higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

WELDING
NQF LEVEL 4

17 NOVEMBER 2022

This marking guideline consists of 5 pages.

Copyright reserved

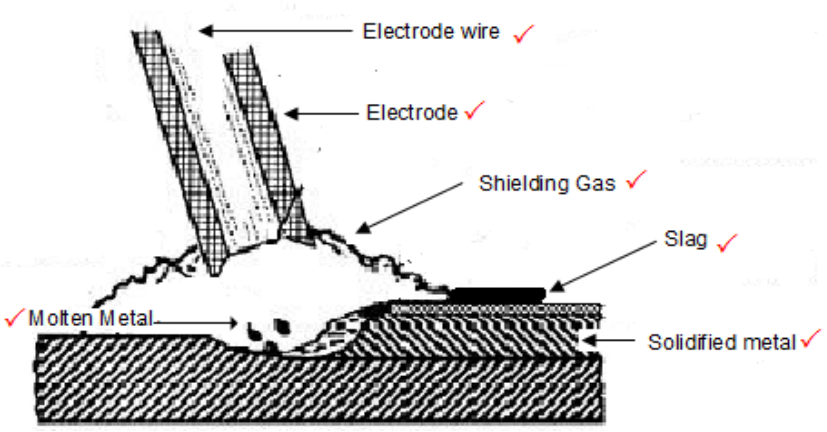
QUESTION 1

1.1 K
1.2 E
1.3 F
1.4 A
1.5 B
1.6 C
1.7 J
1.8 G
1.9 H
1.10 I

(10 × 1) **[10]**

QUESTION 2

2.1



(ONE mark for labelling and TWO marks for drawing) (8)

2.2
- Power source
- Welding machine
- Cables
- Electrode holder
- Electrode

(Any other 4 × 1) (4)

2.3
2.3.1 V-weld OR single-V-joint prep✓✓
2.3.2 Bevel weld OR single-bevel joint prep✓✓
2.3.3 U-weld OR single-U joint prep✓✓
2.3.4 J-weld OR single-J joint prep✓✓
2.3.5 Flare V-weld OR single-flare V joint prep✓✓

(5 × 2) (10)

Copyright reserved

2.4
- Gaseous fumes
- Intense heat from welding and sparks
- Eye injuries
- Intense light
- Exposure to loud noise
- Body injuries – back, shoulders, finger and knee
- Electric shock
- Risk of fire or explosion
- Revolving machinery
- Poor house keeping
- Insufficient ventilation

(Any other 3 × 1) (3)
[25]

QUESTION 3

3.1
- Tack welding holds the parts to be assembled in place
- Tack welding ensures alignment
- Controls movement
- Controls distortion during the final welding process
- Maintains the joint gap properly

(Any other 5 × 1) (5)

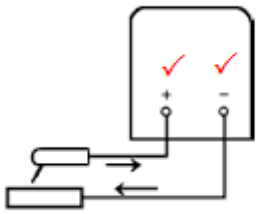
3.2
- Pure tungsten
- Ceriated
- Lanthanated
- Zirconiated
- Thoriated (Any 4 × 1) (4)

3.3
A Nozzle or ceramic cup
B Collet
C Back cap
D Torch body/Handle
E Tungsten insulator
F Collet body (6)

3.4
- Regulators
- Gas valve
- Coolant system
- Torch
- Cables (Any other 5 × 1) (5)

Copyright reserved

3.5



In the direct current earth negative setup, the earth (-) is connected to the workpiece✓ while the electrode holder (+) is the positive.✓
In this setup, more heat is concentrated in the electrode.✓

(Any other 5 × 1) (5)
[25]

QUESTION 4

4.1 Firstly, close the valve on the cylinder.✓ Store the cylinder in an upright position.✓ Make sure that oxygen and gas cylinders are stored separately.✓ Ensure cylinders are chained in a cool gas storeroom.✓ Store empty and full cylinders separately.✓ (Any other 5 × 1) (5)

4.2
- Equipment expensive
- Process requires high degree of skill
- Slow process
- Produces harmful UV rays
- Difficult to weld in windy conditions

(Any other 5 × 1) (5)

4.3 Austenitic-type steels are not hardened by heat treatment✓ although they may become magnetic✓ when welded. They have a relatively higher electrical resistance and a lower thermal conductivity.✓ High travel-speed welding is recommended as this will reduce the heat required and reduce distortion.✓ A low welding current is used due to the lower melting point of austenitic steel.✓
(Any other 5 × 1) (5)

4.4 The aluminium oxide coating✓ needs to be removed before welding can take place to prevent small traces of oxide from being trapped✓ in the weld. The coating can cause lack of fusion,✓ resulting in cracking✓ of the weld. Aluminium oxide absorbs moisture from the air and can cause porosity in the weld.✓ (Any other 5 × 1) (5)

Copyright reserved

4.5
- Power source
- Welding machine
- Cables
- Welding torch/Gun
- Welding wire
- Welding-wire feeder
- Gas hose

(Any other 5 × 1) (5)
[25]

QUESTION 5

5.1
- Select the correct wire size
- Set the correct wire speed
- Adjust the rate of wire feed
- Set the correct current
- Ensure the nozzle matches the wire diameter
- Clean the nozzle
- Ensure all connections are tight
- Ensure that there is sufficient shielding gas
- Check for gas leaks
- Adjust the shielding gas pressure

(Any other 5 × 1) (5)

5.2 An electrical arc is formed between an electrode and a metal work piece.✓ The arc heats the metal,✓ causing it to melt and join.✓ A shielding gas is passed through the welding torch along with the electrode.✓ The shielding gas prevents contamination of the weld.✓ (Any other 5 × 1) (5)

5.3
- High-quality welds are produced
- It is a fast welding process
- No slag is produced, no weld cleaning is required
- No 'start' and 'stop', welding is continuous
- Can weld in all positions
- Lower heat output
- Lower skill factor

(Any other 5 × 1) (5)
[15]

TOTAL: 100

Copyright reserved