



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1580(E)(A4)T

NATIONAL CERTIFICATE

RIGGING THEORY N2

(11041852)

4 April 2018 (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 N2
TIME: 3 HOURS
MARKS: 100

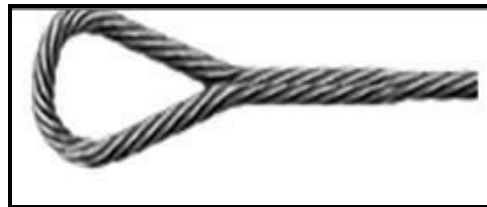
INSTRUCTIONS AND INFORMATION

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 ALL subsections of questions together.
 5. Write neatly and legibly.
-

QUESTION 1

1.1 FIGURE 1 shows different wire rope slings used during a rigging process.

Write the name of each type of sling next to the letter (A–C) in the ANSWER BOOK.



A



B



C

FIGURE 1

(3)

1.2 Explain the purpose of each of the following splices used in wire ropes:

1.2.1 Long splice

(2)

1.2.2 Short splice

(3)

1.3 Name THREE basic types of rope haulages.

(3)

1.4 Give FOUR advantages of triangular strand ropes.

(4)

1.5 Give FIVE advantages of man-made fibre ropes over natural fibre ropes.

(5)
[20]

QUESTION 2

- 2.1 FIGURE 2 shows different types of snatch blocks used during a rigging process.

Write the name of each type of snatch block next to the letter (A–C) in the ANSWER BOOK.

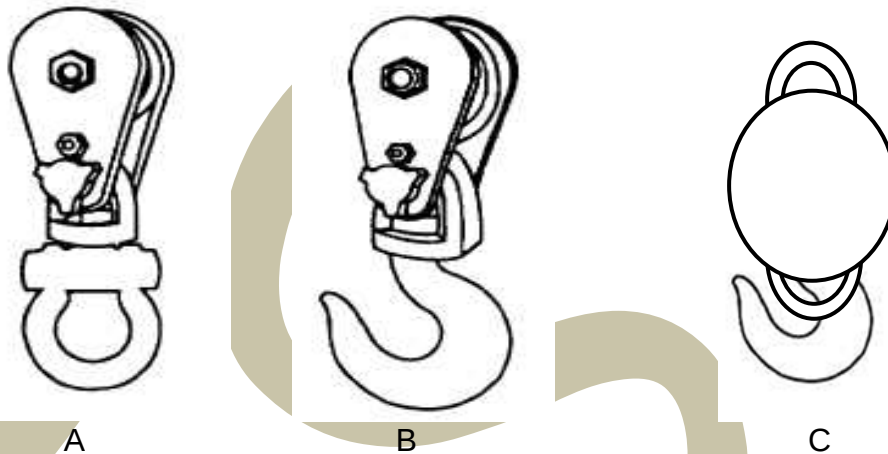


FIGURE 2

- 2.2 State THREE factors to consider when taking care of chain slings. (3)
- 2.3 Illustrate with a neat sketch how one would check the hook for any stretching defects. (3)
- 2.4 List FIVE defects that can occur on a Tirfor winch. (5)
- 2.5 List the personal protective equipment used when pulling the steel rope on the Tirfor winch. (1)
- [15]**

QUESTION 3

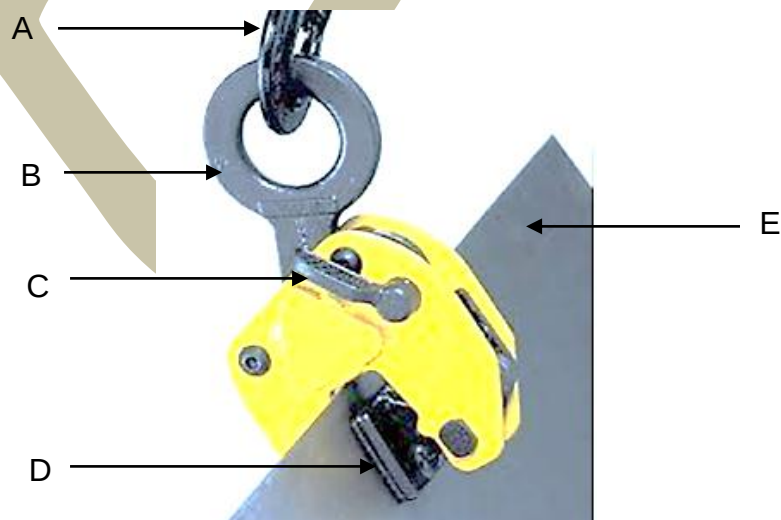
- 3.1 List FOUR points to observe during inspection of attachments. (4)
- 3.2 List THREE possible hazards that cause ropes to be damaged or broken. (3)
- 3.3 Draw a neat, labelled sketch of the location of an under-rope haulage rope during operation. (3)
- [10]**

QUESTION 4

- 4.1 List FOUR types of hoisting systems. (4)
- 4.2 Explain each of the following terms:
- 4.2.1 Breaking force
- 4.2.2 Reserve strength (2 × 3) (6)
- 4.3 Draw a neat sketch of a 90°-undercut groove in traction elevators. (2)
- 4.4 Wire ropes used with scraper haulers or winches must have flexibility, as well as good wearing qualities.
- 4.4.1 Name the type of core used in this construction. (1)
- 4.4.2 Give TWO reasons for using this type of core. (2)
- [15]**

QUESTION 5

- 5.1 FIGURE 3 shows a detachable device.
- Label the parts of the detachable device by writing the answer next to the letter (A–E) in the ANSWER BOOK.

**FIGURE 3**

- (5)
- 5.2 Name the detachable device shown in FIGURE 3. (1)
- 5.3 List FOUR visual inspections that must be done before using the device shown in FIGURE 3. (4)
- [10]**

QUESTION 6

6.1 Define each of the following terms that apply to mobile cranes:

6.1.1 Derricking

6.1.2 Stability reach

6.1.3 Margin of stability

(3 × 2)

(6)

6.2 Explain each of the following types of derricks:

6.2.1 A-frame derrick

6.2.2 Stiff-leg derrick

(2 × 2)

(4)

6.3 Give FIVE advantages of a jib crane.

(5)

6.4 Explain how the chain of a crane is annealed.

(2)

6.5 Give THREE reasons for the annealing process on a chain of a crane.

(3)

[20]

QUESTION 7

7.1 FIGURE 4 shows a solid block that must be lifted 50 metres onto a platform.

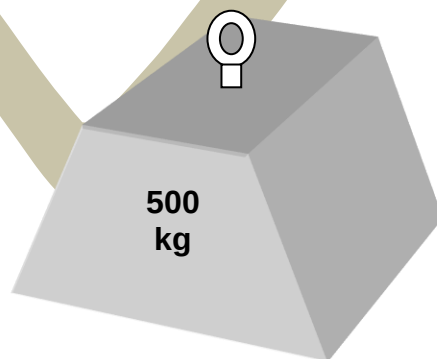


FIGURE 4

Calculate the amount of work done in raising the solid block from ground level onto the platform ($g = 9,81 \text{ m/s}^2$).

(5)

- 7.2 FIGURE 5 below shows a motor and a pump that must be lifted up to be placed onto a base.

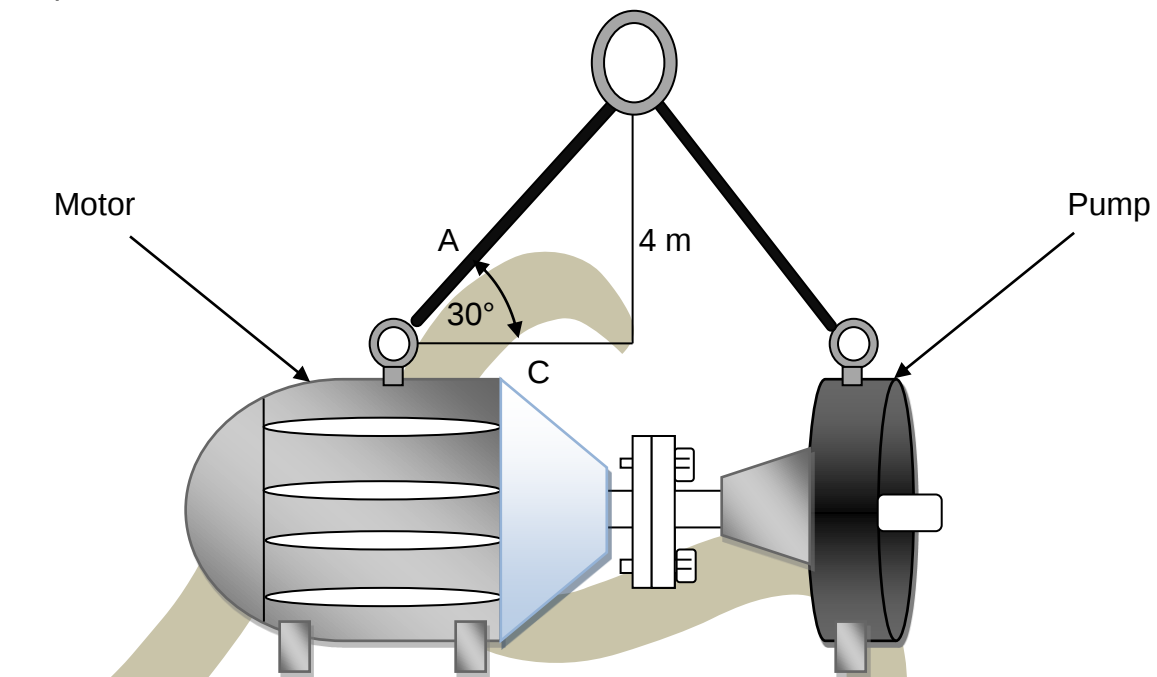


FIGURE 5

Calculate the length of A and C.

(5)
[10]

TOTAL: 100

FORMULA SHEET

Any applicable formula may also be used.

1. $A = \pi r^2$

2. $A = \frac{1}{2} \cdot b \cdot h$

3. $A = \frac{1}{4} \cdot \pi \cdot d^2$

4.. $A = l \cdot b$

5. $f = m \cdot g$

6. $\cos \theta = \frac{\text{Adjacent}}{\text{Hypoteneuse}}$

7. $\sin \theta = \frac{\text{Opposite}}{\text{Hypoteneuse}}$

8. $\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$

9. $V = l \cdot b \cdot h$

10. $V = \pi r^2 \cdot h$