higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1140**(E)**(A5)T

NATIONAL CERTIFICATE

METAL WORKERS' THEORY N1

(11022061)

5 April 2018 (X-Paper)
09:00–12:00

Nonprogrammable calculators may be used.

This question paper consists of 5 pages.

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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. Number the answers according to the numbering system used in this question paper.
4. Keep ALL subsections of questions together.
5. Show ALL calculation steps.
6. Write neatly and legibly.

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QUESTION 1

Name FIVE pieces of personal protective clothing and equipment that should be worn in a workshop. **[5]**

QUESTION 2

2.1 Name THREE types of punches used in a workshop. (3)

2.2 Name FIVE types of files used for filing work in a workshop. (5)

2.3 Describe the function of each of the following marking-off tools:

2.3.1 Boilermaker's wheel

2.3.2 Back-mark gauge

2.3.3 Trammels

2.3.4 Bevel gauge

2.3.5 Scriber

(5 × 1) (5)

2.4 Give the formula for calculating the theorem of Pythagoras. (2)
[15]

QUESTION 3

The most important aspect of the metalworking trade is the ability of the artisan to develop patterns for pipes.

Name FIVE types of lines used when drawing a T-piece and developing the pattern of the branch pipe. State the function of each line. (5 × 2) **[10]**

QUESTION 4

4.1 Explain each of the following properties of metals:

4.1.1 Elasticity (3)

4.1.2 Toughness (2)

4.1.3 Malleability (2)

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4.2 Give the meaning of each of the following abbreviations:

4.2.1 MS/PL

4.2.2 OSU

4.2.3 CSK

4.2.4 GALV

4.2.5 RPM

(5 × 1) (5)
[12]

QUESTION 5

List FIVE safety precautions to consider before and during the use of each of the following machinery:

5.1 Bending press

5.2 Circular power saw

(2 × 5) **[10]**

QUESTION 6

6.1 Name THREE types of rivet heads used in assembly. (3)

6.2 Explain each of the following terms used in fabrication work:

6.2.1 Landing

6.2.2 Pitch

(2 × 1) (2)

6.3 Describe the function of each of the following fastening devices:

6.3.1 Black bolts (2)

6.3.2 Machine-turned bolts (3)
[10]

QUESTION 7

7.1 Briefly explain how to test for gas leaks in oxy-acetylene cylinders. (5)

7.2 List FIVE pieces of protective clothing that should be worn during arc welding and give a reason for each piece. (5 × 2) (10)
[15]

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QUESTION 8

8.1 Name FIVE safety precautions to be observed before, during and after arc welding. (5)

8.2 Give FIVE disadvantages of a direct-current generator. (5)

8.3 Briefly explain *direct-current straight polarity (DCSP)*. (5)
[15]

QUESTION 9

The following information is given to manufacture TWO stiffening rings:

- Internal diameter of the mild-steel cylinder: 480 mm
- Thickness of the mild-steel plate: 10 mm
- Diameter of the ring: 12 mm

Calculate the following:

9.1 The length required to form the internal stiffening ring

9.2 The length required to form the external stiffening ring

(2 × 4) **[8]**

TOTAL: 100

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