higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

RIGGING THEORY N2

(11041852)

21 November 2022 (X-paper)
09:00–12:00

Drawing instruments and nonprogrammable calculators may be used

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

116Q1E2221

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

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QUESTION 1

1.1 List FOUR types of core that can be used in a rope wire. (4)

1.2 Name FIVE causes of deterioration and breakage of a haulage rope. (5)

1.3 There are different types of splices used in wire ropes. Explain the purpose of the splice mentioned below.

1.3.1 Long splice (2)

1.3.2 Short splice. (3)

1.4 FIGURE 1 below shows different types of wire rope fittings (A–C) in manufacturing slings. Write the letters (A–C) and the name of each rope fitting in the ANSWER BOOK. (3)



A **B** **C**

FIGURE 1

1.5 State the meaning of the D/d ratio. (3)
[20]

QUESTION 2

2.1 Describe the preparations and precautions to be taken when a jack is used to raise and support a load. (6)

2.2 Name FOUR storage precautions that must be done for fibre rope slings. (4)

2.3 Illustrate using a neat sketch how you would check the hook for any stretching defect. (3)

2.4 List TWO safety inspections that must be carried out before using the safety harness. (2)
[15]

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QUESTION 3

3.1 Explain why alloy steel chain attachments should not be annealed. (3)

3.2 List TWO visual inspections an operator must carry out on underground trucks, cars and attachments. (2)

3.3 List THREE possible hazards that cause ropes to be damaged or broken. (3)

3.4 Explain the purpose of the pineapple rollers in haulage ropes. (2)

[10]

QUESTION 4

4.1 Explain why it is important to lubricate the elevator rope. (3)

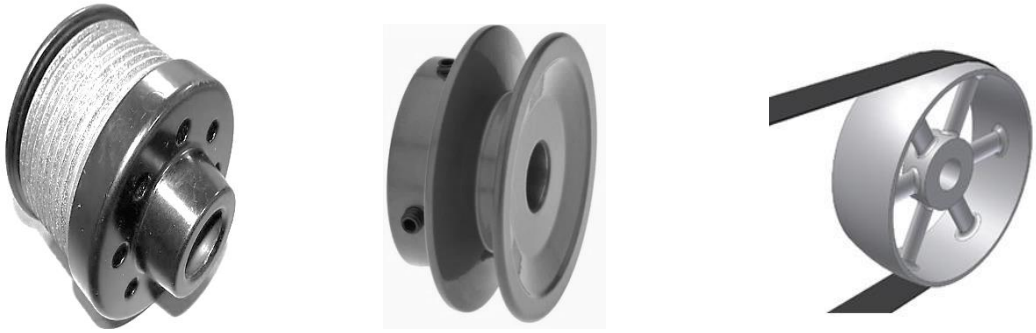
4.2 State THREE advantages of a Koepe hoist system. (3)

4.3 Explain the following terms:

4.3.1 Breaking force. (3)

4.3.2 Reserve strength. (3)

4.4 **FIGURE 2** below shows different pulleys used on winches. Write the letter (A–C) and next to the letters the name of each pulley in the ANSWER BOOK. (3)



A **B** **C**

FIGURE 2

[15]

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QUESTION 5

5.1 State FOUR points to observe during the inspection of detaching hooks and attachments. (4)

5.2 **FIGURE 3** below shows a detaching device hooked onto a hook.

Explain the process of removing the load from component 'B' and then from component 'D' shown in FIGURE 3 below. (6)

5.2

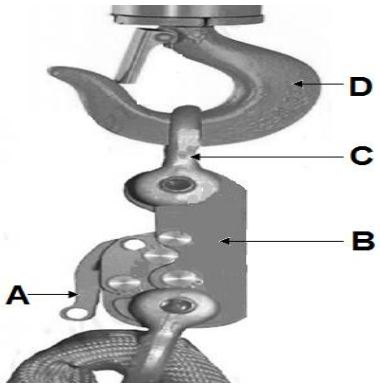


FIGURE 3

[10]

QUESTION 6

6.1 List FIVE types of travelling cranes used during lifting. (5)

6.2 Explain the assembly process of a tripod derrick anchor. (4)

6.3 Define the following terms applicable to mobile cranes, with which an operator or rigger must be familiar.

6.3.1 Derricking.

6.3.2 Stability reach.

6.3.3 Margin of stability.

(3 × 2) (6)

6.4 List FIVE advantages of braided slings compared to single or double slings. (5)

[20]

QUESTION 7

7.1 Define the term *centre of gravity.* (1)

7.2 Calculate the amount of work done in raising a mass of 4 000 kilograms of coal from a mine that is 250 meters deep. (g = 9.81 m/s). (5)

7.3 The following information is given about a steel plate which is to be used as a platform.

Length of steel plate = 1.5 metres.
Width of steel plate = 300 millimetres.
The specific mass of steel plate = 76 kilograms per square metre.

Calculate the mass of the steel plate (4)
[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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