higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING FABRICATION – SHEET METAL WORK
NQF LEVEL 4

(6031024)

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

This question paper consists of 6 pages.

467Q1N2217

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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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SECTION A

QUESTION 1

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Some welding helmets are equipped with electronic lenses.

1.2 Cylinder ruptures occur when a backfire has gone as far back as the hose.

1.3 Acoustic acquisition is the control of temperature.

1.4 Thermal comfort refers to being happy with the thermal environment.

1.5 CNC lathes spin at a very high speeds.

(5 × 1) **[5]**

QUESTION 2

Choose an item from COLUMN B that matches an item in COLUMN A. Write only the letter (A–J) next to the question number (2.1–2.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1	Tools used to measure components	A	... using different cutting technologies.
2.2	A program will tell the controller which tool to be used …	B	forced ventilation
2.3	Swarf	C	done before using a machine
2.4	Acoustic acquisition	D	callipers and micrometres
2.5	SO	E	… and the turret will rotate until the correct tool is in position.
2.6	Fume extraction	F	control of noise
2.7	There are many types of CNC cutting machines …	G	stretch-out of a pattern
2.8	Preoperational checks	H	most serious welding defect
2.9	TIG welding	I	gas tungsten arc welding
2.10	Cracking	J	shavings and chippings of metal

(10 × 1) **[10]**

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QUESTION 3

Give the abbreviation of each of the following:

3.1 Numerically controlled

3.2 Computer-aided drawing

3.3 Two-dimensional

3.4 Metal inert gas

3.5 Underfloor air-distribution system

(5 × 1) **[5]**

TOTAL SECTION A: 20

SECTION B

QUESTION 4

4.1 List FIVE precautionary measures one should take when operating a TIG welding machine. (5)

4.2

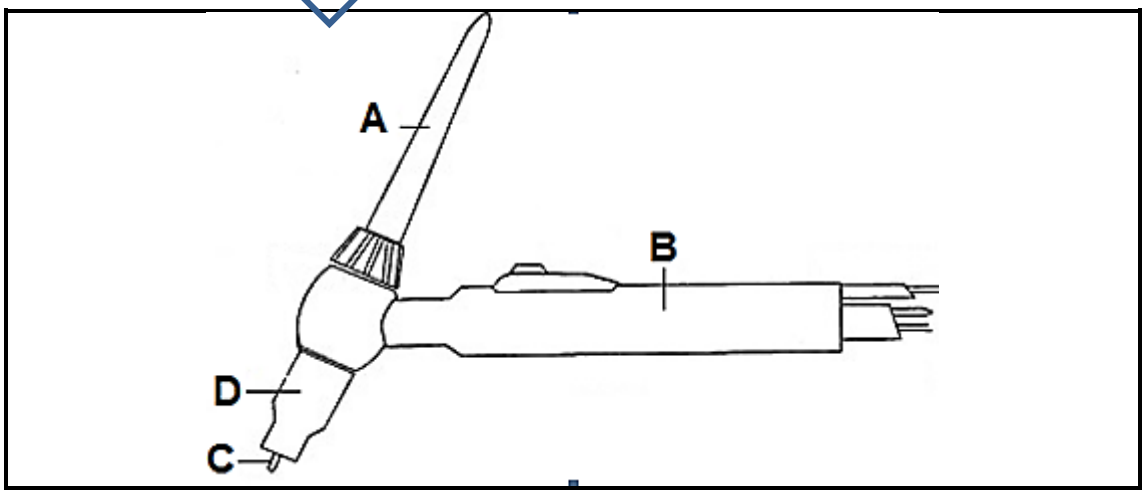


FIGURE 1

4.2.1 Name the welding equipment shown in FIGURE 1. (1)

4.2.2 Name the parts of the welding equipment in FIGURE 1 by writing only the answer next to the letter (A–D) in the ANSWER BOOK.
(4 × 1) (4)

4.3 Briefly explain how the torch should be positioned when butt welding is done. Refer to the angle and the direction of weld. (3)

4.4 Give ONE scientific and ONE natural way of preventing exhaust fumes in a welding workshop. (2)

4.5 Briefly explain each of the following important aspects to remember when storing gas cylinders safely:

4.5.1 Fasten cylinders securely.

4.5.2 Keep cylinders away from heat sources.

4.5.3 Move cylinders correctly.

4.5.4 Never weld on any cylinder.

4.5.5 Know what you are doing.

(5 × 1) (5)
[20]

QUESTION 5

5.1 Explain how a Pittsburgh seam is formed. (2)

5.2 State FOUR general rules for dimensioning when drawing a schematic ductwork layout. (4)

5.3 Define the term *schematic ductwork layouts*. (2)

5.4 List FOUR standard drawing conventions to apply when drawing schematic ductwork layouts. (4)

5.5 State ONE function of each of the following safety devices in the electric motors of air-conditioning systems:

5.5.1 Circuit breaker

5.5.2 Starters

5.5.3 Local isolating switch

(3 × 1) (3)

5.6 Explain each of the following terms regarding air-diffusion terminals within a ductwork layout:

5.6.1 Forced ventilation

5.6.2 Infiltration

5.6.3 Natural ventilation

(3 × 1) (3)

5.7 State TWO main requirements for a good ducting design. (2)
[20]

QUESTION 6

6.1 Give THREE advantages of applying the JIT principle. (3)

6.2 Give THREE reasons for buying tool tips made of tungsten and ceramics. (3)

6.3 State FIVE safety procedures to follow when performing preoperational checks on a CNC machine. (5)

6.4 List SEVEN steps to observe when setting the tool in a machine turret using the scratch method. (7)

6.5 List THREE steps that CNC operators must follow when preparing a machine for use. (3)

6.6 Briefly explain the cleaning of a CNC machine with regard to each of the following:

6.6.1 Removal of waste materials

6.6.2 Separate waste

6.6.3 Company's procedure on waste

(3 × 2) (6)

6.7 Explain the representation of each finger in the right-hand rule. (3)

6.8 FIGURE 2 is a tool tip used in a lathe machine.

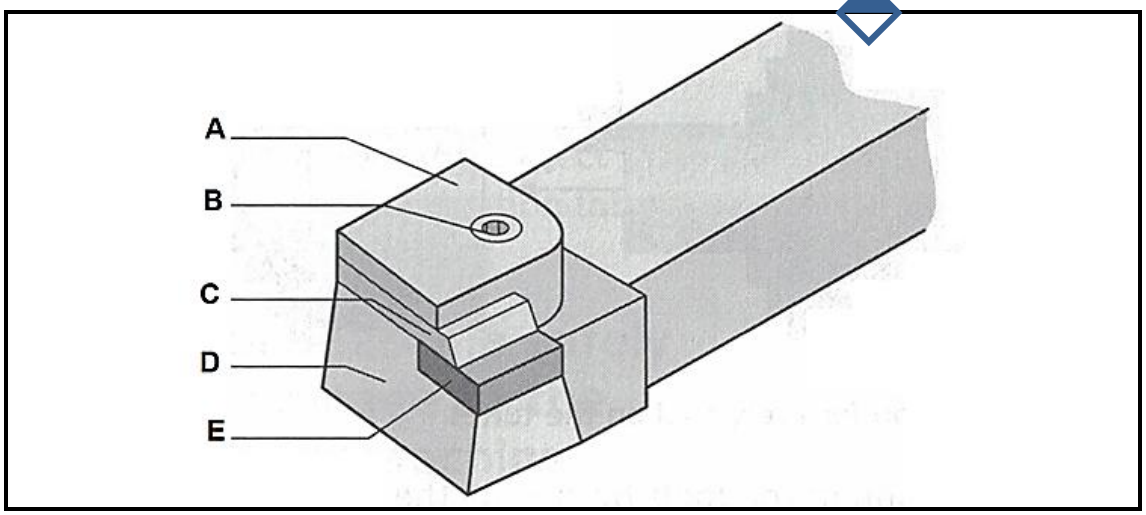


FIGURE 2

Name the parts of the tool tip by writing only the answer next to the letter (A–E) in the ANSWER BOOK. (5 × 1) (5)

6.9 Give FIVE key factors to consider when selecting machines and tools. (5)

[40]

TOTAL SECTION B: 80
GRAND TOTAL: 100

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