higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL-EXAMINATION

METAL WORKER'S THEORY N1

24 March 2014

This marking guideline consists of 7 pages.

QUESTION 1

1.1.1 True
1.1.2 True
1.1.3 False
1.1.4 True
1.1.5 False

(5 x 1) **[5]**

QUESTION 2

2.1 2.1.1 Prick punch is used to mark holes or lines from cardboard or metal template

2.1.2 Centre punch is used to enlarge the punch mark for drilling or punching.

2.1.3 Sleeve punch is used when a large number of items are to be marked from a template made from wood.

(3 x 2) (6)

2.1 2.2.1 Wedge
2.2.2 Soaked
2.2.3 Expand
2.2.4 Hickory

(4 x 1) (4)

2.3 2.3.1 It is used to obtain the inside diameter of a hole or pipe.

2.3.2 It is used to check the accuracy of small jobs and for marking off angle irons, channels and flat bars.

(2 x 1) (2)

2.4 $R2 = H2 + V2$
$H2 = R2 - V2$ ✓

$= (210\ mm)2 - (164\ mm)2$
$= 44100\ mm2 - 26896\ mm2$ (0,5)
$= 17204\ mm2$ (0,5)✓

$= 131,16\ mm$ ✓

(3)
[15]

QUESTION 3

3.1 See the SUPPLEMENT A (2)

3.2 Circumference = 3,142 x 32 mm✓
= 100,54 mm✓ (2)

3.3 See the SUPPLEMENT A (2)

3.4 See the SUPPLEMENT A (4)
[10]

QUESTION 4

4.1 4.1.1 1 Carbon content is between 0,8% and 1,4% (1)

4.1.2 Toughness, hardness, brittleness, elasticity. (Any two) (2)

4.1.3 Woodworking blades, lathe turning tools, surgical instruments, razor blade. (Any two) (2)

4.2 4.2.1 It is the ability of the metal which allows the metal to be drawn out into awire

4.2.2 It is the metals property which allows it to be hammered without breaking.

(2 x 1) (2)

4.3 4.3.1 Ms pl
4.3.2 O/D
4.3.3 ?

(3 x 1) (3)

4.4 Back mark = 45 mm + 6 mm (0,5)
= 51 mm ÷ 2 (0,5)
= 25,5 mm (1)
[12]

QUESTION 5

5.1
- Wear goggles
- Ensure that the workpiece to be drilled is properly and securely clamped.
- Set the machine to the correct working speed.
- Use the wooden stick to remove the drill shavings from the drill bit.
- Apply a suitable solution to cool off the drill bit.
- Ensure that the machine guard is in position.

(Any 5 x 1) (5)

5.2 5.2 1 It is used to remove surplus welding from steel sections.

5.2.2 It is used for shearing steel plates.

5.2.3 It is used for bending steel plates or flat bars to various angles.

5.2.4 It is used to cut heavy steel profiles such as I-beams, channels and angle irons.

5.2.5 It is used to roll out steel plates into round or ellipse shapes.

(5 x 1) (5)
[10]

QUESTION 6

6.1 6.1.1 See sketches

6.1.2 See sketches

(2 x 1) (2)

6.2 See sketches (3)

6.3 Length = 1,5 x bolt diameter + thickness of material + thickness of the washer

= 1,5 x 12 mm + 2x18 mm + 6 mm
= 18 mm + 36 mm + 6 mm
= 60 mm

(3)

6.4 Landing is the distance measured form the edge of the plate to the centre of the hole to be drilled. (2)
[10]

QUESTION 7

7.1 Oxygen
Acetylene
LP-Gas

(3 x 1) (3)

7.2 7.2.1 It is used to regulate pressure in the cylinder to an operating pressure suitable for welding.

7.2.2 It prevents the burning gas caused by a flashback to enter the cylinder.

(2 x 1) (2)

7.3 Neutral flame is used for welding mild steel, stainless steel, cast iron, copper and aluminium.✓✓
Oxidising flame is used for welding brass and brazing.✓✓
Carbonizing flame is used for hard-surfacing.✓✓ (3 x 2) (6)

7.4 First close the acetylene valve needle then oxygen in the torch. (2)

7.5 Rightward and leftward welding techniques. (2)
[15]

QUESTION 8

8.1 Check that all the electrical connections are secure and that the machine has a proper earth connection.
Check that the welding cables, electrode holder and earth clamp are in good condition
Ensure that all cable connections are secure and properly insulated.
Have a fire extinguisher within easy access.
Ensure that there is adequate ventilation.
Welding cables should be cleared from walkways.
Wear all necessary person protective equipment such as goggles, etc.
Keep the working area neat and tidy after welding has been completed.

(Any 5 x 1) (5)

8.2 8.2.1 It is used to chip slag from a completed weld.

8.2.2 It ensures good current flow and prevents electric shock.

8.2.3 It regulates the flow of alternating current.

(3 x 1) (3)

8.3 8.3.1 It refers to the current that flows in one direction only in the electric circuit. (1)

8.3.2 It is when the electrode holder is connected to the positive pole and the metal being welded connected to the negative pole in the direct current welding generator. (2)

8.4 The transformer is approximately cheaper as compared to the DC generator.
It is more economical to operate than the generator.
The transformer has no rotating parts and few if any moving parts to wear out.
It is more efficient as compared to the generator.
The transformer does not produce any appreciable noise when welding ins being done.
Arc-blows does not occur when welding with transformer.
(Any 4 x 1) (4)
[15]

QUESTION 9

9.1 9.1.1 Internal cylinder:

Out of pipe diameter = 760 mm – (5 mm + 5 mm)

Mean diameter of ring = 750 mm

Circumference = 3,142 x 750 mm
= 2356,5 mm

9.1.2 External stiffening ring:
Mean diameter = 760 mm + 10 mm + 10 mm (0,5)
= 780 mm + 6 mm + 6 mm (0,5)
= 792 mm
Circumference = 3,142 x 792 mm
= 2488,46 mm

(2 x 4) **[8]**

TOTAL: **100**