higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEEL WORK DETAILING

(First Paper**)**

NQF LEVEL 3

(12050663)

12 November 2018 (X-Paper)
09:00–11:00

REQUIREMENTS: **A4 drawing sheet**

Calculators may be used.

This question paper consists of 5 pages.

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TIME: 2 HOURS
MARKS: 75

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. Rule off across the page on completion of each question.
6. Drawings and sketches must be done neatly using drawing instruments.
7. Write neatly and legibly.

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QUESTION 1: GENERAL

1.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (1.1.1–1.1.9) in the ANSWER BOOK.

1.1.1 Rafters are main beams supporting a roof.

1.1.2 False work is a temporary structure used to support a permanent structure while it is not self-supporting.

1.1.3 SANS stands for South African National Surveying.

1.1.4 Compressive strength is the ability of concrete not to break when pulled apart.

1.1.5 A gusset plate transfers loads between members.

1.1.6 A retaining wall reacts to forces in much the same way as a cantilever.

1.1.7 A purlin is the section used to support a heavy column.

1.1.8 Steel formwork is initially less costly than timber formwork.

1.1.9 A welded joint in which pieces of metal form a jointed overlap is called a butt weld.

(9 × 1) (9)

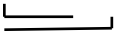
1.2 Make free-hand drawings of each of the THREE forces that act on concrete and name each force. (6)

[15]

QUESTION 2: REINFORCED CONCRETE DETAILING

2.1 Write down each of the following abbreviations in full:

2.1.1 EW 

2.1.2 ABR 

2.1.3 STGD 

(3 × 1) (3)

2.2 Name TWO materials used in reinforced concrete and explain the role each material plays. (4)

2.3 Detailing involves a schematic description of the way in which steel is placed.

Briefly describe how to orient reinforcement bars on a slab. (2)

2.4 Give TWO advantages of using steel for reinforcing. (4)

2.5 Name FOUR types of footing generally used. (4)

2.6 What is the function of a structural engineer? (3)
[20]

QUESTION 3: STRUCTURAL STEEL WORK DETAILING

3.1 Describe the purpose of a gusset connection. (3)

3.2 List FOUR simple rules for gusset fabrication. (4)

3.3 Name THREE important things to consider when detailing the top and bottom chords of a lattice girder. (3)

3.4 Explain where portal framed buildings are used. (3)

3.5 Name TWO disadvantages of steel portal framed structures. (4)

3.6 List THREE types of column bases used in steel buildings. (3)
[20]

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QUESTION 4: WELDING

4.1 Choose a description from COLUMN B to match an item in COLUMN A. Write only the letter (A–E) next to the question number (4.1.1–4.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
4.1.1	Crater	A	crust that results from fusion of electrode
4.1.2	Electrode	B	straight weld bead with little or no side-to-side movement
4.1.3	Weld pool	C	welding rod
4.1.4	Stringer beads	D	formed at the end of a run when weld is stopped
4.1.5	Slag	E	molten metal consisting of electrode filler and base metal

(5 × 1) (5)

4.2 Name FOUR different types of protective clothing you have to wear during welding operations. (4)

4.3 The quality of a weld can be checked by testing its strength.

State FOUR factors on which strength depends. (4)

4.4 Write down each of the following acronyms in full:

4.4.1 MMAW (1)

4.4.2 ESW (1)

4.5 Name FIVE metals for which gas metal arc welding is a fast welding process. (5)

[20]

TOTAL: 75

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