higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING FABRICATION: SHEET METAL WORK
NQF LEVEL 4

(6031024)

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09:00–12:00

This question paper consists of 7 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
ENGINEERING FABRICATION: SHEET METAL WORK
NQF LEVEL 4
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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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 Open windows and air vents are not good for ventilation when welding.

1.2 CNC machines are known for mass production.

1.3 Grilles are only used in motor vehicles.

1.4 The term, *isothermal*, means same temperature as the surroundings.

1.5 The control panels are different from one CNC to another.

(5 × 1) **[5]**

QUESTION 2

Choose a term from COLUMN B that matches a description 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	Keep welding metal clean	A	tungsten rod
2.2	Four available cutting corners	B	arcing
2.3	Control of noise	C	thermal acquisition
2.4	Method of testing the program	D	main stop button
2.5	Touching the electrode to work	E	rectangular tool tip
2.6	The control of temperature	F	flux
2.7	Supports combustion	G	acoustic acquisition
2.8	To prevent the machine from restarting	H	simulation
2.9	To store programs	I	oxygen
2.10	Electrode used for TIG welding	J	flash disc

(10 × 1) **[10]**

TOTAL SECTION A: 15

SECTION B

QUESTION 3

3.1 Rigid fibrous duct board is the insulation board material used for soundproofing and insulation in duct work.

Name THREE materials that can be used to manufacture rigid fibrous duct board. (3)

3.2 Write down the abbreviations used for the following heating and air-conditioning piping.

3.2.1 High pressure steam

3.2.2 Hot water heating return

3.2.3 Refrigerant liquid

3.2.4 Condenser water return

3.2.5 Drain

(5 × 1) (5)

3.3 State ONE important use of each of the following components used in duct work.

3.1.1 Off-sets

3.1.2 Transition elbows

3.1.3 Rectangular or square elbows

(3 × 1) (3)

3.4 Elbows are the most common components in duct work.

3.4.1 State the main function of an elbow in duct work. (1)

3.4.2 State the TWO factors by which elbows can be classified. (2)

3.5 Schematic duct work layouts are drawn over the outlines of the floor plan of a building, as an overlay.

3.5.1 State ONE reason why the schematic duct work layout is drawn. (2)

3.5.2 State how the shape of duct work is shown in a schematic duct work layout. (1)

[17]

QUESTION 4

4.1 Draw a neat sketch of a square-throat radius-heel elbow. Label the throat and the heel. (4)

4.2 State ONE reason why a draughtsperson should know the following information before preparing a plant layout drawing.

4.2.1 Accurate information

4.2.2 Duct connection

4.2.3 Service access

(3 × 2) (6)

4.3 State ONE function of the following safety devices that one would use to protect the air conditioning system from damage.

4.3.1 Circuit breaker

4.3.2 Starter

4.3.3 Local isolating switch

(3 × 1) (3)

4.4 Air ductwork systems are designed to deliver the required air volumes to the conditioned areas.

State FOUR requirements of a good conducting system to the conditioned areas. (4)

[17]

QUESTION 5

5.1 'Pickling' and 'passivating' are terms commonly used when doing quality checks on welded workpieces.

Briefly explain the following terms:

5.1.1 Pickling

5.1.2 Passivating

(2 × 2) (4)

5.2 After induction at a new workstation, the supervisor requests you to make a check list for a welding bay before starting WBE.

State any FIVE safety precaution checks/questions that will assist to make the welding environment a safer place to work in. (5)

5.3 Compliance with welding procedures and drawing specifications is important.

State the SIX values to be checked once the weld has been completed as a measure of international standards. (6)

5.4 Gas cylinders must be handled with care in the working environment.

Describe ONE danger that could be created when one hangs a LIVE welding torch against a cylinder. (2)

[17]

QUESTION 6

6.1 Briefly define the following terms that are commonly used in CNC work.

6.1.1 Software

6.1.2 Post-processor

6.1.3 Algorithm

(3 × 2) (6)

6.2 The table below explains the functions or applications of M-codes and G-codes in CNC machine operation.

Choose the CNC function or application from COLUMN B that matches the applicable code in COLUMN A. Write only the letter (A–E) next to the question number (6.2.1–6.2.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
6.2.1	M 0	A	Coolant off
6.2.2	M 1	B	Programming in inches
6.2.3	M 8	C	Optional stop
6.2.4	G 20	D	Program stop
6.2.5	G 21	E	Programming in mm

(5 × 1) (5)

6.3 List the EIGHT processes to be processed by the post processor before a task can be executed. (8)

6.4 List any FIVE points of information that a machinist must interpret on the machine shop drawings. (5)

6.5 List any FIVE common faults that may appear with regard the tool and cutting process if the correct procedures are not followed during a CNC cutting process. (5)

6.6 One will be safe when one follows all safety procedures in a working environment.

State any FIVE safety procedures to be followed at all times when working with a CNC machine in a workshop. (5)

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TOTAL SECTION B: 85
GRAND TOTAL: 100

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