



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

RIGGING THEORY N2

(11041852)

9 April 2021 (X-paper)

09:00–12:00

Nonprogrammable calculators may be used.

This question paper consists of 5 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

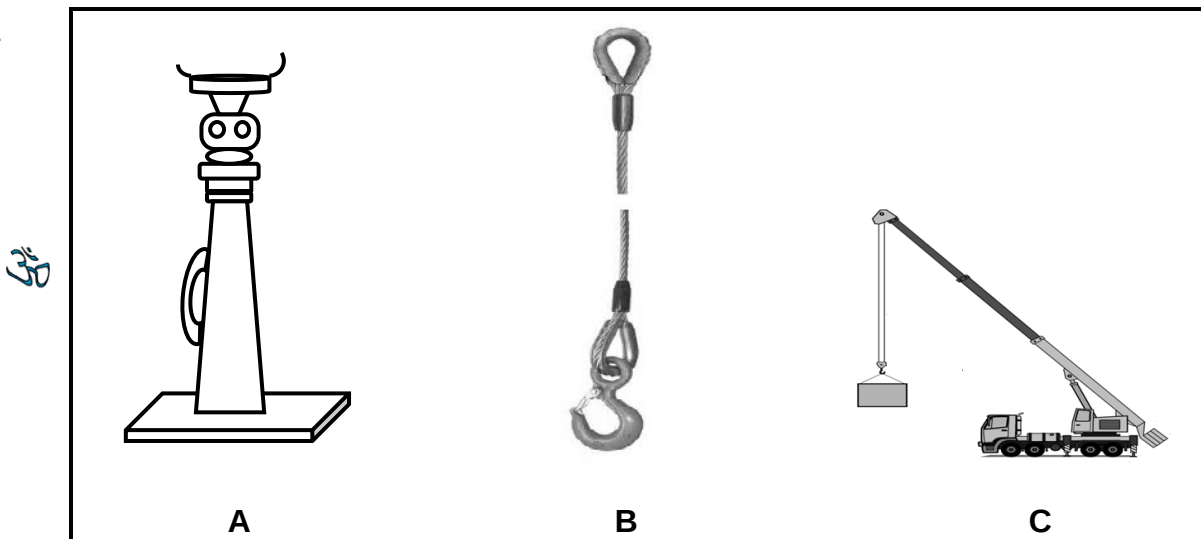
1. Answer all the questions.
 2. Read all the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Start each question on a new page.
 5. Only use a black or blue pen.
 6. Write neatly and legibly.
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QUESTION 1

- 1.1 List FOUR main forms of deterioration and causes of breakage in wire ropes. (4)
- 1.2 Name THREE factors to consider when selecting the best rope for a particular job. (3)
- 1.3 Explain each of the terms relating to wire ropes:
- 1.3.1 Resistance to crushing 30
- 1.3.2 Resistance to bending fatigue (2 × 3) (6)
- 1.4 Give FOUR advantages of a thimble fitted to the eye of a steel wire rope. (4)
- 1.5 Give THREE advantages of braided slings over single- or double-unit slings. (3)
- [20]

QUESTION 2

2.1

**FIGURE 1**

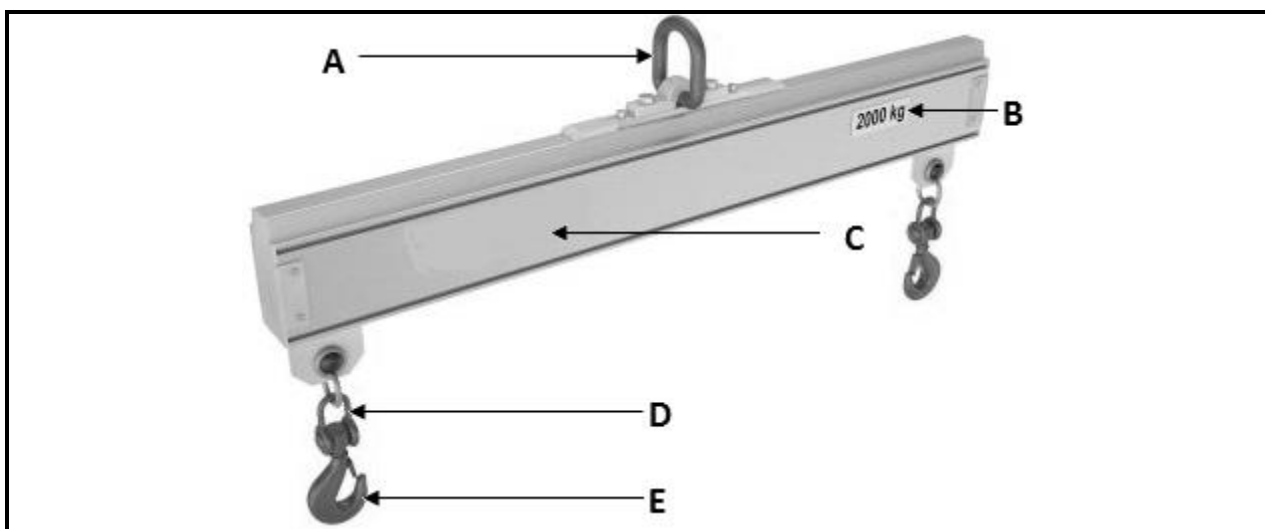
- Name the equipment shown in FIGURE 1 by writing only the answer next to the letter (A–C) in the ANSWER BOOK. (3 × 1) (3)
- 2.2 List FIVE defects that can occur on a hydraulic jack. 30 (5)
- 2.3 Give FOUR differences between chain slings and steel wire rope slings. (4)
- 2.4 List THREE defects that can occur on a hook of a snatch block. (3)
- [15]

QUESTION 3

- 3.1 Draw a neat, labelled sketch of an under and over rope used to pull a car. (4)
- 3.2 List THREE hazards that cause damage to haulage ropes. (3)
- 3.3 List THREE checks to observe when inspecting sheave wheels. (3)

[10]**QUESTION 4**

- 4.1 Give FOUR reasons why Koepe wheels and the driving motor are usually arranged above the shaft. (4)
- 4.2 Explain the construction of each of the wire ropes:
- 4.2.1 Reverse-lay rope
- 4.2.2 Nonspin rope (2 × 3) (6)
- 4.3 Explain why ferrules are fitted at the end and the front of a rope. (2)
- 4.4 List THREE safety precautions to apply when using a locomotive crane to lift a load. (3)

[15]**QUESTION 5****FIGURE 2**

- 5.1 Name the detaching device used during a lifting process shown in FIGURE 2. (1)
- 5.2 Label the detaching device shown in FIGURE 2 by writing only the answer next to the letter (A–E) in the ANSWER BOOK. (5 × 1) (5)

5.3 Explain how to release the detaching device shown in FIGURE 2.

(4)
[10]



QUESTION 6

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

6.1.1 Load indication

6.1.2 Blocking-up base

6.1.3 Derricking

(3 × 2) (6)

6.2 Name THREE differences between an overhead crane and an automotive crane.

(3)



6.3 Explain the erecting of a gin pole anchor.

(4)

6.4 Name TWO types of jacks used during a lifting process.

(2)

6.5 Explain how to determine whether there is a defect with the brakes on the hoisting drum of a gantry crane when lifting a load.

(5)
[20]

QUESTION 7

FIGURE 3 shows a square tank (3 × 3 m) filled with water to a level of 2,5 m. Water is pumped from the tank until the depth of the water in the tank is 0,6 m.

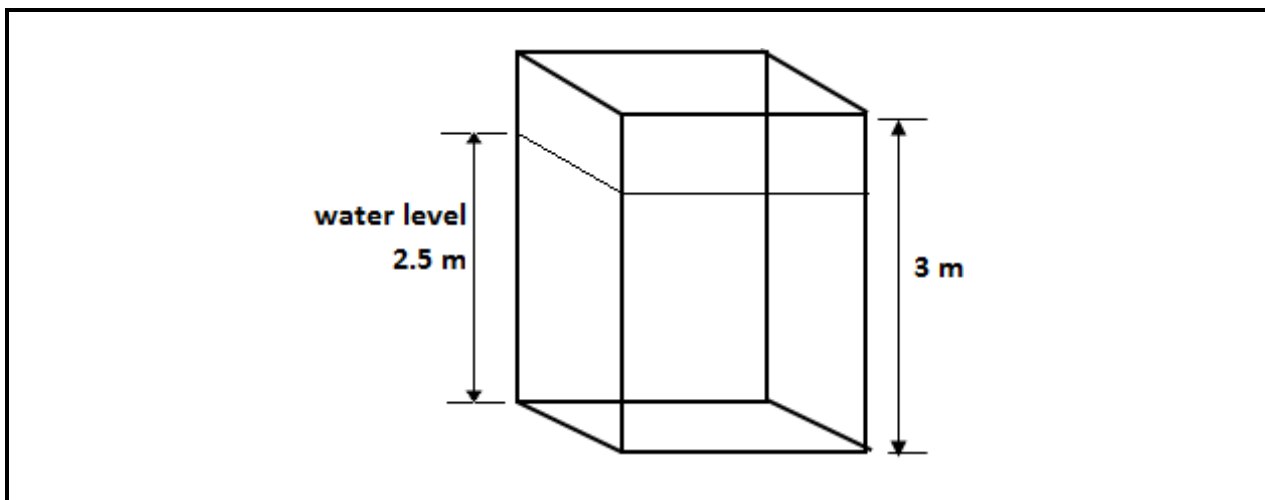


FIGURE 3

7.1 Calculate the volume of water that has been pumped out in cubic metres.

(4)

7.2 Calculate the mass of water that has been pumped out in kilograms. The density of the water (ρ) = 1 000 kg/m³.

(3)



7.3 Calculate the pressure at the bottom of the tank after the water has been pumped out. Force of gravity = 9,81 m/s².

(3)
[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. $A = L \cdot L$

5. $A = l \cdot b$

6. $f = m \cdot g$

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

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

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

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

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

12. $V = A \cdot h$

13. $\text{Work done} = \text{force} \times \text{distance}$

14. $\text{Force} = \text{mass} \times \text{gravitational force}$

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