higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

RIGGING THEORY N1

(11041841)

5 December 2023 (X-paper)
09:00–12:00

Drawing instruments and nonprogrammable calculators may be used

This question paper consists of 7 pages and a formula sheet.

266Q1G2305

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
RIGGING 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. Start each question on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 State ONE purpose of the personal protective equipment (PPE) listed below:

1.1.1 Safety goggles

1.1.2 Ear plugs

1.1.3 Safety harness

1.1.4 Leather spats

1.1.5 Dust mask

(5 × 1) (5)

1.2 State FIVE safety precautions that must be taken into consideration before working with electric tools. (5)

1.3 Explain the planning procedure that needs to be carried out before entering a confined space. (5)

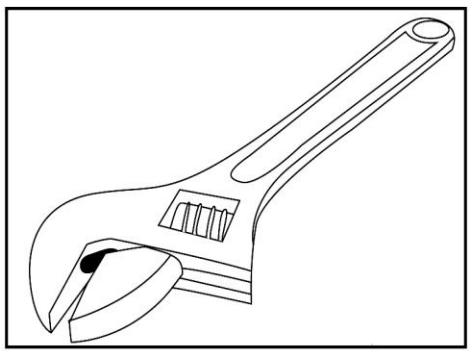
[15]

QUESTION 2

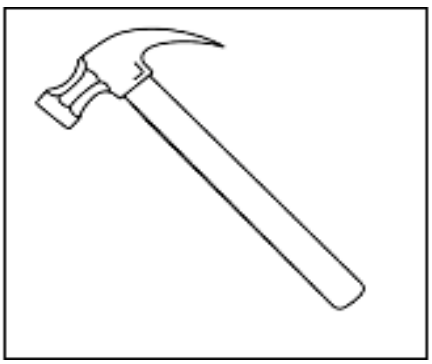
2.1 List TWO types of marline spikes that are used in the rigging process. (2)

2.2 State ONE purpose of each marline spike mentioned in QUESTION 2.1. (2)

2.3 FIGURE 1 shows different types of hand tools used in the rigging process:



A



B

FIGURE 1

2.3.1 Name hand tool A (1)

2.3.2 Name hand tool B (1)

2.3.3 State ONE purpose of each hand tool shown FIGURE 1. (2)

[8]

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QUESTION 3

Draw a neat sketch of the profiles given below:

3.1 Chequer plate (2)

3.2 H-beam (2)

3.3 Hexagon bar (2)

[6]

QUESTION 4

4.1 State the purpose of the following parts with regard to scaffolding:

4.1.1 Brace

4.1.2 Toe boards

4.1.3 Cradle

4.1.4 Guard rail

(4 × 2) (8)

4.2 By means of a neat sketch, illustrate a steel base plate used in scaffolding. (2)

[10]

QUESTION 5

5.1 Domestic wood is divided into two classes. Name the TWO types wood classes. (2)

5.2 State the purpose of the following substances in the preservation of timber:

5.2.1 Coal tar

5.2.2 Water-repellent paint

5.2.3 Zinc sulphate

(3 × 1) (3)

[5]

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QUESTION 6

6.1 Calculate the amount of work done in raising a mass of 500 kilograms of coal from a mine that is 24 meters deep (g = 9,81 m/s). (6)

6.2 FIGURE 2 shows a nylon web sling.



FIGURE 2

6.2.1 Explain what a nylon web sling is. (3)

6.2.2 State what it is manufactured from. (2)

6.3 Explain what is meant by post-forming of wire ropes. (3)

6.4 State FIVE factors that must be considered when selecting a rope. (5)

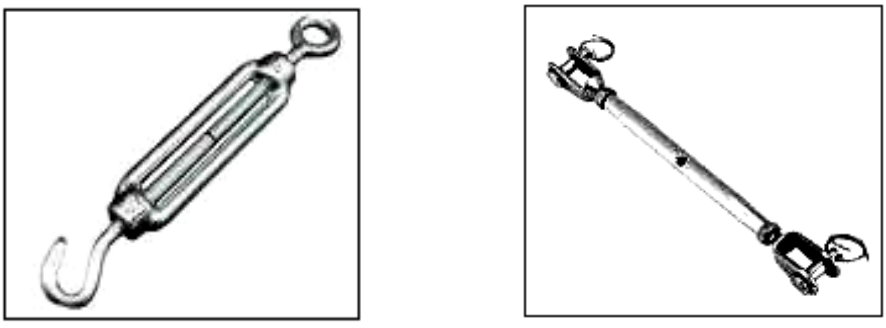
6.5 All lifting equipment, slings and lifting beams have a stamped acronym.

What does the acronym WLL indicate? (1)

[20]

QUESTION 7

7.1 The FIGURES below show different types of rope fittings. Name the rope fittings by writing the answer next to the letter (A–B) in the ANSWER BOOK.



A **B**

(2)

FIGURE 3

7.2 Explain how one would tighten the rope fitting shown in FIGURE B in QUESTION 7.1 during the rigging process. (3)

[5]

QUESTION 8

8.1 Draw a neat sketch of a figure-of-eight knot. (2)

8.2 Explain the purpose of a marline spike hitch. (2)

8.3 List FOUR types of bends used to tie slings. (4)
[8]

QUESTION 9

9.1 Describe each of the following splices done in slings:

9.1.1 Back splice

9.1.2 Eye splice

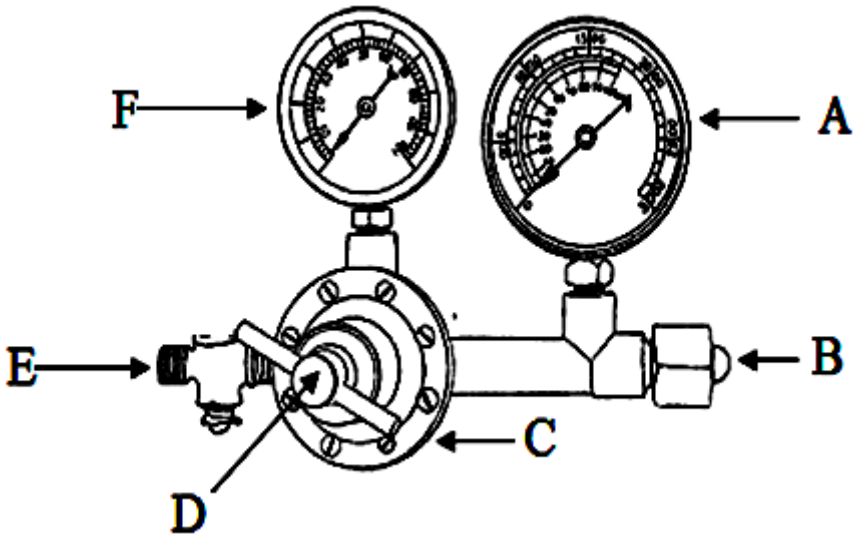
9.1.3 Short splice

(3 × 2) (6)

9.2 List FOUR disadvantages of chain slings. (4)
[10]

QUESTION 10

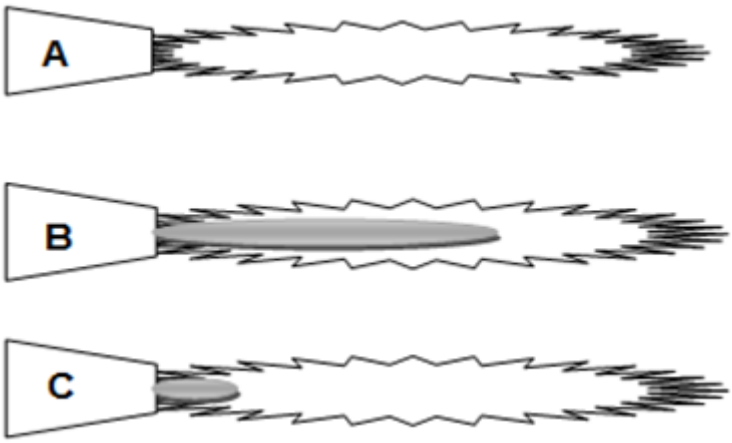
10.1 FIGURE 4 below shows a gas regulator that is used in the oxy-acetylene process. Name the labelled parts by writing the answer next to the letter (A–F) in the ANSWER BOOK.



(6)

FIGURE 4

10.2 FIGURE 5 shows different types of flames related to the oxy-acetylene process. Name each flame by writing the answer next to the letter (A–C) in the ANSWER BOOK.



(3 × 1) (3)

FIGURE 5

10.3 List FOUR contaminants on slings that can have an adverse effect when using gas cutting or welding. (4)

[13]

TOTAL: 100

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FORMULA SHEET

Any applicable formula may be used:

1. $A = \pi r^2$
2. $A = \frac{1}{2.} . b. h$
3. $A = \frac{1}{4} . \pi . d^2$
4. $A = L. L$
5. $A = l . b$
6. $f = m. g$
7. $Cos\ \theta = \frac{Adjacent}{Hypotenuse}$
8. $Sin\ \theta = \frac{Opposite}{Hypotenuse}$
9. $Tan\ \theta = \frac{Opposite}{Adjacent}$
10. $V = l . b. h$
11. $V = \pi r^2 . h$
12. $V = A. h$
13. $Work\ done = force \times distance$
14. $Force = mass \times gravitational\ force$

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