higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

METAL WORKER'S THEORY N1

2 APRIL 2013

This marking guideline consists of 8 pages.

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QUESTION 1

1.1 Unsafe condition

1.2 Unsafe condition

1.3 Unsafe action

1.4 Unsafe condition

1.5 Unsafe action

(5 × 1) **[5]**

QUESTION 2

2.1 2.1.1 Prick punch

2.1.2 Centre punch

2.1.3 Sleeve punch (3 × 1) (3)

2.2 2.2.1 Cast

2.2.2 Hickory or a well-seasoned, straight-grained ash wood (2 × 1) (2)

2.3 It is the angle that the chisel is to be held in relation to the work. (2)

2.4 2.4.1 It is used to scribe a permanent mark or groove onto mild steel or sections.

2.4.2 It is used to determine the size of round steel sections.

2.4.3 It is used to check the accuracy of small jobs and for marking angles, beams.

2.4.4 It is used to scribe arcs or radius larger than 400 mm.

2.4.5 It is used to mark off bevels or mitres on steel sections. (5 × 1) (5)

2.5 $R^2 = V^2 + H^2$ (0, 5)
$= (120\ mm)^2 + (185\ mm)^2$ (0, 5)
$= 14400\ mm^2 + 34225\ mm^2$ (0, 5)
$= \sqrt{48625\ mm^2}$ (0, 5)
$= 220,51\ mm$ (3)

[15]

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QUESTION 3

3.1		See ADDENDUM A	(2)
3.2		C = 3,142 x 34 mm	(1)
		= 106 mm	(1)
3.3		See the diagram	(2)
3.4		See the sketch	(4)
			[10]

QUESTION 4

4.1	4.1.1	It refers to the ability of the metal to return to its original shape after it has been stretched.	(1)
	4.1.2	It is the property of a metal which allows it to be drawn out into wire.	(1)
	4.1.3	It is the property of the metal which allows it to be stretched or hammered into shape without being fractured.	(1)
4.2	4.2.1	Mild steel has carbon content between 0, 1% and 0, 3%.	(1)
	4.2.2	Malleable Ductile Fusible Tough. (Any 2 × 1)	(2)
	4.2.3	It is used for general forging work Pressing of motor panels Extensively used for structural steelwork in the form of steel sections Bolts Nuts (Any 2 × 1)	(2)
4.3	4.3.1	Drawing	(1)
	4.3.2	Revolutions per minute	(1)
4.4		Back mark = 50 mm + 6 = 56 mm ÷ 2 (0, 5) = 28 mm	(2)
			[12]

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QUESTION 5

5.1 Pedestal drilling machine:

- Wear goggles
- Adjust the machine to the correct working speed
- Clamp the workpiece properly
- Use the coolant during the drilling process
- Use a wooden stick to remove the drill shavings from the drill bits
- One person at a time to operate the machine

(Any 5 × 1) (5)

5.2 Horizontal bending rolls:

- Do not overload the machine.
- The steel profile to be bent must be free from any oil or grease.
- Ensure that the rolls are clean and free from grease or oil.
- Check that the plate or bar to be rolled is securely held or supported.
- Ensure that the area around the rolling machine is clear.
- Avoid fingers from getting trapped into the rollers.
- Avoid wearing any loose or hanging clothing.

(Any 5 × 1) (5)
[10]

QUESTION 6

6.1 6.1.1 See the sketch (2)

6.1.2 See the sketch (1)

6.1.3 It is the distance measured from the edge to the centre point of the rivet. (1)

6.1.4 It is the distance measured from the centre to the next centre point of the rivet. (1)

6.2 L = 1,5 x bolt diameter + thickness of material + 3 mm for every 12 mm thickness of material used. (0, 5) (1)
= 1, 5 x 25 mm + 2 x 18 mm + 9 mm (1)
= 37, 5 mm + 36 mm + 9 mm (0, 5)
= 82, 5 mm (1)

6.3 It is used where the bolt head is set flush or be in line with the metal and also where excessive vibration occurs. (2)
[10]

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QUESTION 7

7.1	7.1.1	Gas bottles		
	7.1.2	Pressure regulators		
	7.1.3	Flash back arresters		
	7.1.4	Welding hose		
	7.1.5	Welding torch	(5 × 1)	(5)
7.2	7.2.1	It determines the pressure inside the cylinder and the working pressure in the hoses.		(2)
7.3	See the sketch			(2)
7.4	7.4.1	Holding the welding torch too close to the workpiece.		
	7.4.2	Overheated nozzle.		
	7.4.3	Incorrect gas setting.		
	7.4.4	Empty gas bottles.		
	7.4.5	Dirty nozzle.	(Any 4 × 1)	(4)
7.5	The flame is extinguished by first closing the LP-gas and then the oxygen gas.			(2)
				[15]

QUESTION 8

8.1	8.1.1	Leather apron protects the body against ultra-violet rays and arc rays.		
	8.1.2	Overalls for body protection.		
	8.1.3	Safety boots protect the feet against heavy falling objects		
	8.1.4	Leather spats for feet protection.		
	8.1.5	Leather gloves are used for hands protection.		
	8.1.6	Leather yoke protects the back and shoulders from sparks and hot globular metals.	(Any 5 ×1)	(5)

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8.2 8.2.1 The transformer is approximately 50% cheaper to purchase than an equivalent generator.

8.2.2 The transformer is more economical to operate.

8.2.3 It is more efficient than the generator.

8.2.4 It has no rotating parts and few if any moving parts to wear out.

8.2.5 It does not produce any appreciable noise when welding is being done.

8.2.6 Arc-blow does not occur when welding with a transformer.

(Any 4 × 1) (4)

8.3 8.3.1 TIG welding plant consists of a transformer, an inert gas such as Argon and the tungsten electrode and the filler rod. (2)

8.3.2 Earthing is when the earth clamp is mounted onto the metal being welded to complete the welding cycle and to avoid any electric shock. (2)

8.4 8.4.1 It is used to clean and prepare the joint before welding work is done. (1)

8.4.2 It is used to chip the slag from the completed weld. (1)

[15]

QUESTION 9

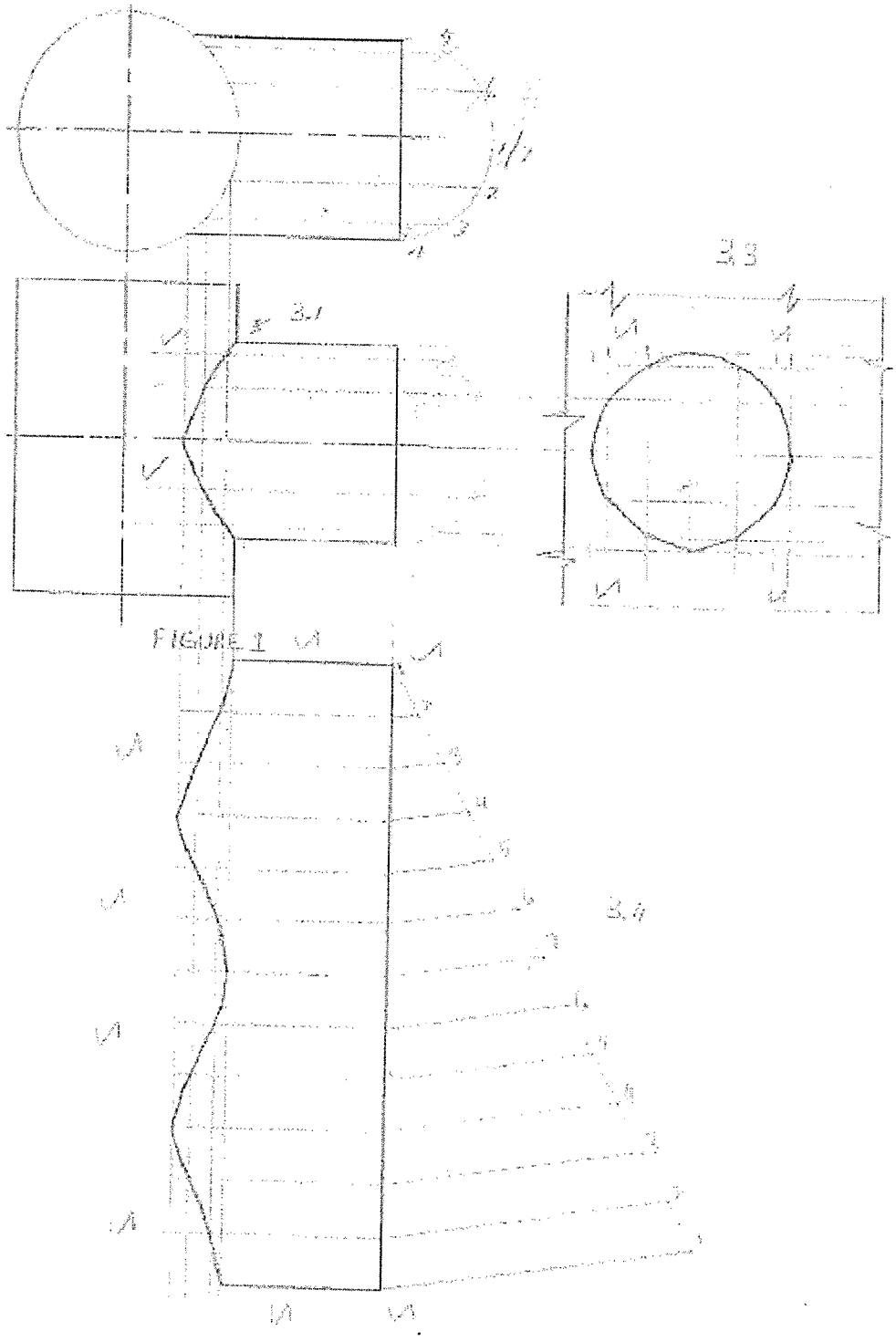
9.1 9.1.1 The cylinder:
Mean diameter:
= 864 mm + 5 mm + 5 mm (1)
= 874 mm (1)
Circumference
= 3,142 x 874 mm (1)
= 2746, 11 mm (1)

9.1.2 The external stiffening ring:
Mean diameter:
= 864 mm + 10 mm + 10 mm (0, 5)
= 884 mm + 12 mm (0, 5)
= 896 mm (1)
Circumference
= 3,142 x 896 mm (1)
= 2815, 23 mm (1)

[8]

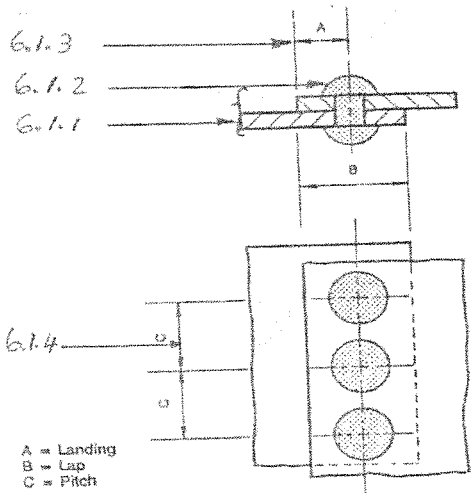
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ADDENDUM A

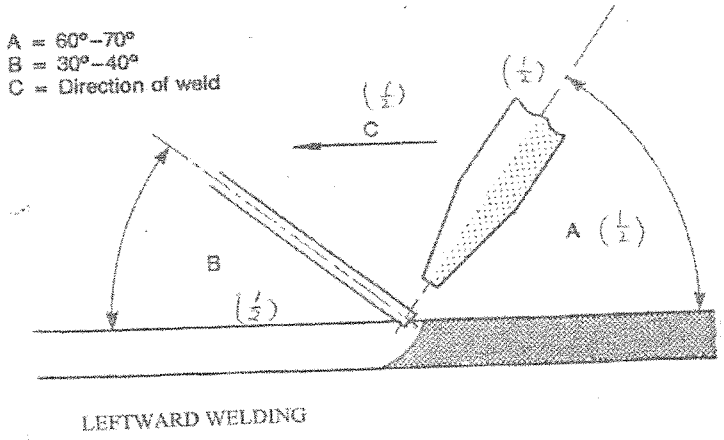


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SKETCHES



6.1



7.3

TOTAL OF SKETCHES: 40
GRAND TOTAL: 100

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