higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

WELDING
NQF LEVEL 3

(6031033)

7 December 2020 (X-paper)
09:00–12:00

Calculators may be used.

This question paper consists of 6 pages.

389Q1N2007

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TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

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QUESTION 1

Choose a description from COLUMN B that matches an item in COLUMN A. Write only the letter (A–J) next to the question number (1.1–1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1	Boron	A	increases strength while keeping ductility
1.2	Silicon	B	contains carbon, iron, residual elements and many other elements
1.3	Vanadium	C	welding defect
1.4	Tungsten	D	contains carbon, iron, residual elements and molybdenum
1.5	Moly steel	E	minimises distortion
1.6	Alloy steel	F	makes steel harder
1.7	Stainless steel	G	improves magnetic properties
1.8	Non-alloy steel	H	contains carbon, iron and residual elements
1.9	Lack of fusion	I	increases melting point
1.10	Back-step welding	J	contains carbon, iron, residual elements and chromium

(10 × 1) **[10]**

QUESTION 2

2.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

2.1.1 E7024 welding rods are used to weld low-carbon stainless steel.

2.1.2 E308L-16 welding rods are used to weld low-carbon stainless steel.

2.1.3 E6013 welding rods are used for welding on mild steel.

2.1.4 E312-16 welding rods are used for aluminium.

2.1.5 E7018 welding rods are used for high strength and high efficiency.

(5 × 1) (5)

2.2 FIGURE 1 shows an electrode specification number. Name each symbol and write the answer next to the question number (2.2.1–2.2.4) in the ANSWER BOOK.

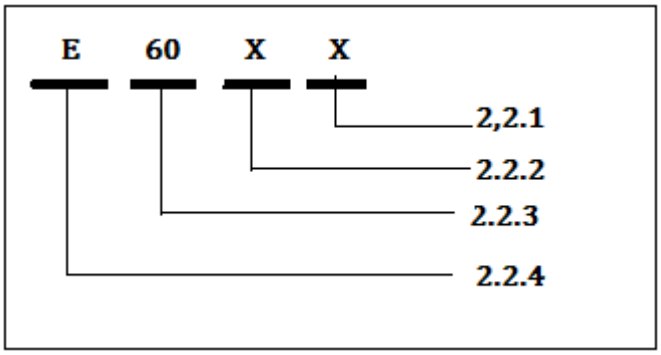

FIGURE 1 (4 × 1) (4)

2.3 Explain what is meant by *destructive testing methods* and describe TWO testing methods. (3 × 2) (6)

2.4 State FOUR ways of protecting welding rods. (4)

2.5 State SIX safety requirements set up by the OHS Act relating to welding. (6)
[25]

QUESTION 3

3.1 FIGURE 2 shows different types of welding joints. Name each joint and write the answer next to the question number (3.1.1–3.1.5.) in the ANSWER BOOK.

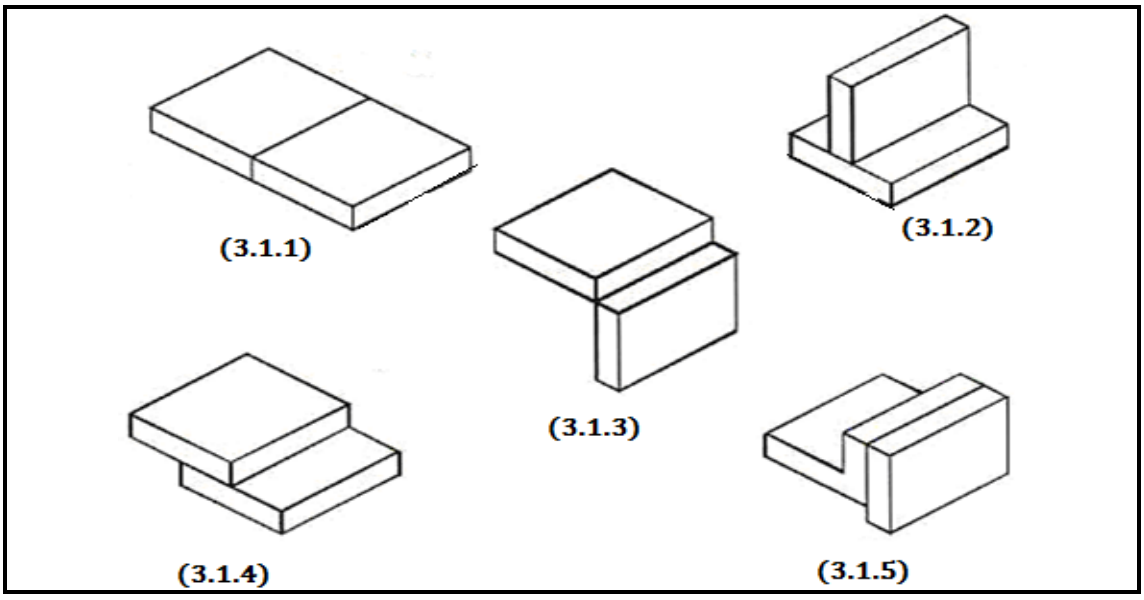

FIGURE 2 (5 × 1) (5)

3.2 State FIVE general steps that should be followed to prepare the workplace for the oxyacetylene welding process. (5)

3.3 Explain the function of the check valves on a gas welding torch. (3)

3.4 Name SEVEN components of oxyacetylene gas welding equipment. (7)
[20]

QUESTION 4

4.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (4.1.1–4.1.10) in the ANSWER BOOK.

4.1.1 Polarity is when the electrons flow from the negative pole to the positive pole.

4.1.2 The weld bead is the result of the deposition of the filler metal from a single pass.

4.1.3 Weld metal is the meeting point of two metals that are joined together.

4.1.4 Direct current is the flow of electric charge that reverses direction periodically.

4.1.5 The arc length is the distance from the end of the electrode to the workpiece.

4.1.6 The weld pool is the area of the weld where the base metal has reached its melting point and is ready to be mixed with the filler material.

4.1.7 Arc voltage is the current that flows through the circuit during the welding process.

4.1.8 Alternating current is the amount of current present between the electrode and the workpiece.

4.1.9 An electrode is an electrical conductor used to conduct current through a workpiece to join two pieces together.

4.1.10 Shielded gas is an inert gas used during welding to protect the weld area from atmospheric gases.

(10 × 1) (10)

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4.2 State FIVE safety concerns when performing aluminum welding in tungsten inert-gas (TIG) welding. (5)

4.3 State TWO safety precautions that must be taken to store each of the following welding equipment:

4.3.1 Shielding gas cylinders

4.3.2 Electrodes

4.3.3 Filler rods

4.3.4 Gas nozzles and torches

4.3.5 Hose assembly

(5 × 2) (10)
[25]

QUESTION 5

5.1 State THREE ways to prevent yourself from getting burnt by a hot workpiece. (3)

5.2 State TWO requirements when selecting welding cables. (2)

5.3 State TWO functions of a flowmeter regulator. (2)

5.4 State the functions of the electrode wire. (2)

5.5 Calculate the amperage required to weld a 12 mm plate.

HINT: 0,0254 mm = 1 A (5)

5.6 State SIX inspection checks to ensure that a work area complies with requirements. (6)
[20]

TOTAL: 100

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