higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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NATIONAL CERTIFICATE

RIGGING THEORY N2

(11041852)

1 August 2019 (X-Paper)
09:00–12:00

This question paper consists of 6 pages and 1 formula sheet.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
RIGGING THEORY N2
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 subsections of questions together.
5. Write neatly and legibly.

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QUESTION 1

1.1 Give FIVE safety precautions when storing fibre rope slings. (5)

1.2 State FIVE advantages of a super-loop stirrup fitted to the eye of a rope. (5)

1.3 FIGURE 1 below shows different types and sizes of rope cores.

Identify the rope core and its size by writing the answer next to the letter (A–C) in the ANSWER BOOK.

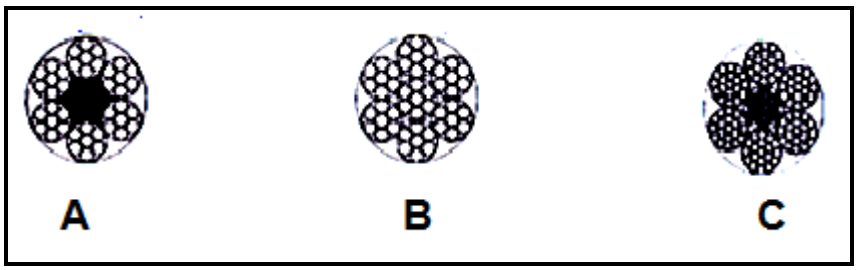


FIGURE 1 (6)

1.4 Explain each of the following defects with regard to wire ropes:

1.4.1 Wear

1.4.2 Kink

1.4.3 Corrosion

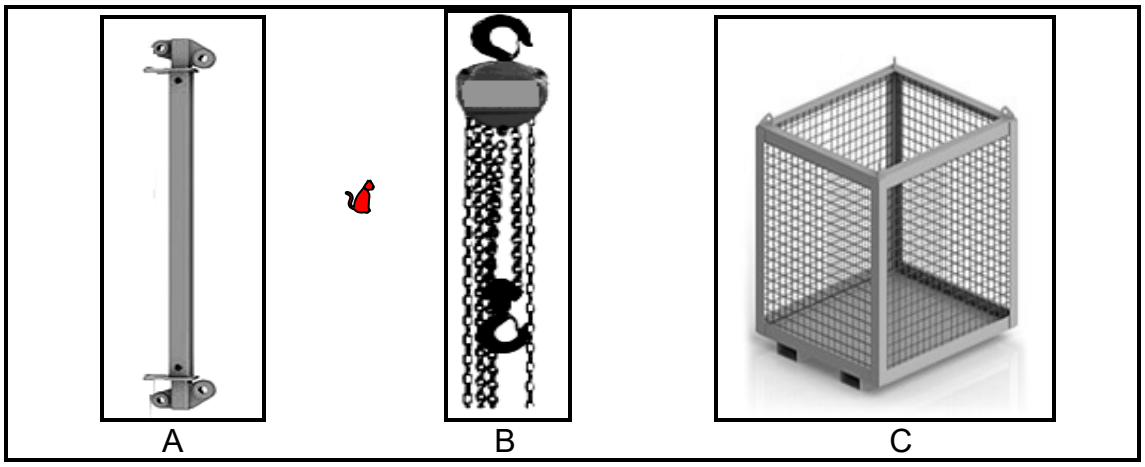
1.4.4 Breaking of strands

(4 × 1) (4)

[20]

QUESTION 2

2.1 Identify the types of lifting equipment and attachments in FIGURE 2 used for rigging. Write the answer next to the letter (A–C) in the ANSWER BOOK.



(3)

FIGURE 2

2.2 Name TWO safety precautions that must be considered before using each of the following jacks:

2.2.1 Screw jack

2.2.2 Ratchet jack

(2 × 2) (4)

2.3 Define *wire rope reeving*. (2)

2.4 Explain how a safety harness is strapped on a person. (3)

2.5 List THREE defects on steel wire slings. (3)

[15]

QUESTION 3

3.1 Make a neat sketch of mushroom rollers used to guide a haulage rope. (3)

3.2 Name FOUR things to consider when selecting a haulage rope. (4)

3.3 Explain the use of self-detaching pulleys on haulage ropes. (2)

3.4 Why should alloy steel chains not be annealed? (1)

[10]

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QUESTION 4

4.1 Explain how a new elevator rope must be installed. (6)

4.2 Name FOUR defects that can occur on cable drum winders. (4)

4.3 Explain where each of the following wire rope constructions are used:

4.3.1 Seale

4.3.2 Nonspin construction

(2 × 1) (2)

4.4 Give THREE advantages of a Koepe hoist system. (3)
[15]

QUESTION 5

5.1 State TWO functions of safety detaching hooks. (4)

5.2 List FIVE defects that can be found on a detachable hook. (5)

5.3 Give ONE purpose of a plate grab. (1)
[10]

QUESTION 6

6.1 Define *anchorage.* (2)

6.2 Explain the operation of a hydraulic jack when lifting a load. (3)

6.3 Explain the assembly process of an A-frame derrick. (4)

6.4 Make a neat sketch of a tower crane. (4)

6.5 Name FOUR visual defects which must be checked on underground trucks. (4)

6.6 Define *jib crane*. (3)
[20]

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QUESTION 7

A closed steel container of unknown mass is used to store goods. The dimensions of the container are as follows:

Length = 2,5 metres
Width = 1,2 metres
Height = 2 metres
Mass of goods = 2 500 kg

Calculate each of the following:

7.1 Total area of material used in the construction of container. (6)

7.2 Mass of material used in the construction of container if the specific mass of the steel is 400 kg/m² (3)

7.3 Total mass of container and goods (1)
[10]

TOTAL: 100

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RIGGING THEORY N2

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. $Force = mass \times gravitational\ force$

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