



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE BUILDING AND STRUCTURAL CONSTRUCTION N5

(8060015)

**26 August 2021 (X-paper)
09:00–13:00**

CLOSED BOOK EXAMINATION

**REQUIREMENTS: ONE A2 and ONE A3 drawing sheet
Hot-rolled steel sections (BOE 8/2)
Answer book (8/13)**

Drawing instruments and nonprogrammable calculators may be used.

This question paper consists of 7 pages and 1 formula sheet.

160Q1G2103

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
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BUILDING AND STRUCTURAL CONSTRUCTION N5
TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
 2. Read all the questions carefully.
 3. Answer QUESTION 4 on the A3 drawing paper. Answer QUESTIONS 5 and 6 on the A2 drawing paper. Answer all the other questions in the ANSWER BOOK.
 4. Number the answers according to the numbering system used in the question paper.
 5. Do all drawings in pencil with bold outlines.
 6. Do all drawings in accordance with the National Standards.
 7. All drawings must be fully labelled with descriptive notes and dimensions where applicable.
 8. All calculations must conform to the relevant SABS/SANS Code of Practices.
 9. Write neatly and legibly.
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QUESTION 1

FIGURE 1 below shows two tie bars connected by means of two connector plates. The joint is held together by means of six bolts.

Calculate the following: 

1.1 The diameter of the bolts

SPECIFICATIONS:

- Shear stress of 104 MPa with a 96 kN load (4)

1.2 The maximum load that the bolts can safely withstand if M16 bolts are used to connect the plates

SPECIFICATIONS:

- Bearing stress of 248 MPa
- 125 × 8 mm tie bars
- 6 mm thick connector plates (3)

1.3 The tearing stress if M12 bolts are used

SPECIFICATIONS: 

- 130 × 8 mm thick tie bars
- 295 kN applied force (3)

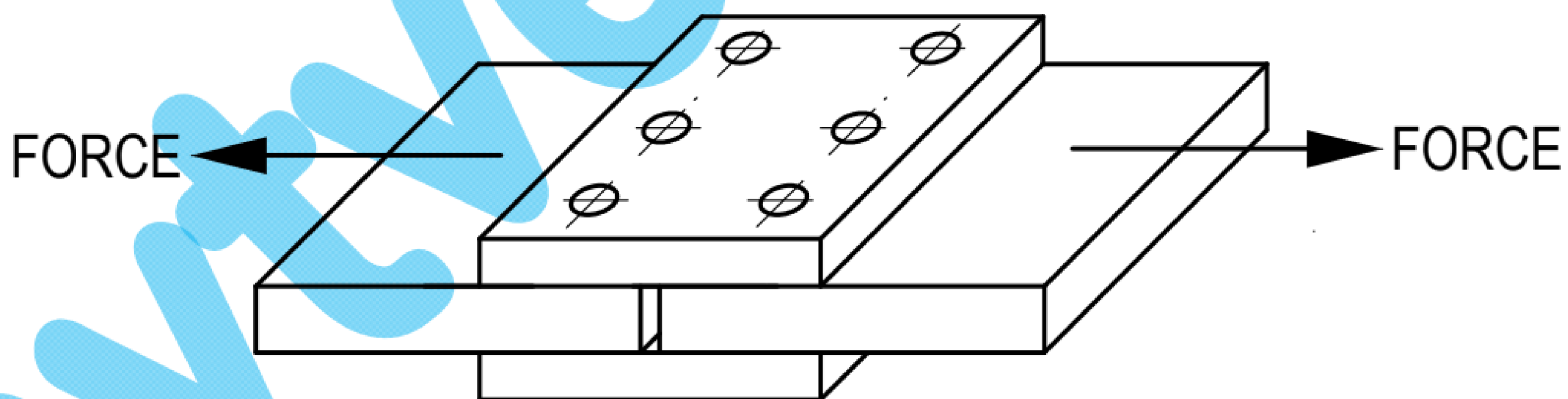


FIGURE 1

[10]