higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# NATIONAL CERTIFICATE (VOCATIONAL)

## ENGINEERING FABRICATION: SHEET METAL WORK
## NQF LEVEL 3

(6031023)

**21 November 2018 (X-Paper)**
**09:00–12:00**

**This question paper consists of 5 pages.**

NCV

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**TIME: 3 HOURS**
**MARKS: 100**

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**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. Write neatly and legibly.

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NCV

## QUESTION 1

1.1 Name the THREE main types in which metals are classified. (3)

1.2 Briefly describe the composition of the THREE metal classes mentioned in QUESTION 1.1. (3 × 2) (6)

1.3 Name the THREE types of cast iron used in industry. (3)

1.4 Name TWO types of non-ferrous metals. (2)

1.5 Explain the composition of non-ferrous alloys. (2)

1.6 Name THREE types of non-ferrous alloys. (3)

1.7 Describe the main use of high-speed steel. (2)

1.8 Give TWO common uses of aluminium in the industry. (2)

1.9 Describe ONE use of each of the following hand tools:

1.9.1 Sledge hammer

1.9.2 Phillips screwdriver

1.9.3 Vice-grip plier

1.9.4 Allen key

1.9.5 Round-nose chisel

(5 × 1) (5)

1.10 Explain TWO safety precautions with regards to a portable electric drill. (2)

1.11 Explain the TWO main uses of an angle grinder. (2)

1.12 Draw a neat sketch indicating the working order of the electrodes of the rocker-arm spot welding machine. (2 × 1) (2)

1.13 Explain the working of a compressor. (2)

1.14 Name THREE main types of self-secured joints used in fabrication. (3)

1.15 Explain the purpose of joggling in the fabrication field. (2)

1.16 Explain ONE use of the odd-leg caliper (jenny caliper). (1)

1.17 Construct a neat drawing indicating how to bisect an angle. (Any angle can be used.) (2)

1.18 Which method will be used to develop one segment of a lobster back bend? (1)

1.19 Calculate the volume of a cube that has a side length of 100 mm.
Give the answer in $m^3$. (3)

**[48]**

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## QUESTION 2

2.1 Explain THREE general safety precautions with regards to welding. (3)

2.2 Draw a neat sketch indicating a leftward gas welding operation. Ensure that all necessary components are labelled and that the direction of the nozzle movement is indicated on the sketch. (4)

2.3 Give TWO fire hazards during a welding process. (2)

2.4 Draw a welding symbol indicating the following elements:

- The symbol for weld all around
- The symbol for a fillet weld on other side of connection
- The symbol for a grinding process as finishing (3)

2.5 Draw a neat sketch indicating a single V butt joint manufactured from equal-sized plates. (2)

2.6 Describe THREE disadvantages of the SMAW process. (3)

2.7 Draw a neat sketch indicating the flame setting of the carburising flame. (2)

2.8 Explain why acetylene cylinders and fittings are provided with left-hand thread. (2)

2.9 Describe the main purpose of a gas cylinder regulator. (2)

2.10 After completing a gas welding operation, which valve must be closed first? (1)

2.11 Briefly explain the meaning of *backfiring* with regards to gas welding. (2)

**[26]**

## QUESTION 3

3.1 Describe the purpose of a scale with regards to drawings. (2)

3.2 What is the main purpose of a detailed drawing with regards to an HVAC layout? (2)

3.3 Give any THREE inspections to be done on hooks before lifting commences. (3)

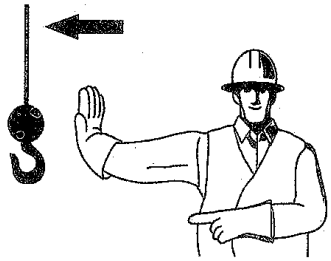
3.4 Name any TWO main HVAC components that are installed as part of the building and forms part of the air-conditioning plant. (2)

3.5 Describe any TWO safety rules that crane drivers must adhere to. (2)

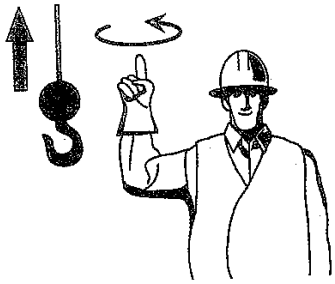
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3.6 Describe the THREE instructions indicated by the crane assistant in the following sketches:

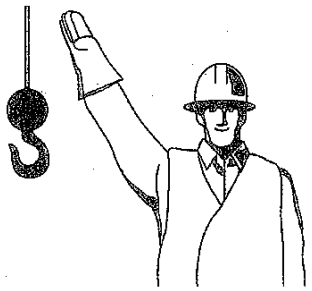
3.6.1



3.6.2



3.6.3



(3 × 1) (3)

3.7 Explain the identifiable property of a Lang's lay rope. (2)

3.8 Explain the identifiable property of an ordinary lay (cross-*lay)* rope. (2)

3.9 Describe ONE characteristic of a rope with a wire core. (2)

3.10 Draw a neat sketch indicating a two-legged chain sling lifting a beam. Ensure that the balancing aspect is indicated. (3)

3.11 Describe in THREE steps how chain slings must be inspected before use. (3)

**[26]**

**TOTAL: 100**

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