higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

RIGGING THEORY N2

(11040852)

6 April 2020 (X-paper)
09:00–12:00

Calculators may be used.

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

114Q1A2006

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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. Write neatly and legibly.

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QUESTION 1

1.1 Name FIVE main resistance factors that must be considered when selecting wire rope. (5)

1.2 Give FIVE causes of wire-rope failure. (5)

1.3 Explain the correct method of uncoiling a fibre rope from a reel. (4)

1.4 Name THREE important factors in favour of the triangular strand ropes. (3)

1.5 List THREE safety precautions when storing wire ropes. (3)
[20]

QUESTION 2

2.1 Identify each piece of lift equipment in FIGURE 1 used for rigging by writing only the answer next to the letter (A–C) in the ANSWER BOOK.

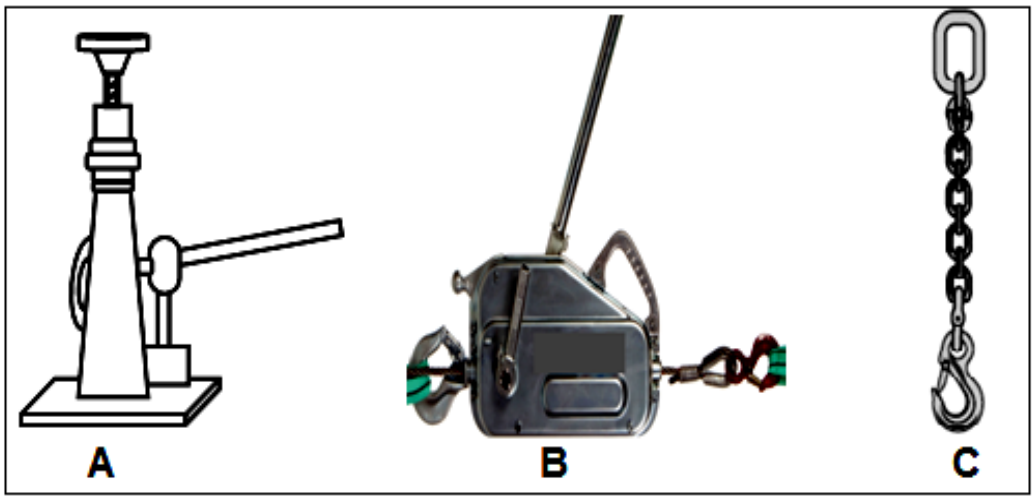


FIGURE 1 (3)

2.2 Name THREE defects that can occur on the screw jack. (3)

2.3 Explain the operation of a chain block to lift a load in rigging. (6)

2.4 Give THREE factors to remember when caring for fibre-rope slings. (3)
[15]

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QUESTION 3

3.1 Explain the purpose of mushroom rollers shown in FIGURE 2.

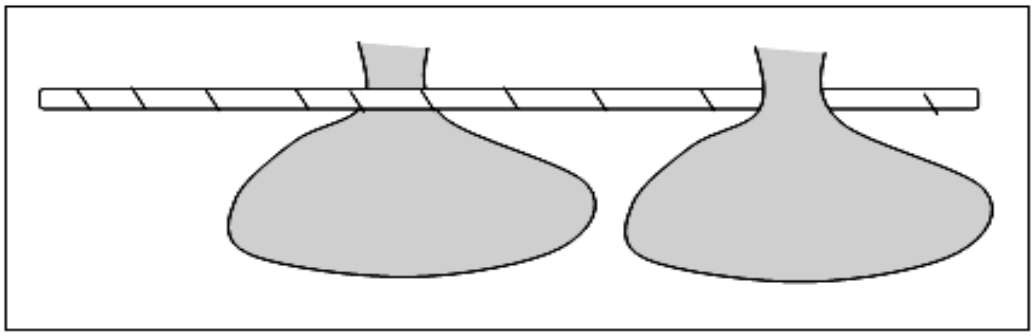


FIGURE 2

(2)

3.2 Explain each of the following terms regarding haulage rope:

3.2.1 Rope supports

3.2.2 Coiling

3.2.3 Self-detaching pulleys

(3 × 2) (6)

3.3 Define a*nnealing* in underground trucks and attachment. (2)

[10]

QUESTION 4

4.1 Identify the indicated parts of the drum winder on a winch shown in FIGURE 3 by writing the answer next to the letter (A–E) in the ANSWER BOOK.

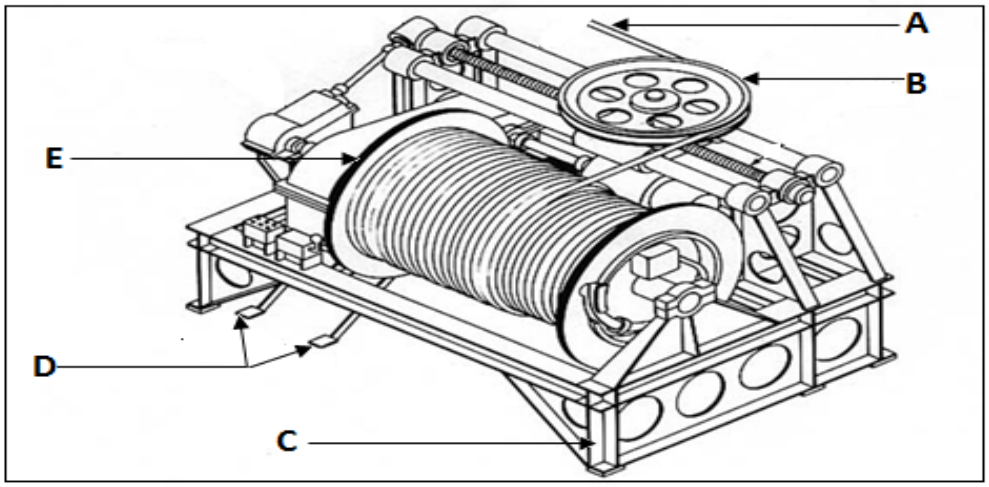


FIGURE 3

(5)

4.2 Give THREE advantages of nonspin ropes over six-stranded ropes on platform winders used for sinking shafts. (3)

4.3 Explain how the ropes on drum winders are used for sinking shafts. (3)

4.4 Name FOUR defects on pulleys regarding hoisting systems in cranes. (4)
[15]

QUESTION 5

5.1 Explain each step in FIGURE 4 showing how to basket-hitch a load onto a detaching device. Write only the answer next to the step number (1–8) in the ANSWER BOOK.

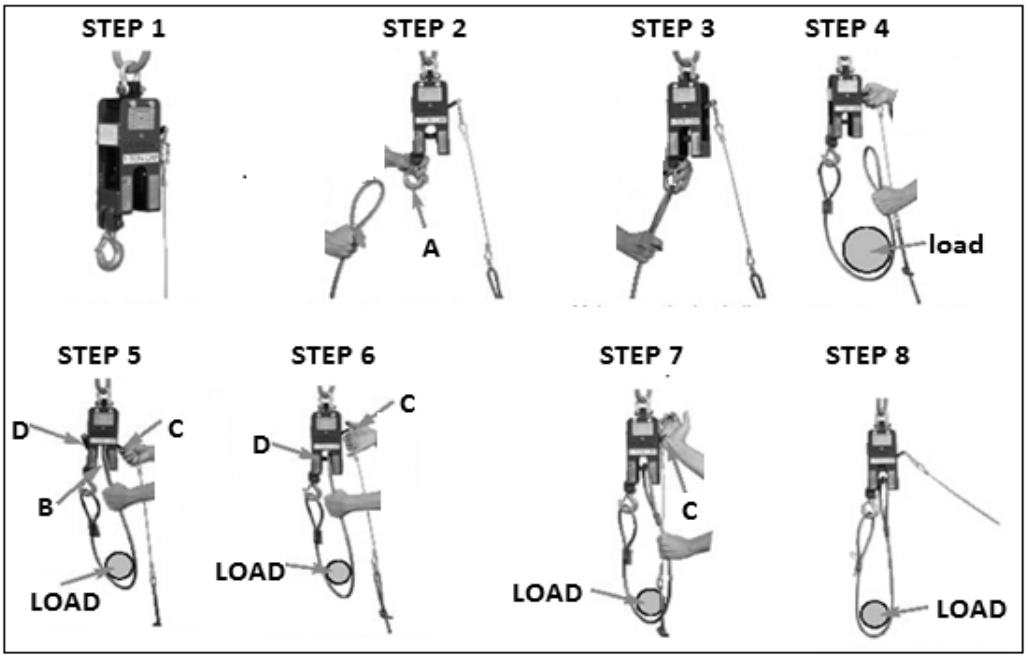


FIGURE 4 (8)

5.2 Name TWO visual defects on a compensating arm device. (2)
[10]

QUESTION 6

6.1 Define each of the following terms regarding cranes:

6.1.1 Jib crane

6.1.2 Overhead gantry crane

6.1.3 Wall crane

(3 × 2) (6)

6.2 Draw a neat, labelled sketch of a gin-pole anchor. (6)

6.3 List the FOUR main types of anchors that are commonly used. (4)

6.4 Explain a *stiff-leg Derrick anchor*. (3)

6.5 Name ONE type of mobile crane. (1)
[20]

QUESTION 7

7.1 Study FIGURE 4 showing a solid round bar that has to be lifted to a platform by a crane.

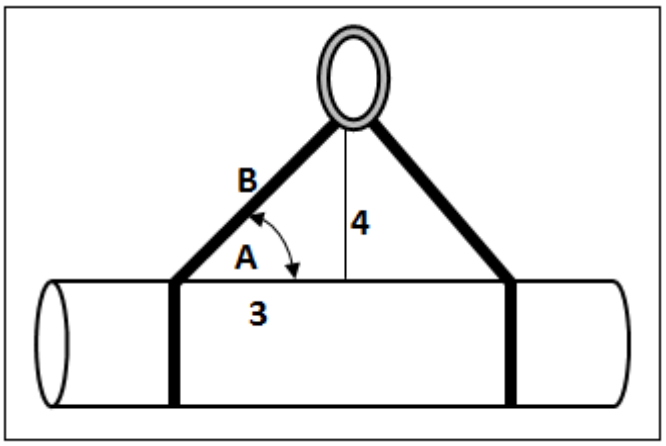


FIGURE 4

7.1.1 Calculate angle A. (3)

7.1.2 Calculate the length of B. (2)

7.2 Calculate the work done in raising a motor with a mass of 3 500 kg from ground level to a height of 4 metres. The force of gravity is 9,81 m/s. (5)
[10]

TOTAL: 100

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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. $Force = mass \times gravitational\ force$

15. $P = p \times g \times h$

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