higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 3

(12020343)

21 November 2018 (X-Paper)
09:00–12:00

This question paper consists of 8 pages.

NCV

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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.

NEW

QUESTION 1: THE THEORY AND USE OF REINFORCED CONCRETE

1.1 Define the following terms:

1.1.1 Compression strength

1.1.2 Tensile force

1.1.3 Shear strength

(3 × 2) (6)

1.2 Give FIVE reasons, why reinforced concrete will start to crack or collapse. (5)

1.3 Explain the term *bearing failure.* (2)

1.4 Make a neat labelled drawing to illustrate the idea of punching shear failure in concrete structures. (4)

1.5 Give THREE reasons, why we use stirrups in concrete beams or columns. (3)

1.6 A continuous beam has many columns acting as supports.

Make a neat sketch showing the stress distribution in a continuous beam. (5)
[25]

QUESTION 2: REINFORCED CONCRETE IN CONSTRUCTION

2.1 Give FIVE reasons why steel is the most practical material to be used as reinforcement. (5)

2.2 When we change the shape and the size of metal at room temperature, we call it cold working.

List and explain the FOUR methods of cold working which are commonly used in the industry. (4 × 2) (8)

2.3 Drawing is a metalwork process that uses tensile forces to stretch metal.

Name and discuss TWO types of cold drawing. (6)

2.4 Name THREE disadvantages of polypropylene fibre. (3 × 2) (6)
[25]

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QUESTION 3: REINFORCING DOCUMENTATION

3.1 Explain the following terms.

3.1.1 Prefix

3.1.2 Tolerance

3.1.3 Convention

(3 × 1) (3)

3.2 What are the tolerances of the following reinforced steel below?

3.2.1 Straight length bars.

3.2.2 Bending more than 2 mm bar.

3.2.3 Bending between 1 m and 2 m.

(3 × 1) (3)

3.3 Correctly interpret the following abbreviation in full according to SABS 1044-1995:

3.3.1 NTS.

3.3.2 o/a.

3.3.3 T.

3.3.4 T3.

3.3.5 B3.

3.3.6 STG.

(6 × 1) (6)

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3.4 The following symbols are used when reinforcement bars have to be placed. Write down the meaning of each symbol in full.

3.4.1



3.4.2



3.4.3



3.4.4



(4 × 2) (8)

3.5 Explain the following different types of lines used on the reinforcing drawings:

3.5.1 Continuous thick lines.

3.5.2 Continuous thin lines.

3.5.3 Broken lines.

3.5.4 Chain dotted lines.

3.5.5 Shaded portions or hatched area.

(5 × 1) (5)
[25]

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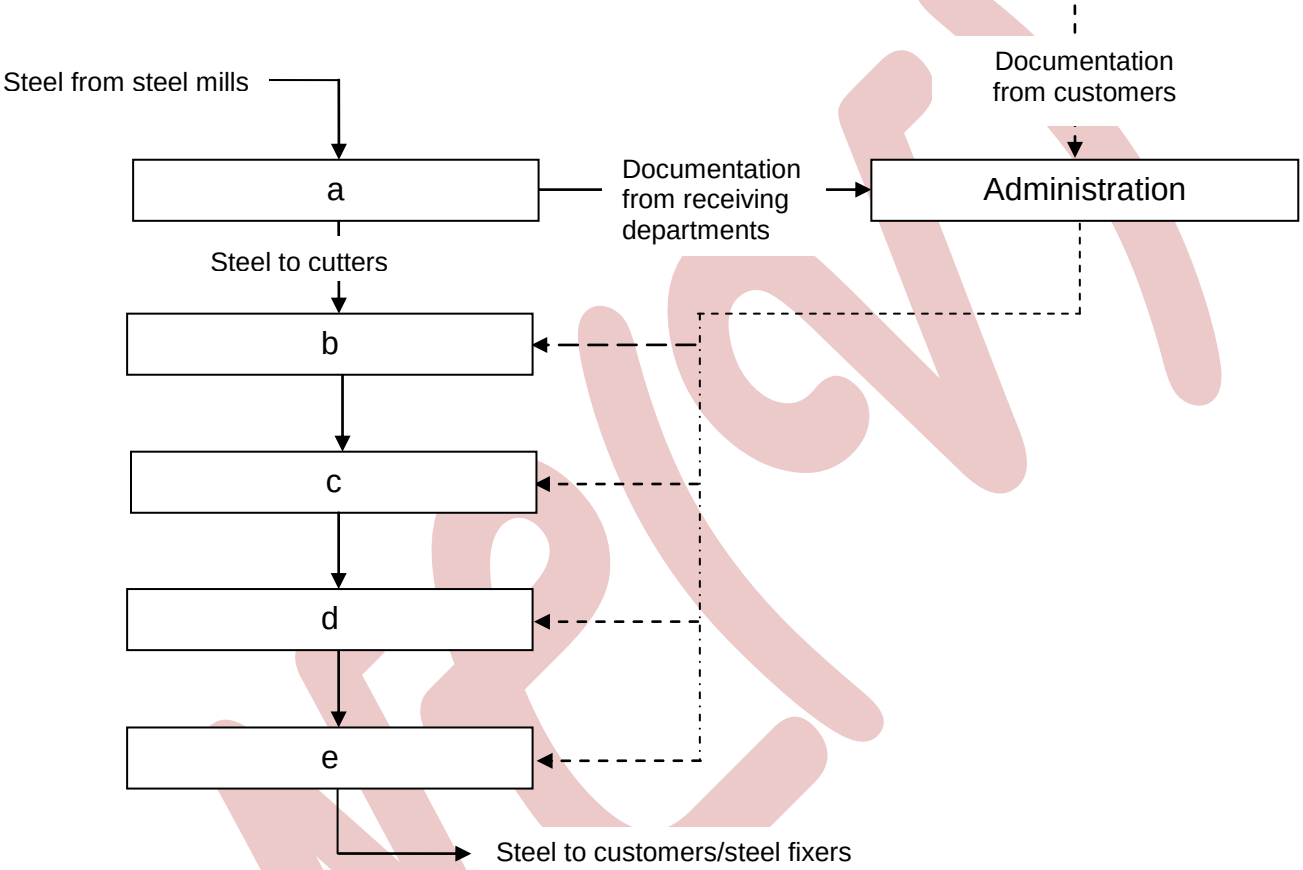
QUESTION 4: FABRICATION OF REINFORCED STEEL

4.1 There are various activities that take place in the steel yard. Complete the following process taking place in the steel yard below, by writing the answer next to the letter (a)–(e) in the ANSWER BOOK.



(5 × 1) (5)

4.2 Study the cutting sheet below (FIGURE A) and answer the questions that follow. Write the answer next to the number (4.2.1–4.2.7) in the ANSWER BOOK.

No. Labels :4
No. 08
Cutting Sheet No. H25251
WALL FOOTINGS
JJ Contractors CONTRACT: 7707 HAT
Domino REIF
Drawing No. 04
Bar Mark: 136

242 **R16** **4 250**

400



240

3 500

FIGURE A

4.2.1 Who is the buyer?

4.2.2 What is the bar mark?

4.2.3 How many steel bars are there?

4.2.4 What is the shape code number of the steel profile?

4.2.5 What is the grade and diameter of the steel?

4.2.6 What is the cutting length of the steel?

4.2.7 Where will you place these bars in the building project?

(7 × 1) (7)

4.3 Explain the following terms.

4.3.1 Cranking bars

4.3.2 Spacers

(2 × 2) (4)

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4.4 Mr Nkosi works for WHBO Construction company as a steel fixer, he has to fix reinforcement for a concrete beam.

Write down the step by step procedure in which reinforcing bars for beams are fixed together. (5)

4.5 State TWO reasons why reinforcement must be completely clean before it is placed in formwork. (2)

4.6 Name TWO ways of cleaning dirt, mud or grease when it contaminate reinforcement. (2)

[25]

TOTAL: 100

NEW

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