higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

WELDING
NQF LEVEL 2

(6031012)

2 December 2020 (X-paper)
09:00–12:00

This question paper consists of 7 pages.

235Q1N2002

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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. Start each question on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 The voltage across the arc, including the positive electrode (anode) and negative electrode (cathode) voltage drop, is measured as near as possible to the arc:

A Welding voltage
B Arc voltage
C Safety voltage
D Load voltage

1.1.2 The colour code of the live, neutral and earth wires connected to a plug:

A Red, blue and green
B Black, brown and orange
C Red, brown and blue
D Blue, green and yellow

1.1.3 The three main requirements for combustion to take place are …

A paper, wood and gas.
B flammable liquid, gas and heat.
C heat, fuel and oxygen.
D fuel, heat and metals.

1.1.4 The placing of two metals parallel next to each other for welding without their edges overlapping is known as a …

A fillet joint.
B lap joint.
C angle joint.
D butt joint.

1.1.5 The types of mechanical cutting equipment are …

A hacksaw, grinders and circular saw.
B plasma cutter, gas cutter and laser cutter.
C guillotine, bending machine and cropping machine.
D gas gouging, arc gouging and plasma gouging.

(5 × 1) (5)

1.2 List FIVE weld imperfections that can occur during the welding process. (5)

[10]

QUESTION 2

2.1 Butt welds are the most common method to join two plates.

Explain how to create a butt weld on a plate in Shielded Metal Arc Welding. (5)

2.2 List SIX ways of storing Personal Protective Equipment (PPE) in an appropriate manner. (6)

2.3 State SIX ways of preparing the work area for the Shielded Metal Arc Welding process. (6)

2.4 List FIVE welding hazards associated with Shielded Metal Arc Welding. (5)

2.5 FIGURE 1 below shows an electrode holder as one of the welding accessories. Label the parts (A–C) in the ANSWER BOOK.

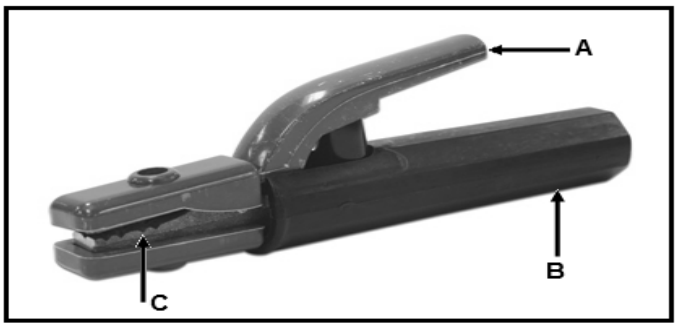


FIGURE 1 (3)

[25]

QUESTION 3

3.1 Name TWO types of gauges found on the gas regulators of oxy-acetylene equipment. (2)

3.2 State ONE function of each gauge mentioned in QUESTION 3.1. (2)

3.3 Name TWO safety precautions with regard to securing gas cylinders in the storage bay. (2)

3.4 FIGURE 2 shows welding symbols found in drawings for oxy-acetylene gas welding. Label the items (A–D) next to the letters (A–D) in the ANSWER BOOK.

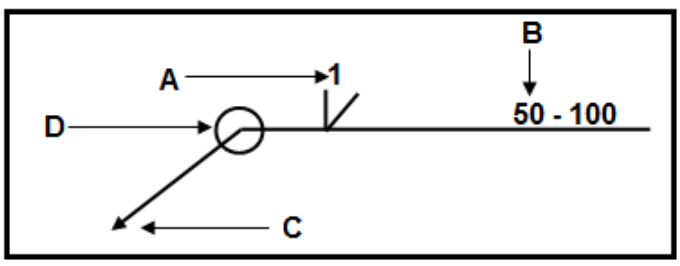


FIGURE 2 (4)

[10]

QUESTION 4

4.1 Explain how a flashback occurs during the oxy acetylene cutting process. (3)

4.2 Indicate whether the following components form part of oxy acetylene cutting equipment. Choose the answer and write only 'Correct' or 'Incorrect' next to the question numbers (4.4.1–4.4.6) in the ANSWER BOOK.

4.2.1 Flashback arrestor

4.2.2 Electrode holder

4.2.3 Oxygen cylinder

4.2.4 Argon gas cylinder

4.2.5 Cutting torch

4.2.6 Wire feeder gun

(6 × 1) (6)

4.3 Explain the steps required to perform a cut on a steel plate. (5)

4.4 FIGURE 3 shows different types of fittings (A–B) used to connect oxy acetylene cutting equipment.

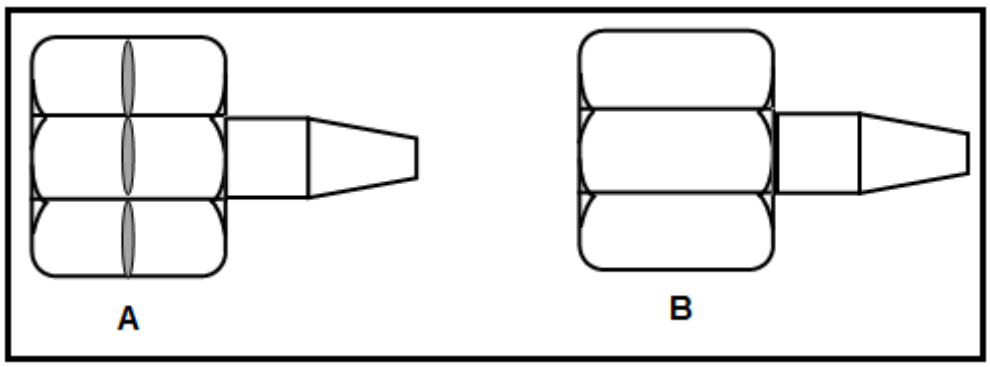


FIGURE 3

Tabulate THREE differences between fittings A and B (6)

4.5 Explain the process of shutting down oxy-acetylene equipment. (5)

[25]

QUESTION 5

5.1 FIGURE 4 shows different components of Gas Metal Arc Welding (GMAW) equipment. Label the items (A–H) by writing the answer next to the letters (A–H) in the ANSWER BOOK.

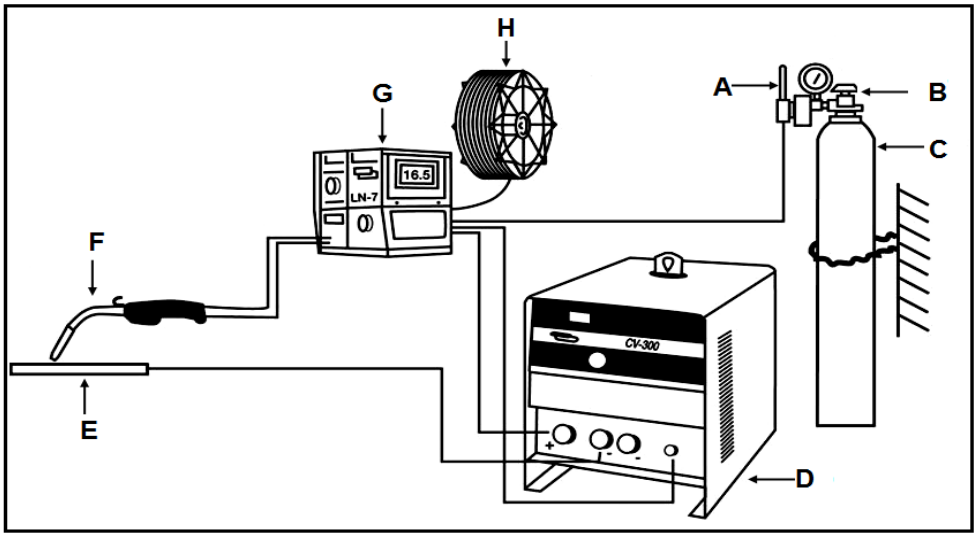


FIGURE 4 (8)

5.2 State FOUR safety measures to be considered when transporting gas cylinders on a trolley. (4)

5.3 The table below shows the GMAW parameters for general carbon steel. Answer the questions based on the table in your ANSWER BOOK.

Material thickness	Wire size	Butt joint			Fillet joint		
		Current	Voltage	Wire feed rate	Current	Voltage	Wire feed rate
mm	mm	Ampere	Volts	m/min	Ampere	Volts	m/min
1,6	0,8	80	19	3,2	90	20	4,0
3,3	1,0	140	22	7,0	160	23	7,5
6,0	1,2	240	25	7,5	260	27	7,8
9,0	1,2	270	27	7,9	280	28	8,0

5.3.1 What is the current on a butt joint with a material thickness of 6 mm?

5.3.2 What will be the speed of the wire feeder on a fillet joint with a material thickness of 1,6 mm?

5.3.3 What is the difference between the voltage of a butt joint and that of a fillet joint with a material thickness of 9 mm?

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5.3.4 What is the voltage required to weld on a 3,3 mm thick plate on a fillet joint?

5.3.5 What is the material thickness with a voltage of 25 on a butt joint?

5.3.6 What is the difference between the currents of a 6 mm and 9 mm thick plate of a butt joint?

(6 × 1) (6)

5.4 State the consequences of assembling the gas hoses of Gas Metal Arc Welding (GMAW) equipment incorrectly. (2)
[20]

QUESTION 6

6.1 Explain the main purpose of flux during the gas brazing process. (3)

6.2 State the FOUR main elements of a quality braze or braze joint. (4)

6.3 Explain the preparation of a mild steel material before oxy-acetylene brazing is implemented. (3)
[10]

TOTAL: 100

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