higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1000**(E)**(N17)T

NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

METAL WORKERS' THEORY N1

(11022061)

17 November 2016 (X-Paper)
09:00–12:00

Non-programmable calculators may be used.

Candidates need drawing instruments

This question paper consists of 7 pages and 1 addendum.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
METAL WORKERS' THEORY N1
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. QUESTION 3 must be answered on the ADDENDUM and handed in.
4. Number the answers according to the numbering system used in this question paper.
5. Freehand drawings must be done in pencil and must be neat and reasonably large.
6. Keep ALL the subsections of questions together.
7. Show ALL the calculation steps where necessary.
8. Write neatly and legibly.

QUESTION 1

1.1 Goggles are safety equipment that must be worn to protect the eyes.

List FOUR tasks where goggles must be worn. (4)

1.2 Explain ONE type of accident that can arise when using damaged electric cables in arc welding. (1)
[5]

QUESTION 2

2.1 Hand chisels have their own cutting action.

2.1.1 List THREE types of hand chisels. (3)

2.1.2 Explain ONE use of each hand chisel listed in QUESTION 2.1.1. (3)

2.2 State ONE use of the following hand tools:

2.2.1 Ball-peen hammer

2.2.2 Sleeve punch

2.2.3 Cross-cut file

2.2.4 Tapered drift

(4 × 1) (4)
[10]

QUESTION 3

FIGURE 1 below shows the front view of a right-angled pipe elbow. Answer the questions that follow on the ADDENDUM (attached). DETACH the ADDENDUM and hand it in.

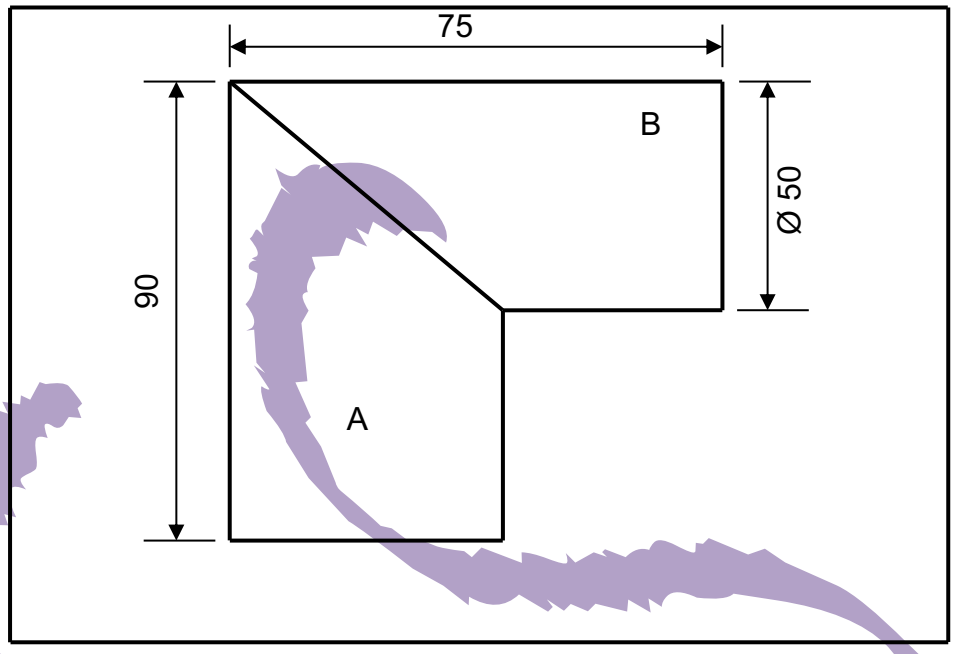

FIGURE 1

3.1 Draw the given view. (2)

3.2 Calculate the circumference of the 50 mm diameter pipe. Use the formula C = 3,142 × diameter. (2)

3.3 Develop the pipe marked A. (3)

3.4 Develop the pipe marked B. (3)
[10]

QUESTION 4

4.1 Define the following properties of a metal:

4.1.1 Elasticity

4.1.2 Malleability

4.1.3 Brittleness

(3 × 2) (6)

4.2 Differentiate between the *toughness* and the *hardness* of a metal. (4)
[10]

QUESTION 5

5.1 FIGURE 2 below shows the side view of an angle iron section. Label the parts marked A–E. Write down only the answer next to the letter (A–E) in the ANSWER BOOK.

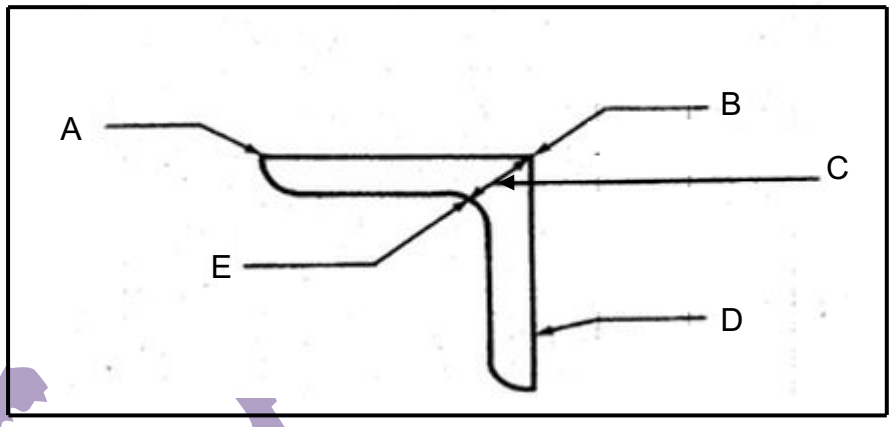

FIGURE 2 (5)

5.2 What do the following abbreviations stand for?

5.2.1 PCD

5.2.2 CSK

(2 x 1) (2)
[7]

QUESTION 6

6.1 List FOUR safety precautions to be observed when working with a pedestal drilling machine. (4)

6.2 List THREE safety precautions to be observed when working with horizontal or vertical bending rolls. (3)

6.3 State ONE function of each of the following machines:

6.3.1 Circular power saw

6.3.2 Radial-arm drilling machine

6.3.3 Bending press

(3 x 1) (3)
[10]

QUESTION 7

7.1 Name FOUR types of rivet heads used in an assembly work. (4)

7.2 Explain the following terms that describe the distance between rivets and between the centre of the rivet and the edge of the metal:

7.2.1 Lap

7.2.2 Landing

7.2.3 Pitch

(3 × 2) (6)

7.3 Name FOUR types of bolts commonly used in an assembly. (4)

7.4 Explain the purpose of the following washers as used in general structural work:

7.4.1 Flat washer

7.4.2 Spring washer

7.4.3 Taper washer

(3 × 2) (6)
[20]

QUESTION 8

8.1 FIGURE 3 below shows a cutting nozzle in position. Label the parts marked A–E. Write down only the answer next to the letter (A–E) in the ANSWER BOOK.

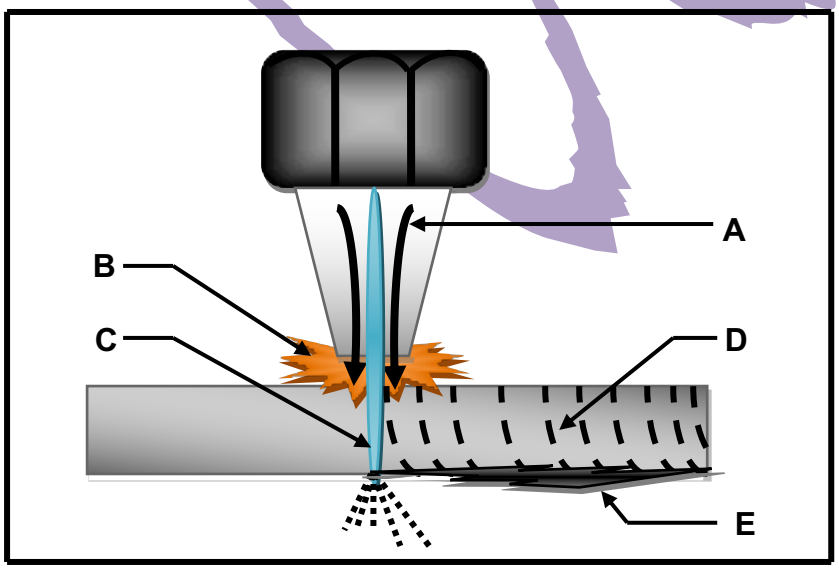

FIGURE 3 (5)

8.2 Explain why gas cylinder valves should be opened slowly. (2)

8.3 Name THREE oxyacetylene welding flame settings. (3)
[10]

QUESTION 9

9.1 Explain the following welding terms:

9.1.1 DC welding machine (1)

9.1.2 Earthing (2)

9.1.3 Reverse polarity (2)

9.2 Explain why the welding electrodes are heavily coated. (2)

9.3 List THREE disadvantages of using an alternating-current welding machine. (3)
[10]

QUESTION 10

The following information is given to make up a steel tank cylinder and to stiffen the cylinder with an external stiffening ring:

Internal diameter of the cylinder is 770 mm
Thickness of the cylinder is 12 mm
Thickness of the flat bar is 12 mm
Width of the flat bar is 75 mm

Calculate the following:

10.1 The length required to form the internal cylinder.

10.2 The length required to form the external stiffening ring from the flat bar.
(2 × 4) **[8]**

TOTAL: 100

ADDENDUM **EXAMINATION NUMBER:**

QUESTION 3