higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1570**(E)**(A8)T

NATIONAL CERTIFICATE

RIGGING THEORY N1

(11041841)

8 August 2019 (X-Paper)
09:00–12:00

This question paper consists of 7 pages and 1 formula sheet.

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. Keep ALL the subsections of questions together.
5. Write neatly and legibly.

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 (1.1.1–1.1.10) in the ANSWER BOOK.

1.1.1 Always ensure that a jewellery ring is worn during a rigging process.

1.1.2 Good housekeeping means a place for everything and everything in its place.

1.1.3 The use of hand signals is important during any rigging process.

1.1.4 Defective scaffolding equipment should be repaired and used again.

1.1.5 Proper ventilation must not be available when working in confined spaces.

1.1.6 When hooking a safety belt always make sure that there is NO excessive slack on the harness rope.

1.1.7 Always check the oxy-acetylene equipment for any leaks using a tee-pol solution before lighting up.

1.1.8 Machine guards must always be mounted on all movable parts of a machine.

1.1.9 Oxygen, fuel and heat are three elements in starting a fire.

1.1.10 Always carry out a visual inspection on electrical tools to check for any defects.

(10 × 1) (10)

1.2 State TWO precautions to keep in mind with regard to electricity. (2)

1.3 Explain THREE dangers that can occur with regard to compressed air. (3)

[15]

QUESTION 2

2.1 Give the purpose of each of the following tools used in rigging:

2.1.1 Bolt cutter

2.1.2 Lay blocks

2.1.3 Cold chisel

(3 × 2) (6)

2.2 State THREE disadvantages of cast iron. (3)

2.3 Draw a neat, labelled sketch of each of the following profiles used during a rigging process:

2.3.1 H-beam

2.3.2 Lipped channel

(2 × 3) (6)
[15]

QUESTION 3

3.1 FIGURE 1 below shows suspended scaffolding.

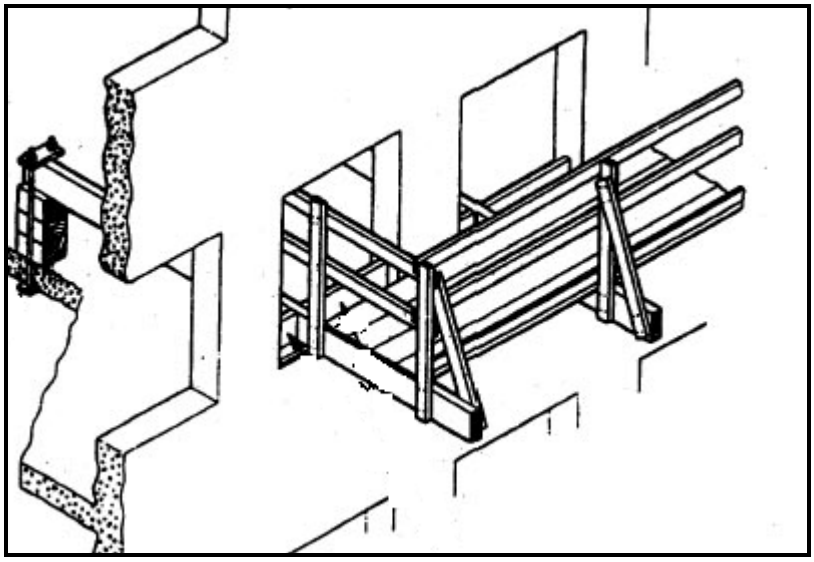

FIGURE 1

3.1.1 Name the type of suspended scaffolding. (1)

3.1.2 Explain how this scaffolding is erected. (4)

3.2 Explain the purpose of each of the following components used during the erecting of scaffolding:

3.2.1 Brace

3.2.2 Bracket scaffold

3.2.3 Bridle

(3 × 2) (6)

3.3 Explain each of the preservation methods below used for timber.

3.3.1 Water-repellent solution

3.3.2 Phenol

(2 × 2) (4)
[15]

QUESTION 4

4.1 FIGURE 2 below shows a sling used during rigging.

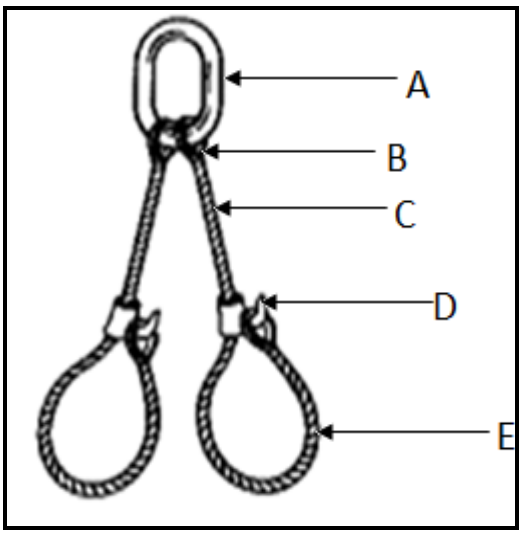

FIGURE 2

4.1.1 Name the type of sling. (1)

4.1.2 Identify each of the indicated parts by writing the answer next to the letter (A–E) in the ANSWER BOOK. (5)

4.2 Draw a neatly labelled sketch of a thimble and shackle sling. (4)

4.3 Explain the correct method of uncoiling fibre ropes. (3)

4.4 Name FIVE different types of synthetic fibre ropes. (5)

4.5 Explain what happens to steel-wire rope slings if they are not kept well-lubricated. (2)
[20]

QUESTION 5

5.1 A mobile crane lifts an electrical motor on the ground 150 metres to a second-floor level onto a base.

5.1.1 Calculate the force required to lift the electrical motor with a mass of 465 kg. The gravitational force is 9,81 m/s.

5.1.2 Calculate the work done by lifting the electrical motor.

(2 × 3) (6)

5.2 Define the following rigging terms:

5.2.1 Sling (2)

5.2.2 Strand (2)

5.2.3 Socket (2)

5.2.4 Track cable (2)

5.2.5 Thimble (1)

[15]

QUESTION 6

6.1 The following types of gas cylinders are used in oxy-acetylene equipment:

A. Oxygen
B. Acetylene
C. Liquid petroleum gas

6.1.1 State the colour of each cylinder by writing the answer next to the letter (A–C) in the ANSWER BOOK. (3)

6.1.2 State the type of thread found on the valves of each cylinder by writing the answer next to the letter (A–C) in the ANSWER BOOK. (3)

6.1.3 Give the reason for the answer in QUESTION 6.1.2. (1)

6.2 List FOUR causes of back-firing while gas welding is done. (4)

6.3 Make a neat sketch of an end clove hitch. (3)

6.4 Explain each of the following terms regarding various rope bends and hitches:

6.4.1 End

6.4.2 Seizing

6.4.3 Stopping

(3 × 2) (6)
[20]

TOTAL: 100

FORMULA SHEET

Any other applicable formula may also 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. $Cos\ \theta = \frac{Adjacent}{Hypoteneuse}$
8. $Sin\ \theta = \frac{Opposite}{Hypoteneuse}$
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. $Force = mass \times gravitational\ force$