higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1580**(E)**(A3)T

NATIONAL CERTIFICATE

RIGGING THEORY N2

(11040852)

3 April 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 List FIVE advantages of braided slings. (5)

1.2 Explain each of the following terms applicable to wire ropes:

1.2.1 Breaking force

1.2.2 Reserve strength

1.2.3 Stretch

(3 × 2) (6)

1.3 Describe the construction of each of the following wire ropes:

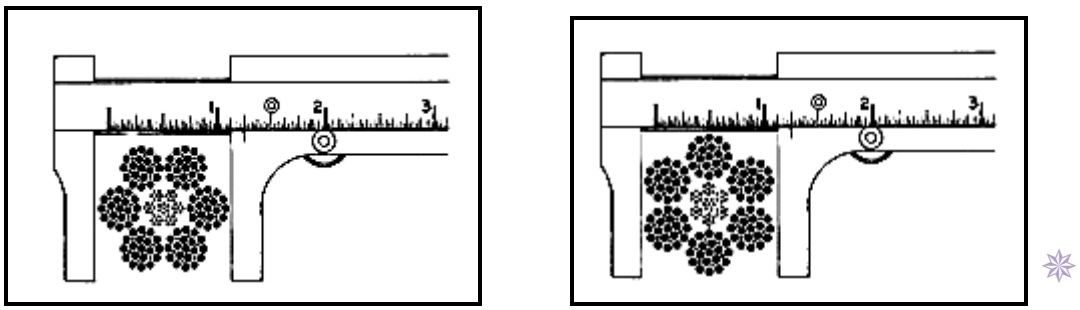
1.3.1 Reverse lay rope

1.3.2 Warrington

(2 × 2) (4)

1.4 FIGURE 1 below shows the correct and the incorrect method of measuring the core of a rope.

1.4



A B

FIGURE 1

1.4.1 State which diagram, A or B, shows the correct method of mearsuring. (1)

1.4.2 Explain why the method you chose is correct and why the other one is incorrect. (4)

[20]

QUESTION 2

2.1 FIGURE 2 below shows different types of lift equipment used during rigging. Identity each piece of equipment by writing the answer next to the letter (A–C) in the ANSWER BOOK.



A B C

FIGURE 2 (3)

2.2 List FIVE defects which may occur on synthetic rope web slings. (5)

2.3 Explain the operation of a ratchet and pawl holdback device used in hand-operated winches. (4)

2.4 State THREE factors to be considered in the caring of chain slings. (3)

[15]

QUESTION 3

3.1 Explain the purpose of haulage depressing rollers shown in FIGURE 3.

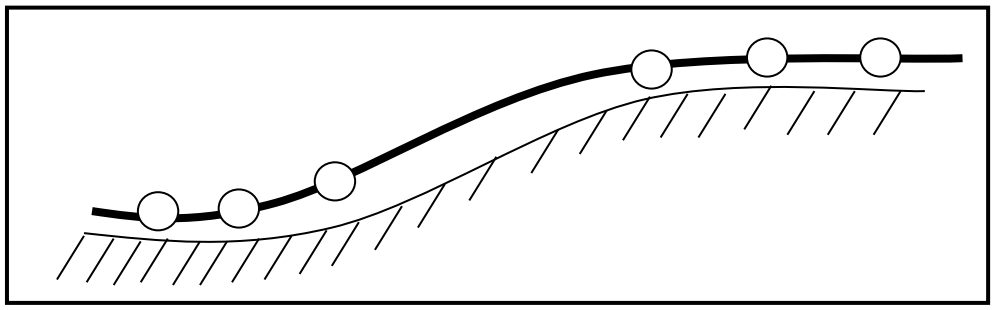


FIGURE 3 (2)

3.2 Explain each of the following defects that may occur in haulage ropes:

3.2.1 Corrosion

3.2.2 Wire fatigue

3.2.3 Wear

(3 × 2) (6)

3.3 State TWO safety precautions that must be considered when operating a winch. (2)

[10]

QUESTION 4

4.1 Identify the labelled parts of the elevator in FIGURE 4 by writing the answer next to the letter (A–F) in the ANSWER BOOK.

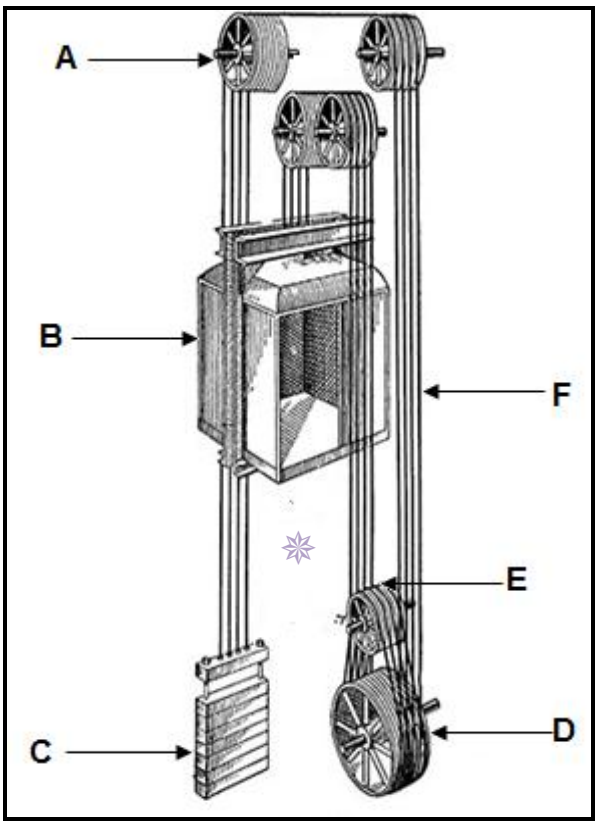


FIGURE 4 (6)

4.2 List FOUR defects found on pulleys used in hoisting systems of cranes. (4)

4.3 The correct groove is important when installing sheave weels.

Explain what will happen if the sheave groove is too narrow for the elevator rope. (2)

4.4 Make a neat sketch of a worn u-sheave groove in a traction elevator. (3)

[15]

QUESTION 5

5.1 Explain the purpose of safety detachable hooks. (3)

5.2 Name FOUR visual defects found on compensating wheel devices. (4)

5.3 Explain the function of a lifting beam. (3)
[10]

QUESTION 6

6.1 Define each of the following terms applicable to mobile cranes:

6.1.1 Hoisting

6.1.2 Jib centre distance

6.1.3 Outreach

(3 × 2) (6)

6.2 Name THREE types of mobile cranes. (3)

6.3 Explain the pupose of a gin pole. (2)

6.4 Name the TWO ways in which winches are operated. (2)

6.5 Make a neat, labelled sketch of a tripod anchor. (5)

6.6 Explain the purpose of a guy derrick. (2)
[20]

QUESTION 7

7.1 Calculate the mass of a solid round bar 2,5 metres long and 200 mm in diameter. The specific mass of steel is given as 820 kg/m². (5)

7.2 Calculate the amount of work done in lifting an electrical motor of 600 kilograms from a mine that is 120 meters deep. (g = 9,81 m/s). (5)
[10]

TOTAL: 100

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FORMULA SHEET

Any 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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