overheats before the oxide melts.✓

(4 × 2)
(8)

- 8.2 This is a simple lightweight portable oxy-fuel gas cutting machine.✓
The machine can make long runs on the aluminium track and when fitted with a radius bar can also cut circles.✓

(2)
[10]

QUESTION 9: ARC WELDING

- 9.1 9.1.1 It is the angle formed between the prepared edge of a member✓
and a plane perpendicular to the surface of the member.✓

OR

It is the angle at which an end or edge✓ is chamfered.✓

- 9.1.2 It is the total angle of the groove✓ between the parts to be welded.✓

- 9.1.3 It is the metal, produced by the melting of an electrode or filler metal,✓ that becomes part of the weld.✓

- 9.1.4 An electrode is a component of the electrical welding circuit✓ that terminates at the arc, molten conductive slag or base metal.✓

OR

It is a rod or wire (usually covered)✓ for providing weld metal by fusion by the electric arc.✓

(4 × 2) (8)

- 9.2
- Insufficient heat input
 - Welding speed too fast
 - Incorrect polarity when using DC current
 - Incorrect joint design

(4)
[12]

QUESTION 10: CALCULATION AND PLANNING

$$\begin{aligned}\text{Area of base} &= L \times B \checkmark \\ &\quad \checkmark \quad \checkmark \\ &= 0,2 \times 0,4 \\ &= 0,08 \text{ m}^2 \checkmark\end{aligned}$$

$$\begin{aligned}\text{Area of the sides} &= 2(L \times B) + 2(L \times B) \checkmark \\ &\quad \checkmark \quad \checkmark \\ &= 2(0,2 \times 0,06) + 2(0,4 \times 0,06) \\ &= 0,072 \text{ m}^2 \checkmark \checkmark\end{aligned}$$

$$\begin{aligned}\text{Mass of one tray} &= (0,08 + 0,072) \times 7,85 \times 6 \checkmark \\ &\quad \checkmark \quad \checkmark \\ &= 7,1592 \text{ kg} \checkmark\end{aligned}$$

$$\begin{aligned}\text{Mass of 30 trays} &= 7,156 \text{ kg} \times 30 \checkmark \\ &= 214,776 \text{ kg} \checkmark \checkmark\end{aligned}$$

[16]

TOTAL: 100