higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1060(E)(M24)T

APRIL EXAMINATION

NATIONAL CERTIFICATE

METAL WORKERS' THEORY N1

(11022061)

24 March 2014 (Y-Paper)
13:00–16:00

Candidates will need drawing instruments.

Calculators may be used.

This question paper consists of 6 pages and 1 addendum.

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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 correctly according to the numbering system used in this question paper.
4. Keep ALL the subsections of questions together.
5. Show ALL the calculation steps where calculations should be done.
6. QUESTION 3 must be answered on ADDENDUM and then be handed in.
7. Use $\pi = 3,142$
8. Write neatly and legibly.

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QUESTION 1

1.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1.1 Unsafe acts results eventually result in accidents.

1.1.2 Working without permission is regarded as an unsafe condition.

1.1.3 On emergencies gas cylinders can be rolled when transported.

1.1.4 Machine guards must be in position when operating the machine.

1.1.5 Gas welding can be used without wearing goggles.

(5 x 1) **[5]**

QUESTION 2

2.1 State THREE types of punches used in riveting and state its function. (6)

2.2 Complete the following sentences/paragraph(s) by filling the missing word(s). Write only the word(s). Write only the word(s) next to the question number (2.1–2.2.4) in the ANSWER BOOK.

The hammer's head is held firmly in place by … 2.2.1 …,hammered into the end of the shaft. It is then … 2.2.2 … in water, as this will cause the wood to .2.2.3 … properly secured to the shaft. Hammer's shaft is normally made from …2.2.4. which is a strong wood.

(4 x 1) (4)

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

2.3.1 Inside callipers

2.3.2 Try-square (2)

(2 x 1)

2.4 Calculate the length of the third side of the right-angled triangle:

Given the following measurements:

Hypotenuse = 210 mm

Right-angled side = 164 mm

HINT: $R^2 = H^2 + V^2$ (3)

[15]

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QUESTION 3

Use FIGURE 1, ADDENDUM (attached) to answer this question. Drawing instruments must be used.

FIGURE 1 shows a T- piece between two equal diameter steel pipes.

3.1 Draw the line of penetration between the two pipes. (2)

3.2 Calculate the circumference of the 32 mm diameter pipe. (2)
NOTE: Answer this question in your ANSWER BOOK.

3.3 Develop the shape of the hole in the main pipe. (2)

3.4 Develop the pattern of the branch pipe. (4)

HINT: C = 3,142 x D
Hand in ADDENDUM in with your ANSWER BOOK. **[10]**

QUESTION 4

4.1 Define the high carbon steel with reference to the following

4.1.1 Carbon content (1)

4.1.2 Metal properties (2)

4.1.3 Uses (2)

4.2 Define the following metal properties:

4.2.1 Ductility

4.2.2 Malleability

(2 x 1) (2)

4.3 Give the abbreviation of the following:

4.3.1 Mild steel plate

4.3.2 Countersunk

4.3.3 Outside diameter

(3 x 1) (3)

4.4 Calculate the back mark of a 45 mm x 45 mm x 5 mm angle iron. The maximum diameter of the hole to be drilled is 18 mm. (2)
[12]

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QUESTION 5

5.1 Give FIVE general safety precautions that are applicable to the pedestal drilling machine. (5)

5.2 State the function of each of the following machinery:

5.2.1 Angle grinder

5.2.2 Guillotine

5.2.3 Bending machine

5.2.4 Circular power saw

5.2.5 Vertical bending rolls

(5 x 1) (5)
[10]

QUESTION 6

6.1 Make neat sketches of the following rivet heads:

6.1.1 Conical

6.1.2 Countersunk

(2 x 1) (2)

6.2 Draw the front and top views of a single riveted lap joint with a snap head rivet in position. (3)

6.3 Calculate the length of a black bolt required to join two 18 mm thick steel plates together. The diameter of a hole is 12 mm and the flat washer used is 6 mm thick. (3)

6.4 Define landing as applicable to assembly work. (2)
[10]

QUESTION 7

7.1 Name THREE types of gases commonly used for cutting and welding work. (3)

7.2 State the function of the following gas fittings:

7.2.1 Acetylene pressure regulator

7.2.2 Oxygen flashback arrestor

(2 x 1) (2)

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7.3 Give THREE types of flame settings used in oxy-acetylene welding and its uses. (6)

7.4 Explain the procedure that you would follow when extinguishing the oxy-LP gas cutting flame. (2)

7.5 Name TWO welding techniques commonly used in gas welding. (2)
[15]

QUESTION 8

8.1 List FIVE safety procedures that should be considered during arc welding process. (5)

8.2 Describe the uses of the following welding equipment:

8.2.1 Chipping hammer

8.2.2 Earth and clamp cable

8.2.3 AC welding machine

(3 x 1) (3)

8.3 Explain the following welding terms:

8.3.1 Direct current (1)

8.3.2 Reverse polarity (2)

8.4 Give FOUR advantages in using a AC welding machine. (4)
[15]

QUESTION 9

9.1 Given the following measurements:

Internal diameter of a cylinder = 760 mm
Thickness of the cylinder = 10 mm
Thickness of a flat bar = 12 mm
Width of a flat bar = 70 mm

9.1.1 Calculate the length required to form the internal cylinder.

9.1.2 Calculate the length required to form the external stiffening ring from the flat bar.

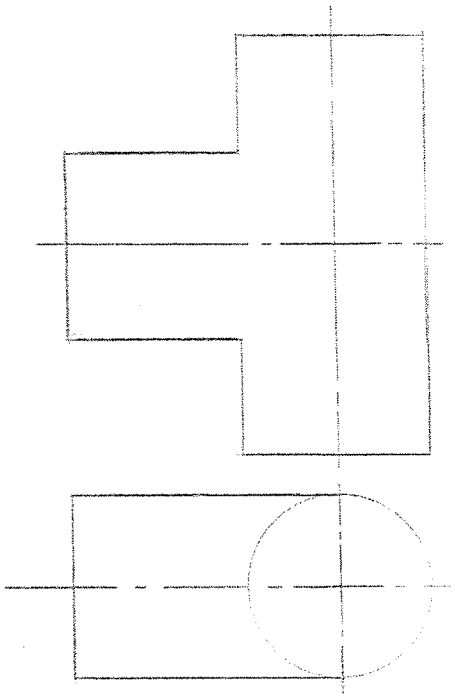
(2 x 4) **[8]**

TOTAL: 100

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ADDENDUM



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