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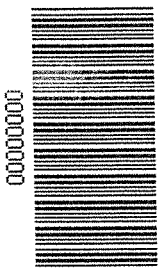

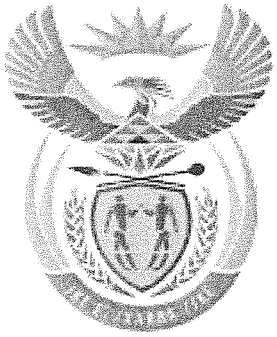

higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

JULY EXAMINATION

METAL WORKERS THEORY N1

21 JULY 2014

This marking guideline consists of 7 pages and 2 answer sheets.

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QUESTION 1

1.1 It is an unplanned and uncontrolled incident which is caused by unsafe acts or unsafe conditions that results in, or has a potential for physical harm to persons or property damage. (2)

1.2 Occupational Health and Safety Act (3)
[5]

QUESTION 2

2.1 2.1.1 Cross cut chisel

2.1.2 Barrel drift

2.1.3 Wrench

2.1.4 Flat or cold chisel

2.1.5 Single cut file

(5 x 1) (5)

2.2 It is the angle at which the chisel is held in relation to the workpiece. (2)

2.3 2.3.1 It is used to scribe a permanent mark or groove onto mild steel plates or sections.

2.3.2 It is used for measuring internal sizes for example the inside of diameters of holes or pipes.

2.3.3 It is used to scribe circles with a radius greater than 400 mm.

2.3.4 It is used to strike long straight lines on steel plates or on template loft floor

2.3.5 It is used to measure or mark off angles or bevels.

(5 x 1) (5)

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2.4 $R^2 = H^2 + V^2$

$= (250\ mm)^2 + (164\ mm)^2$ (1)

$= 62500\ mm^2 + 26896\ mm^2$ (0,5)

$= \sqrt{89396}\ mm^2$

(0,5)

$= 298,99\ mm$ (3)
[15]

QUESTION 3

3.1 See the sketch (2)

3.2 C = 3,142 x 33 mm
= 103,69 mm (2)

3.3 See the diagram (2)

3.4 See the sketch (4)
[10]

QUESTION 4

4.1 4.1.1 Universal beam

4.1.2 Outside diameter

4.1.3 Setting out point

(3 x 1) (3)

4.2 4.2.1 It is the metal's ability to resist wear scratching or damage on the surface of the metal, or be able to cut other metals.

4.2.2 Toughness is a quality of strength and resistance against breaking when being bent or twisted.

4.2.3 It is the ability of the metal to return to its original size or form.

(3 x 1) (3)

4.3 4.3.1 Grey (1)

4.3.2 Carbon content is between 0,1% and 0,3%. (1)

4.3.3 Used to manufacture steel profiles such as angle iron, channels, round bars, steel plates, rivets, bolts and nuts. (2)

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4.4 Back mark = (80 mm + 12 mm) (0,5)
= 92 mm ÷ 2 (0,5)
= 46 mm (2)
[12]

QUESTION 5

5.1 5.1.1 Pedestal grinding machine:

- Wear goggles
- Check the grinding wheel for cracks
- Ensure that the machine guards are in position
- Ensure that the work rest is set at a suitable distance
- Adjust the machine to the correct working speed
- One person at a time should operate the machine
- Avoid horseplay when working on the machine
- Avoid loose hanging clothing when working on the machine

(Any 5 x 1) (5)

5.1.2 Guillotine:

- Adjust the machine to the correct size of the plate to be sheared.
- Under no circumstances may a machine be overloaded.
- Ensure that the machine blades are in good working condition
- Wipe off any grease or oil on the plate to be cut
- Remove any obstructive object behind the machine.
- One person at a time to operate the machine
- Avoid fingers from getting trapped beneath the plate to be cut.

(Any 5 x 1) (5)
[10]

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QUESTION 6

6.1 See the sketch (3)

6.2 6.2.1 It is the distance measured between two centre points of the holes along the straight line. (1)

6.2.2 It is the distance measured from the edge of the metal to the centre of the hole. (1)

6.3 Length = thickness of material + 1,5 x diameter of bolt + 3 mm for every 12 mm of material used

= 3 x 12 mm + (1,5 x 18 mm) + 3 x 3 mm
= (36 + 27 + 9) mm
= 72 mm

(3 x 1) (3)

6.4 It is used where the bolt head should be set flush or in line with the surface of the plate, and where excessive vibration is experienced such as in boilers. (2)

[10]

QUESTION 7

7.1 7.1.1 It is used to store the LP-Gas

7.1.2 It transports the gas from the cylinder to the welding/cutting torch

7.1.3 It regulates the flow of the oxygen gas leaving the cylinder to the welding hose

7.1.4 It is used to prevent the burning gas entering back into the cylinder.

7.1.5 It is used for cutting metal.

(5 x 1) (5)

7.2 7.2.1 Neutral flame has equal amount of oxygen gas and acetylene gas. It is used for welding steel such as mild steel, stainless steel (2)

7.2.2 Oxidising flame it has an excess amount of oxygen. It is used for brazing and bronze welding. (2)

7.3
- Dirty nozzle
- Unequal amounts of gasses
- An overheated nozzle
- The welding nozzle is held too close to the workpiece
- Incorrect cutting speed

(Any 4 x 1) (4)

7.4 Close the acetylene gas first then the oxygen gas (2)

[15]

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QUESTION 8

8.1 8.1.1 It refers to materials which do not allow the current to flow. (1)

8.1.2 Earthing refers to the earth clamp which is connected to the metal to be welded. (2)

8.1.3 Tungsten inert gas welding is a welding that consists of a transformer, an inert gas such as Argon and a tungsten electrode. (2)

8.2
- To stabilise current
- To melt away impurities on the metal surface
- To facilitate the welding process by increasing the melting speed
- To create slag (Any 3 x 1) (3)

8.3
- Almost all commercially available welding rods can be used with a direct current generator.
- The motor generator is not affected by current fluctuations in the power supply and a stable current can be maintained.
- Cast iron and aluminium can only be welded successfully with a DC generator.
- The polarity between the electrode holder and the work being done can be changed to direct the greater heat to either the electrode or the work. (4 x 1) (4)

8.4 See the sketches (3)

[15]

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QUESTION 9

9.1 9.1.1 Cylinder:

Mean diameter = 670 mm – 6 mm
= 664 mm
Circumference = 3,142 x 664 mm
= 2086,29 mm (4)

9.1.2 Stiffening ring:
Mean diameter = 670 mm + 12 mm + 10 mm (1)
= 692 mm (1)
Circumference = 3,142 x 692 mm (1)
= 2174,26 mm (1) (4)
[8]

TOTAL: 100

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SUPPLEMENT A

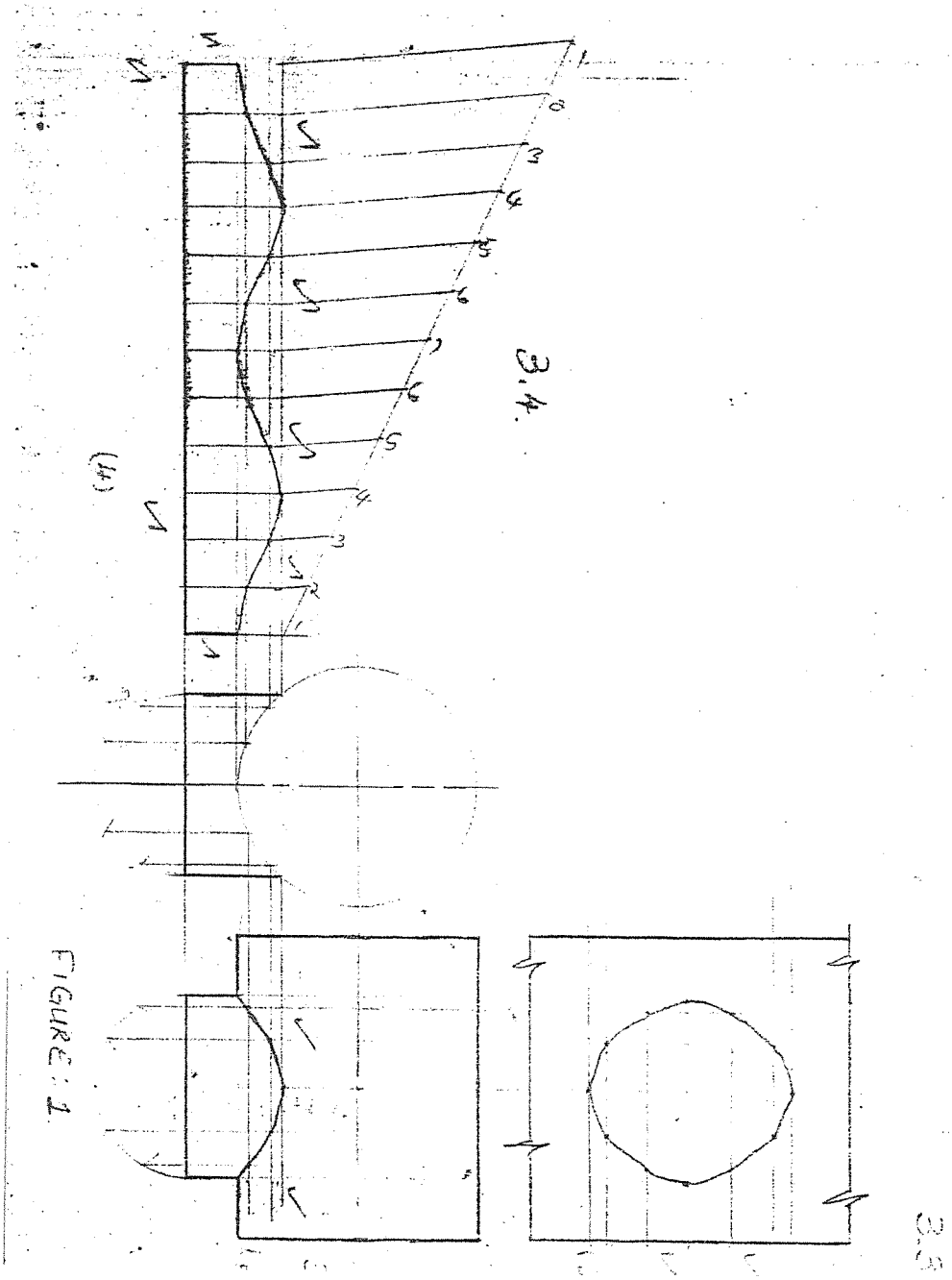

FIGURE 1.

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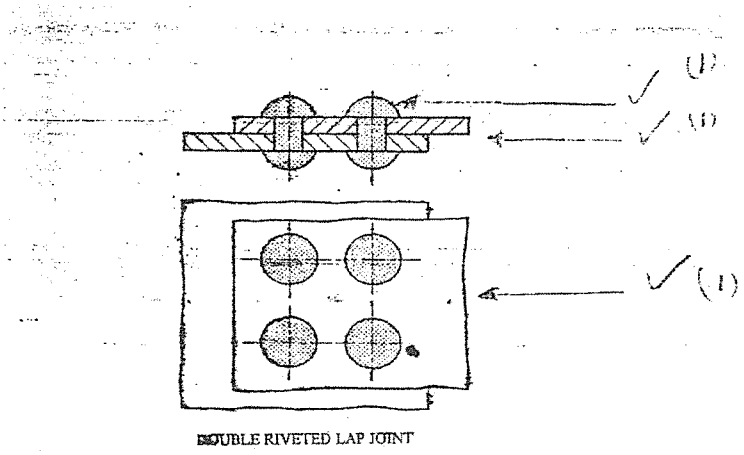
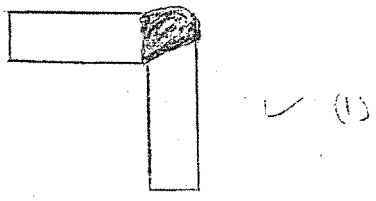
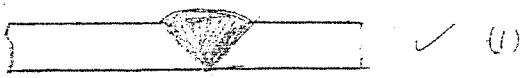
SKETCHES



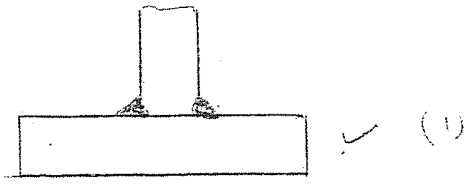
DOUBLE RIVETED LAP JOINT



8.4.1



8.4.2



8.4.3

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