higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

METAL WORKERS' THEORY N1

13 NOVEMBER 2013

This marking guideline consists of 7 pages.

QUESTION 1

- Full and empty cylinders should be stored separately.
- Cylinder valves for empty cylinders should be closed.
- Cylinders should be stored in a well-ventilated storeroom.
- A sign reading 'no naked flame' should be posted on the storeroom door.
- Cylinders should not be stored underground.
- Always keep the cylinders in upright position.

(Any 5 × 1) **[5]**

QUESTION 2

2.1 2.1.1 It is used for general filing work on flat surfaces.

2.1.2 It is used when three or more plates must be aligned for riveting or bolting.

2.1.3 It is used to enlarge the punch mark for drilling or punching.

(3 × 1) (3)

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

2.3
- Length
- Cut
- Roughness
- Shape

(4)

2.4 2.4.1 It is used to measure an arc or radius greater than 300 mm.

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

2.4.3 It is used to mark the centre of a hole before it is punched.

(3 × 1) (3)

2.5 $R^2 = H^2 + V^2$ (1)

$= (250\ mm)^2 + (388\ mm)^2$

$= 62\ 500\ mm^2 + 150\ 544\ mm^2$ (1)

$= 213\ 044\ mm^2$

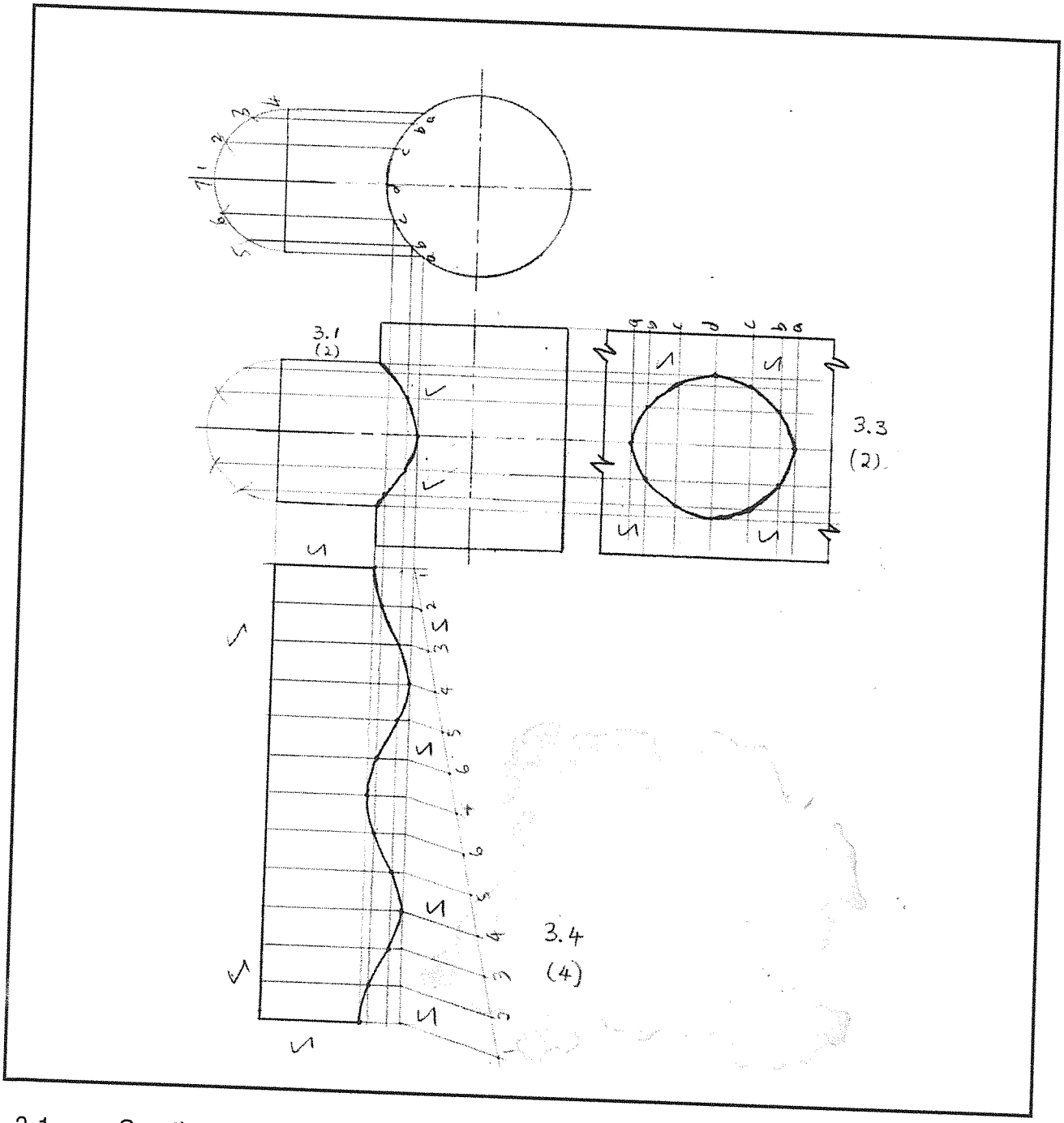
$= 461,57\ mm$ (1)

(1)

[15]

QUESTION 3

ADDENDUM A



3.1 See the sketch above. (2)

3.2 Circumference = 3,142 x 35 mm
= 109,97 mm (2)

3.3 See the sketch above. (2)

3.4 See the sketch above. (4)

[10]

QUESTION 4

4.1 4.1.1 It is the property of a metal which allows it to be drawn out into wire.

4.1.2 It is the ability of a metal to cut other metals.

4.1.3 It is the metal's ability to withstand impact or hammering without cracking or breaking.

(3 × 1) (3)

4.2 4.2.1 Stainless steel is corrosive resistant, heat resistant, creep and abrasive resistant. It can be easily welded and machined using normal methods.

(Any 2 × 1) (2)

4.2.2 Springs, gears, steam and gas turbines, surgical instruments, bolts and nuts.

(Any 2 × 1) (2)

4.3 4.3.1 Rolled steel channels

4.3.2 Outside diameter

4.3.3 Universal beam

(3 × 1) (3)

4.4 Back mark = 90 mm + 12 mm (½)
= 102 mm ÷ 2 (½)
= 51 mm (1)
[12]

QUESTION 5

5.1 5.1.1 It is used for cutting heavy steel profiles such as I-beams, angle iron, etc.

5.1.2 It is used for drilling steel sections.

(2 × 1) (2)

5.2 5.2.1
- Avoid fingers from getting trapped in the press.
- Do not overload the machine.
- Wipe the plates from oil or grease.
- Take note of emergency switches.
- Ensure that all guards are in position.

(Any 4 × 1) (4)

5.2.2
- Wear goggles.
- Check the grinding wheel for any cracks.
- Set the tool rest to the correct distance.
- Keep the machine guards in position.
- Avoid playing around.

(Any 4 × 1) (4)
[10]

QUESTION 6

6.1
- Pan head
- Conical head
- Countersunk head
- Snap/cup head

(Any 3 × 1) (3)

6.2 The length of the rivet = thickness of the material + 1,5 x diameter of the rivet + 3 mm for every 12 mm of material used. (1)

L = 24 mm + (1,5 x 18 mm) + 6 mm (1)
= 57 mm (1)

6.3 6.3.1 They are used where the bolt head is to be set flush or be in line with the surface of the material. Also used where excessive vibration is experienced e.g. in boilers, etc.

6.3.2 They are used for joints where low stress loads are experienced such as in the assembly of roof trusses, angle iron frames and other structural work.

(2 × 2) (4)
[10]

QUESTION 7

7.1
- Leather apron protects the body against ultraviolet rays and arc rays
- Overalls for body protection
- Safety boots protect the feet against heavy falling objects
- Leather spats for feet protection
- Leather gloves are used for protection of hands
- Welding goggles are used for protection of the eyes

(Any 5 × 1) (5)

7.2 7.2.1 It transports the welding gas from the cylinder to the welding torch.

7.2.2 It prevents the burning gas from returning to the cylinder.

7.2.3 It is used for cutting steel profiles.

(3 × 1) (3)

7.3 To avoid damaging the regulator valves as this may result in an explosion. (2)

7.4 Mix a soft soapy mixture thoroughly and then apply the mixture to the hose joints with a paintbrush. (2)

7.5
- Clean the dirty nozzle.
- Keep a suitable cutting distance between the workpiece and the welding torch.
- Avoid using empty gas cylinders.
- Test welding hoses for any leaks.

(Any 3 × 1) (3)
[15]

QUESTION 8

8.1
- Check all the electrical connections are secure and ensure that the machine has a proper earth connection.
- Check the welding cables, electrode holder and the earth clamp are in good condition.
- Have a fire extinguisher within easy reach.
- Ensure there is enough ventilation.
- Keep the work areas clean and neat.
- Ensure that the welding cables are kept clear of walkways during welding.

(Any 5 × 1) (5)

8.2 8.2.1 It is used for welding purposes.

8.2.2 They are used to complete an electric current.

8.2.3 It is used for the protection of eyes and face against arc rays.

(3 × 1) (3)

8.3
- The electrode must have a medium to heavy flux coating.
- Higher open-current voltages must be used.
- The polarity of the transformer cannot be set to control the heat distribution between the tip of the electrode and the metal being welded. (3)

8.4 8.4.1 It ensures that the electric current flows from the machine to the workpiece.

8.4.2 It is when the electrode holder is connected to the positive pole of the direct-current welding generator, and the metal being welded is connected to the negative pole by means of an earth clamp.

(2 × 2) (4)
[15]

QUESTION 9

9.1 Cylinder:

Mean diameter:
= 262 mm + 8 mm
= 270 mm (½) (1)

Circumference:
= 3,142 x 270 mm
= 848,34 mm (½) (1)

9.2 External stiffening ring:

Mean diameter:
= 262 mm + 8 mm + 8 mm (1)
= 278 mm + 6 mm + 6 mm (1)
= 290 mm (1)

Circumference:
= 3,142 x 290 mm (1)
= 911,18 mm (1)
[8]

TOTAL: 100