higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

METAL WORKERS' THEORY N1

2 AUGUST 2019

This marking guideline consists of 6 pages.

QUESTION 1: SAFETY AND HOUSEKEEPING

1.1 Occupational Health and Safety Act (2)

1.2 1.2.1 Gas masks
1.2.2 Goggles
1.2.3 Hard hat
(3 × 1) (3)
[5]

QUESTION 2

2.1 2.1.1 Used for bending round and flat bars to a radius shape

2.1.2 Used for aligning plates for riveting or bolting

2.1.3 Used for removing waste or excess metal or for cutting rods, bars or plates

2.1.4 Used to enlarge punch marks for drilling or punching
(4 × 1) (4)

2.2
- Length
- Shape
- Cut
- Roughness (Any 2 × 1) (2)

2.3 2.3.1 To obtain the inside diameter of a hole or pipe.

2.3.2 To check accuracy of small jobs and marking off the steel profiles.

2.3.3 Used for striking long straight lines on steel plates or floors.

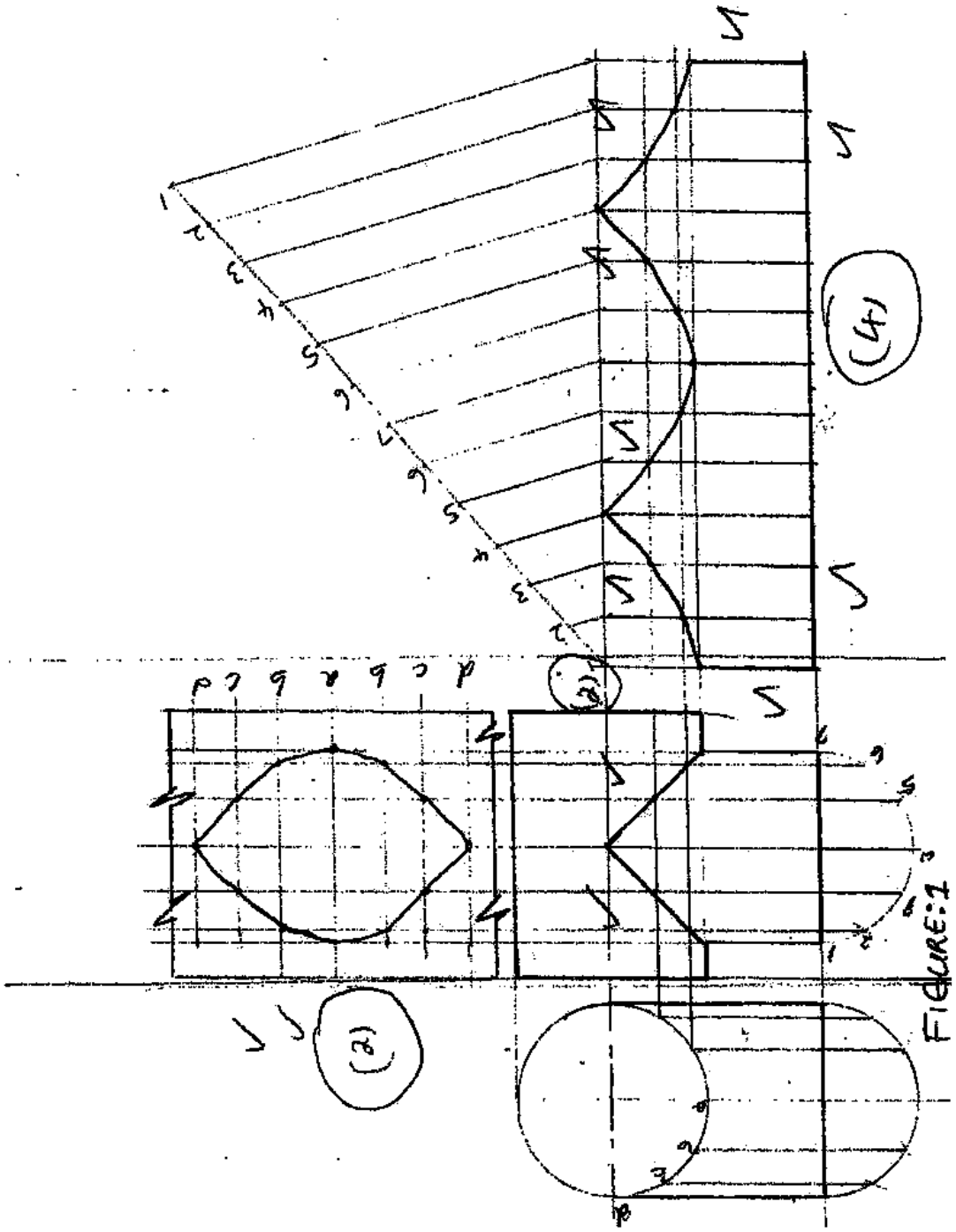
2.3.4 Used for scribing circles or for stepping off dimensions when developing patterns
(4 × 1) (4)

2.4 $R^2 = X^2 + Y^2$
$R = (240\ mm)^2 + (350\ mm)^2$✓
$= 180100\ mm$✓
$= 424{,}38\ mm$✓ (3)

2.5 Used for cutting steel plates with forward and backward strokes. (2)
[15]

QUESTION 3

3.1, 3.2 and 3.4



(8)

3.3 Circumference = 3,142 × D
= 3,142 × 44 mm
= 138,248 mm (2)

[10]

QUESTION 4

4.1 4.1.1 Ability of metal to cut other metals or to resist wear

4.1.2 Ability of metal to return to its original shape or size

4.1.3 Ability of metal to be rolled or hammered into shape without breaking

(3 × 1) (3)

4.2 4.2.1 Metal-cutting tools, lathe-turning tools, shear blades (Any TWO)

4.2.2 Alloy wheels, plates, gear boxes, gears (Any TWO)
(2 × 2) (4)

4.3 4.3.1 Rolled-steel joist (2)
4.3.2 Rolled-steel channel (2)
4.3.3 Setting-out point (1)
[12]

QUESTION 5

5.1
- Note the position of emergency switches.
- Ensure that all machine guards are in position.
- Do not overload the machine.
- Keep fingers away from the blade.
- Wipe off any grease or oil from the blades and the workpiece. (5)

5.2
- Always keep guards in position.
- Adjust the workrest to a recommended distance.
- Check the grinding wheel for cracks.
- Always wear personal protective equipment.
- Only one person should operate the machine.
- Use the correct working speed for the machine. (Any 5 × 1) (5)

[10]

QUESTION 6

6.1
- Countersunk head
- Pan head
- Conical head
- Cup or snap head (4)

6.2 6.2.1 Distance between two centre holes on the same line

6.2.2 Distance measured from the centre of hole to edge of plate (2 × 1) (2)

6.3 6.3.1 Used where bolt head is to be in line with plate and where excessive vibration is experienced

6.3.2 Used in general assembly work and where less stress is experienced (2 × 2) (4)

[10]

QUESTION 7

7.1 7.1.1 Gas bottles
7.1.2 Pressure regulators
7.1.3 Flash-back arrestors
7.1.4 Welding hose
7.1.5 Welding torch (5 × 1) (5)

7.2 Determines pressure inside cylinder and working pressure in hoses (2)

7.3
- Rightward welding technique
- Leftward welding technique (2)

7.4
- Holding the welding torch too close to the work piece
- Overheated nozzle
- Incorrect gas setting
- Empty gas bottles
- Dirty nozzle (Any 4 × 1) (4)

7.5 Close the LP-gas and then the oxygen gas. (2)

[15]

QUESTION 8

8.1 Process of joining metals by striking an electric arc between metal to be welded and consumable flux-coated filler wire (electrode) (1)

8.2 Ensures that workpiece is connected directly to earth of welding machine (2)

8.3
- Conductor material allows current flow, for example silver, copper and aluminum
- Insulator material does not allow current to flow through, for example rubber and glass (2 × 2) (4)

8.4
- Almost all commercially available welding rods can be used with a DC 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 work being done can be changed to direct the greater heat to either the electrode or the work. (4)

8.5 8.5.1 False
8.5.2 False
(2 × 2) (4)
[15]

QUESTION 9

9.1 Mean diameter = 600 mm + 5 mm + 5 mm
= 610 mm

Circumference = 3,142 × 610 mm
= 1916,62 mm (4)

9.2 Diameter = 600 mm – 12 mm
= 588 mm

Mean diameter = 588 mm – 10 mm
= 578 mm

Circumference = 3,142 × 578 mm
= 1816, 08 mm (4)
[8]

TOTAL: 100