higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

METAL WORKERS' THEORY N1

11 NOVEMBER 2014

This marking guideline consists of 9 pages.

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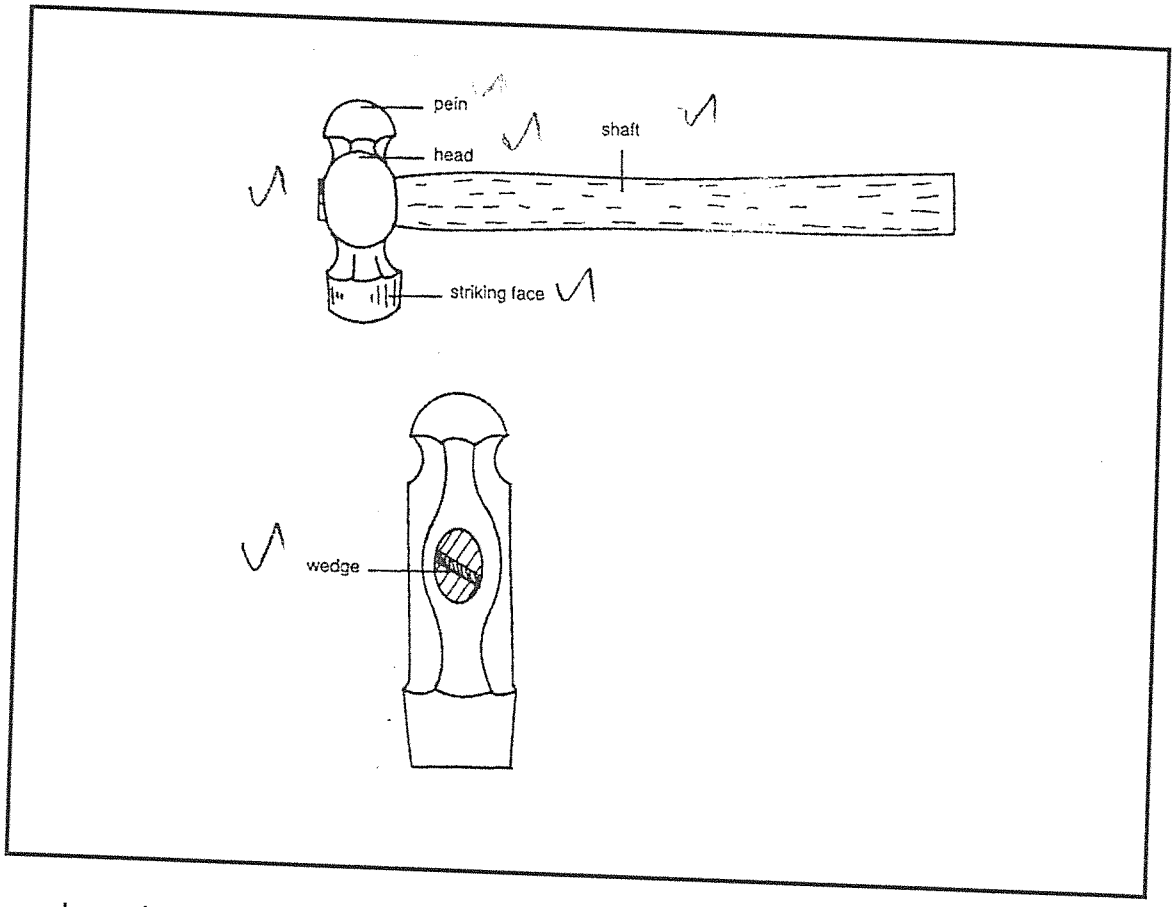
QUESTION 1

- Cylinders must be stored in a sheltered storeroom.
- They must not be stored in the underground storeroom.
- Both acetylene and oxygen cylinders must be stored separately.
- Empty and full cylinders must be stored separately.
- 'No naked flame' sign must be posted where cylinders are stored.
- Empty cylinders must be tightly closed.

(Any 5 × 1) **[5]**

QUESTION 2

2.1



(3)

2.2
- Length
- Roughness
- Cut
- Shape

(4)

2.3

2.3.1 It is used to measure long lengths from 2 m to 25 m.

2.3.2 It is used to scribe circles, and mark out the pitches of rivet and bolt holes.

2.3.3 It is used to mark off bevels or miters on steel sections.

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2.3.4 It is used to obtain the inside diameter of a hole, a pipe or to obtain a measurement where it is not possible to use a steel rule.

2.3.5 It is used for marking lines on plates and bars that have been whitened.

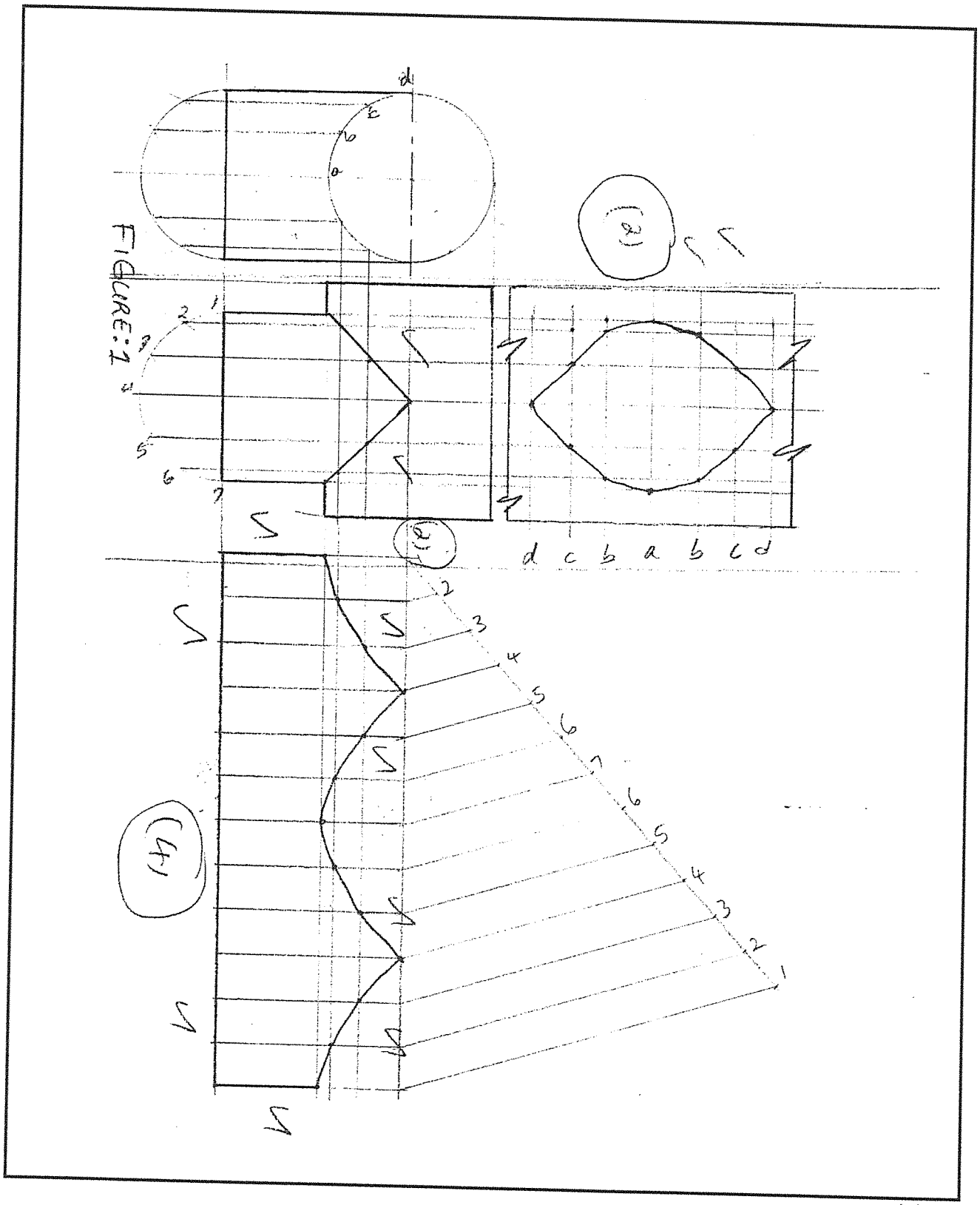
(5 × 1) (5)

2.4 $R^2 = H^2 + V^2$
$H^2 = R^2 - V^2$
$= (365\ mm)^2 - (246\ mm)^2$ (1)
$= 133\ 225\ mm^2 - 60516\ mm^2$ (0,5)
$= \sqrt{72\ 709\ mm^2}$ (0,5)
$= 269{,}65\ mm$ (1)
[15]

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QUESTION 3

3.1



(2)

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3.2 C = 3,142 x 36 mm
= 113,11 mm
(2)

3.3 See the diagram
(2)

3.4 See the sketch
(4)
[10]

QUESTION 4

4.1

		MILD STEEL	HIGH CARBON STEEL
4.1.1	Carbon content	Between 0,1% and 0,3%	Between 0,8% to 1,0% (1)
4.1.2	Metal properties	Malleable, ductile, elastic, tough, fusible	Hard, brittle, tough, elastic,
4.1.3	Uses	Used in the manufacturing of steel plates, bars, angle irons, channel irons, H-beams, rivets, bolts and nuts.	Used in the manufacturing of shear blades, coil springs, knife blades, twist drills, metal cutting tools, files.

(3 × 2) (6)

4.2 It is the metal's ability to withstand an impact without breaking. (1)

4.3 4.3.1 RSJ

4.3.2 DRG

4.3.3 RPM

(3 × 1) (3)

4.4 Back mark = (70 + 12) mm (0,5)
= 82 mm ÷ 2 (0,5)
= 41 mm (1)
[12]

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QUESTION 5

5.1
- Pedestal drilling machine is used for drilling holes on the surface of metals.
- Horizontal bending rolls is used for bending steel plates and bars.
- Guillotine is used for shearing steel plates.

(2 × 3) (6)

5.2
- Avoid fingers from getting trapped in the machine blades
- Wipe off any oil or grease on the metal before bending
- Under no circumstances must the machine be overloaded
- Take note of emergency stop button or switch
- Ensure that all guards are in position before operating the machine

(Any 4 × 1) (4)
[10]

QUESTION 6

6.1 See the sketch (2)

6.2 See the sketch (4)

6.3 6.3.1 It is used where the bolt head should be set flush or be in line with the plate, and used where excessive vibration occurs such as in boilers.

6.3.2 It is used where excessive vibration occurs such as in engines.

(2 × 2) (4)
[10]

QUESTION 7

7.1
- Leather apron protects the body against hot welding flames.
- Overalls for body protection.
- Safety boots protect the feet against heavy falling objects
- Leather spats for feet protection.
- Leather gloves are used for hands protection.
- Leather yoke protects the back and shoulders from sparks and hot globular metals.
- Welding goggles for the protection of the eyes.

(Any 5 × 1) (5)

7.2 7.2.1 Neutral flame

7.2.1 Oxidising flame

(2 × 1) (2)

7.3
- It allows for pressure adjustments
- It keeps pressure constant
- It reduces the high pressure of the gas in the cylinder to an operating pressure suitable for welding.

(3 × 1) (3)

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7.4
- Keep the cylinders outside the confined space.
- Let there be one person to operate the cylinders outside.
- Keep the fire extinguisher handy
- Light the torch outside before entering the confined space.
- Ensure that there is enough ventilation.
- Check for gas leaks on the hoses.

(Any 5 × 1) (5)
[15]

QUESTION 8

8.1 8.1.1 Insulators are materials which do not allow electric current to flow in it. Examples: wood, PVC, glass, rubber, (etc)

8.1.2 Conductors are materials which allow electric current to flow in it. Examples: copper, silver, iron, aluminium, (etc)

(2 × 2) (4)

8.2 8.2.1 It is a current which flows in one direction only. (2)

8.2.2 Metal inert gas welding consists of a transformer, an inert gas such as argon, helium or carbon and the welding gun. (3)

8.2.3 It is the term used when the electrode holder is connected to the negative pole and the metal being welded connected in to the positive pole in the direct current welding machine. (2)

8.3
- Almost all commercial available welding rods can be used with the 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 the direct current 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 work. (4 × 1) (4)

[15]

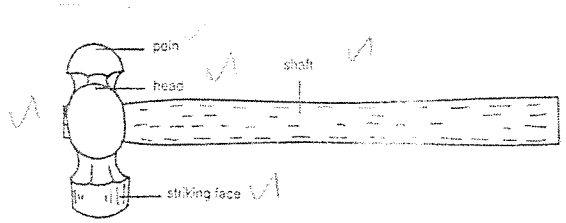
QUESTION 9

Chain link:

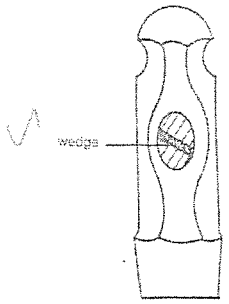
Length required for two straights:
150 mm x 2 = 300 mm
Length required for the two semi-circles:
Circumference = 3,142 x 70 mm
= 219,94 mm
Total length = 300 mm + 219,94 mm
= 519,94 mm
For 20 links: 519,94 mm x 20
10398,8 mm or 10,399 m

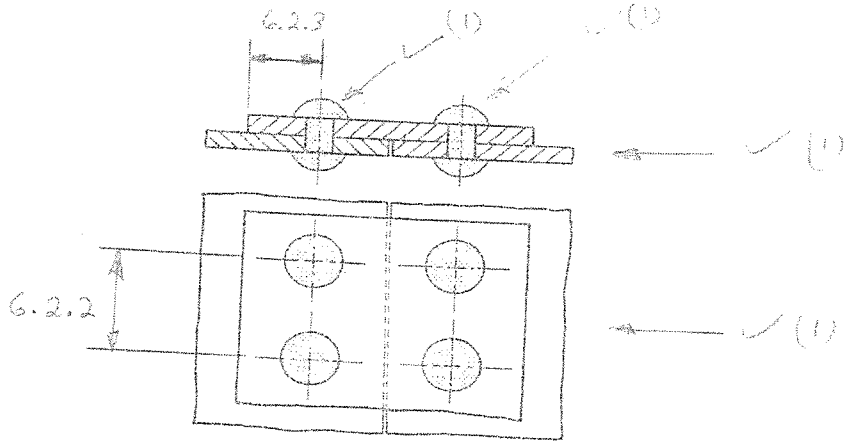
[8]

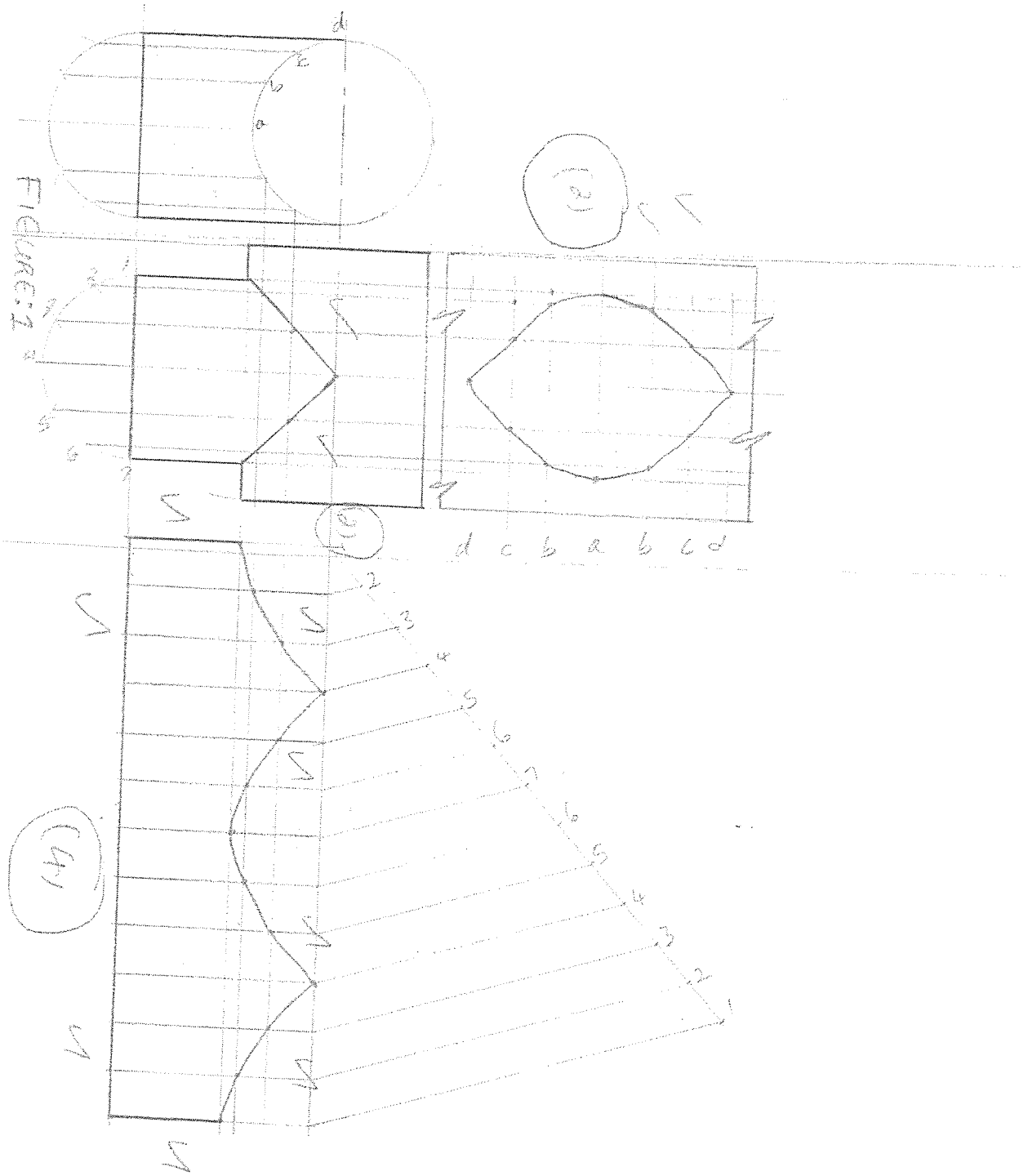
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(3)







TOTAL: 100

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