higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

WELDING
NQF LEVEL 3

(6031033)

16 November 2022 (X-paper)
09:00–12:00

Nonprogrammable calculators may be used.

This question paper consists of 5 pages.

415Q1N2216

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

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QUESTION 1

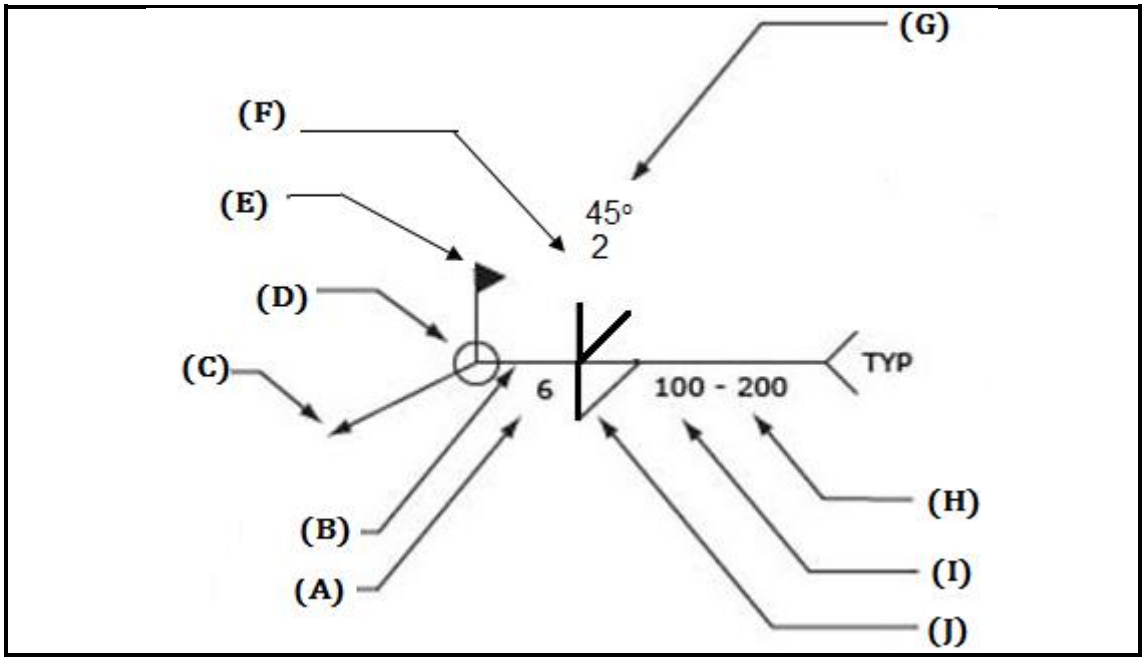
1.1 State THREE methods for minimising weld distortion. Give a reason for each method. (2 × 3) (6)

1.2 List FOUR of the most common and problematic flaws found in welds. (4)

[10]

QUESTION 2

2.1 **FIGURE 1** below shows a welding symbol diagram. Label the diagram by writing only the answer next to the letter (A–J) in the ANSWER BOOK.



(10 × 1) (10)

FIGURE 1

2.2 List FOUR causes of weld splatter during the shielded metal arc welding (SMAW) process. (4)

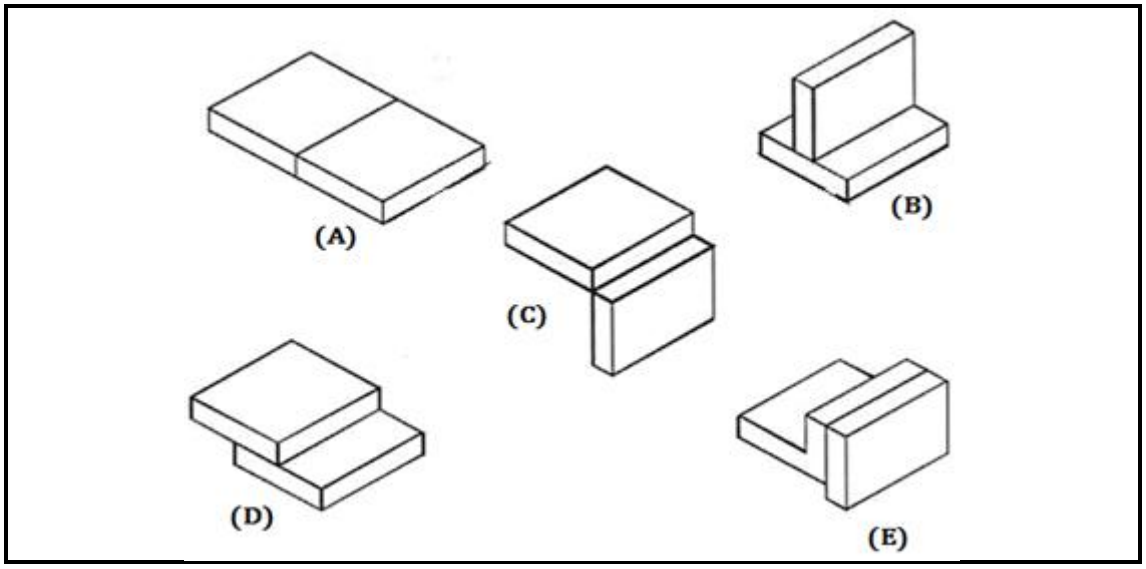
2.3 List SIX potential welding hazards that can occur during shielded metal arc welding (SMAW). (6)

2.4 List FIVE important effects of flux during the welding process. (5)

[25]

QUESTION 3

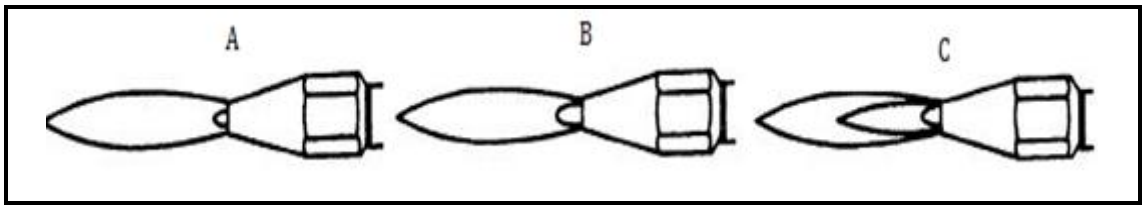
3.1 **FIGURE 2** below shows FIVE different types of welding joints. Name each joint by writing only the answer next to the letter (A–E) in the ANSWER BOOK.



(5 × 1) (5)

FIGURE 2

3.2 **FIGURE 3** below shows different types of oxy-acetylene flames. Name each flame by writing only the answer next to the letter (A–C) in the ANSWER BOOK.



(3 × 1) (3)

FIGURE 3

3.3 Name THREE defects that can be found in oxy-acetylene welding. (3)

3.4 State THREE causes of the following hazards related to the oxy-acetylene welding process:

3.4.1 Gas cylinder breach

3.4.2 Flashback

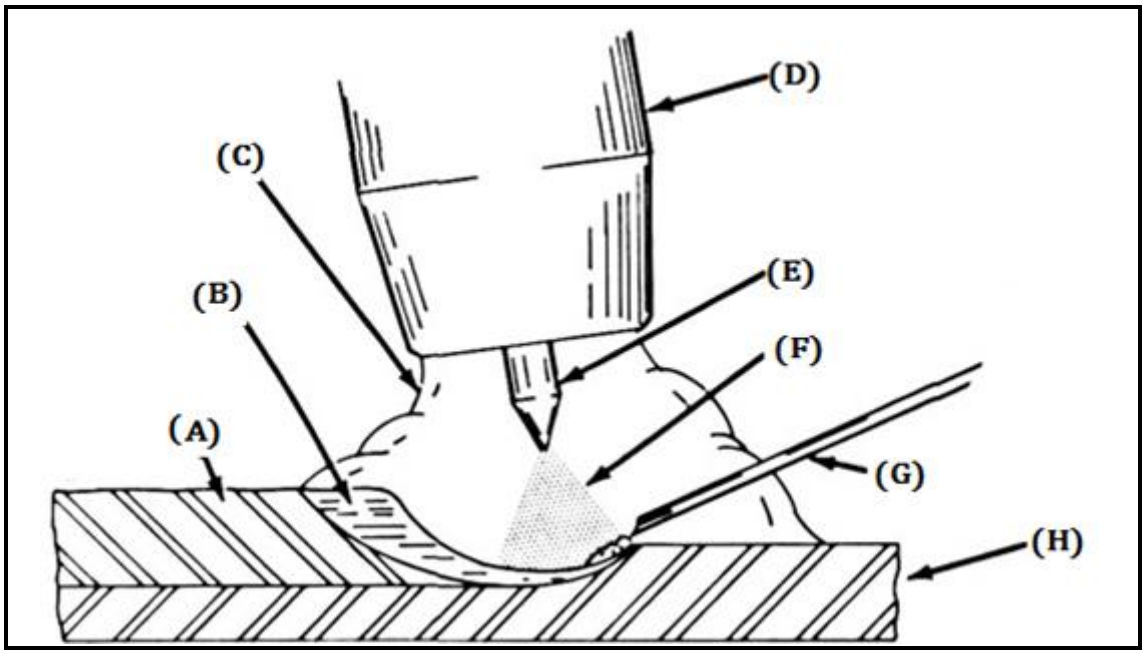
3.4.3 Regulator gauge malfunction

(3 × 3) (9)

[20]

QUESTION 4

4.1 **FIGURE 4** below shows a typical TIG welding setup. Label the diagram by writing only the answer next to the letter (A–H) in the ANSWER BOOK.



(8 × 1) (8)

FIGURE 4

4.2 Explain what causes porosity in gas tungsten arc welding (GTAW). (5)

4.3 List FIVE causes of cracks in gas tungsten arc welding (GTAW). (5)

4.4 Give SEVEN advantages of gas tungsten arc welding (GTAW). (7)

[25]

QUESTION 5

5.1 List FIVE primary precautions that should be taken to prevent the inhalation of harmful fumes and gases during metal inert gas welding (MIG). (5)

5.2 List FIVE pieces of personal protective equipment required for welding. (5)

5.3 Give FIVE reasons why it is important to tack weld the work piece before welding. (5)

5.4 List FIVE properties of radiographic inspection. (5)

[20]

TOTAL: 100

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