higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

WELDERS' THEORY N2

(11022082)

22 November 2016 (X-Paper)
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
WELDERS' THEORY N2
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. ALL the sketches and diagrams must be clear and neat.
5. Keep questions and subsections of questions together.
6. Show ALL the steps and calculations.
7. Write neatly and legibly.

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QUESTION 1

1.1 Name TWO safety precautions to be observed when working with each of the following machines:

1.1.1 Drill press

1.1.2 Bending roll

(2 × 2) (4)

1.2 State THREE safety precautions to be observed when working with a guillotine. (3)

[7]

QUESTION 2

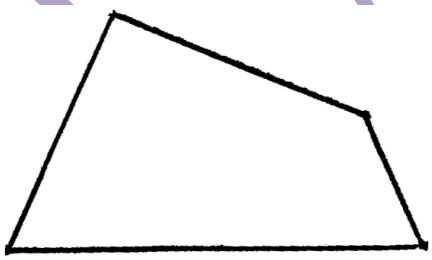
Illustrate, by means of a freehand drawing, a method of joining an angle-iron to another angle-iron. **[4]**

QUESTION 3

Illustrate, by means of a freehand drawing, a four-holed circular pipe flange with two holes horizontally aligned. **[4]**

QUESTION 4

Develop the pattern of the cone transition piece shown below according to the radial-line method.



Transition piece **[15]**

QUESTION 5

The span of a simple roof truss is 8 metres and the rafter 5 metres.

Calculate the rise. **[5]**

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QUESTION 6

6.1 What general component is mainly used to harden steel? (1)

6.2 Name TWO different metal-alloying elements and ONE each of the alloying effects when used. (2 × 2) (4)

6.3 Various options are given as possible answers to the following questions. Choose the answer or answers and write only the letter (A–D) next to the question number (6.3.1–6.3.2) in the ANSWER BOOK.

6.3.1 Mild steel, cast iron and medium carbon steel are all …

A metals.
B ferrous metals.
C non-ferrous metals.
D heavy metals. (2 × 1) (2)

6.3.2 Stainless steel is an alloy of …

A copper and tin.
B steel.
C nickel.
D chrome. (3 × 1) (3)

[10]

QUESTION 7

7.1 Name FOUR precautions to be observed when handling gas cylinders. (4)

7.2 Illustrate, by means of a freehand drawing the OA gas-welding equipment. Label NINE of the components. (9)

7.3 Draw, name and explain the THREE different OA-flame settings. (3 x 3) (9)

[22]

QUESTION 8

8.1 Describe TWO causes of each of two different types of welding defects.
(2 x 3) (6)

8.2 Briefly define the following welding terms:

8.2.1 Parent metal

8.2.2 Arc length

8.2.3 Electrode
(3 × 1) (3)

8.3 Use and show in diagram form, the appropriate weld and welding symbol for:

8.3.1 A fillet weld on the arrow side, done in the workshop.

8.3.2 A V-groove weld on BOTH sides, done on site.
(2 × 2) (4)

8.4 Describe the following welding terms with the aid of sketches where necessary:

8.4.1 V-bevel

8.4.2 Root-gap
(2 × 2) (4)
(17]

QUESTION 9

Various options are given as possible answers to the following questions. Choose the answer or answers and write only the letter (A–D) next to the question number (9.1–9.3) in the ANSWER BOOK.

9.1 When a test piece has to undergo a tensile test, plastic deformation occurs. This happens when ...

A the plate is stretched beyond its elastic limit and does not return to its original shape.
B the plate has undergone permanent deformation.
C the plate returns to its original shape after it has been stretched.
D all the above-mentioned aspects occur simultaneously. (2 x 1) (2)

9.2 Some non-destructive methods of testing welded joints are …testing.

A radiographic
B visual
C X-ray
D Bending (3 x 1) (3)

9.3 Some destructive methods of testing welded joints are …

A dye penetrant.
B X-ray.
C bending.
D impact testing. (2 x 1) (2)
[7]

QUESTION 10

10.1 Explain what is meant by the term *annealing.* (3)

10.2 Explain the term *hardening of steel*. (3)

10.3 Various options are given as possible answers to the following questions. Choose the answer or answers and write only the letter (A–D) next to the question number (10.3.1–10.3.2) in the ANSWER BOOK.

10.3.1 Hardening cannot be done on …

A low-carbon steel.
B non-ferrous metals.
C high-carbon steel.
D medium-carbon steel. (1)

10.3.2 The properties of hardening the metal during alloying with carbon to form cementite is that the …

A internal structure of the metal stays hard while the outside layer stays soft.
B whole structure becomes hard and brittle.
C internal structure stays soft while the outside layer becomes harder.
D whole structure stays soft. (2 x 1) (2)

[9]

TOTAL: 100

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