higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# NATIONAL CERTIFICATE (VOCATIONAL)

# CIVIL AND STRUCTURAL STEEL WORK DETAILING
## NQF LEVEL 2

(12050652)

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

**REQUIREMENTS:** **A4 drawing sheets**
**Answer book**

**Drawing instruments may be used.**

**This question paper consists of 7 pages.**

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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. Start each question on a NEW page.
5. Rule off across the page on completion of each question.
6. Make drawings and sketches clear enough to show detail.
7. Fully dimension and label ALL drawings.
8. Write neatly and legibly.

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## QUESTION 1: INTRODUCTION TO CIVIL AND STRUCTURAL STEEL WORK

1.1 Briefly explain why abbreviations are necessary in a drawing. (2)

1.2 Name each of the drawing lines shown in FIGURE 1 by writing only the answer next to the question number (1.2.1–1.2.8) in the ANSWER BOOK.

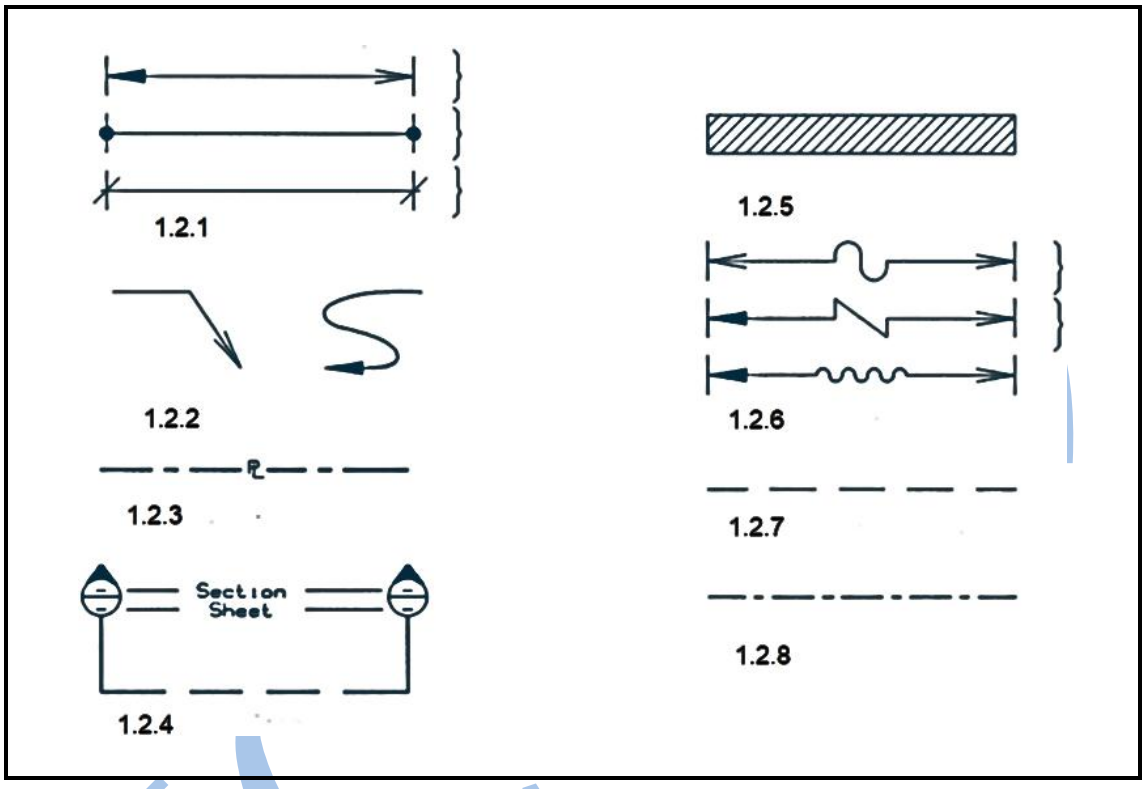



**FIGURE 1** (8 × 1) (8)

1.3 How can welding be represented on a drawing? (2)

1.4 Discuss the function of footings in a concrete column. (2)

1.5 Describe a grid system in detailing columns. (3)

1.6 What does the label 30Y-09-120-T2 mean and where would one find it? (5)

1.7 Name the reinforcement bars, commonly used in concrete reinforcement, shown in FIGURE 2 by writing only the answer next to the question number (1.7.1–1.7.5) in the ANSWER BOOK.

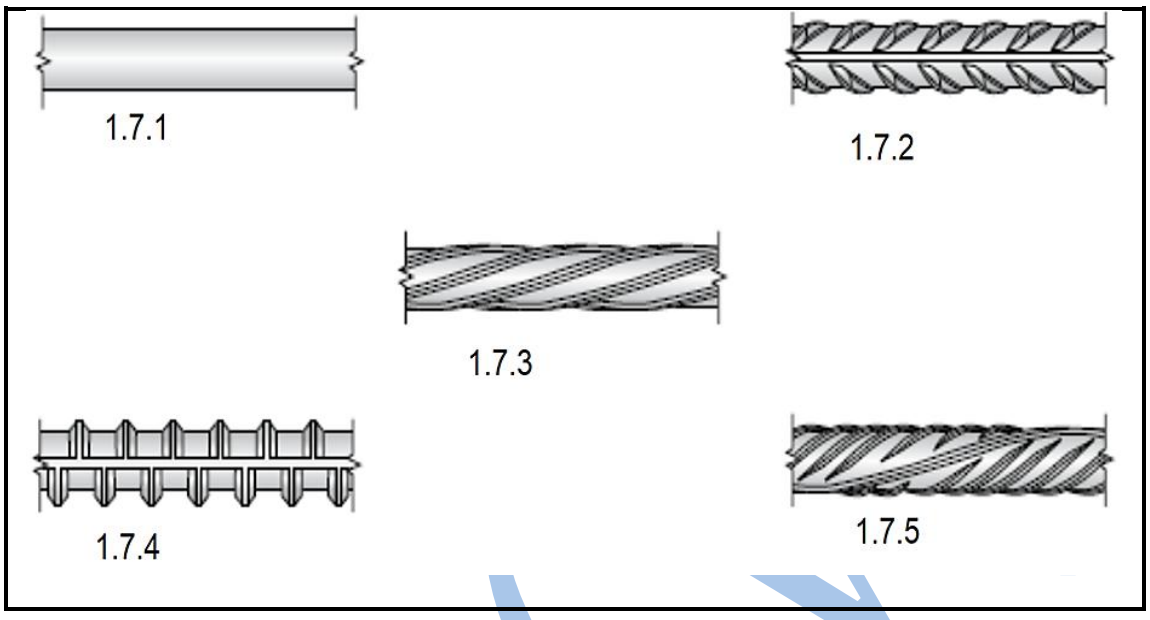



**FIGURE 2** (5 × 1) (5)

1.8 Explain how individual steel pieces can be identified during all stages of fabrication. (3)

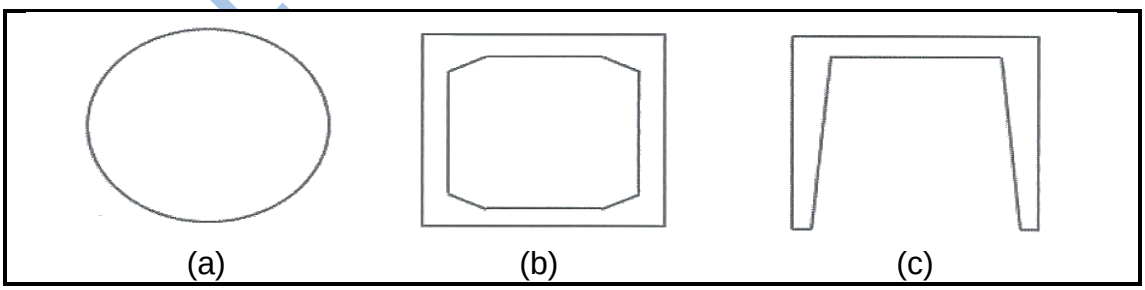
1.9 Describe how steel to be galvanised can be temporarily marked. (2)

1.10 The performance of protective paint coatings and related products applied to steel is significantly affected by the state of the steel surface immediately prior to painting.

Outline the benefits of priming steel before painting. (3)

1.11 Explain *prefabricated steel sections*. (2)

1.12 Name each of the following structures:




(3)
**[40]**

## QUESTION 2: STRUCTURAL STEEL WORK AND REINFORCED CONCRETE

2.1 Briefly discuss the implications of a poorly done or missing bending schedule. (4)

2.2 FIGURE 3 shows a composite truss. Various steel sections are used to construct and join different components.

Sketch and name FIVE such components or sections.

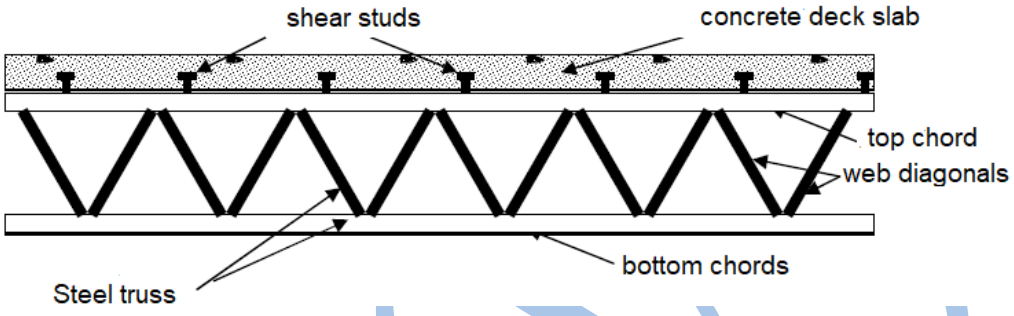



**FIGURE 3** (5 × 1) (5)

2.3 Draw, to scale 1:10, the shape in FIGURE 4 on an A4 DRAWING SHEET. Fully dimension the drawing. The beam and column depths are 800 mm and 650 mm respectively with a cover of 50 mm.

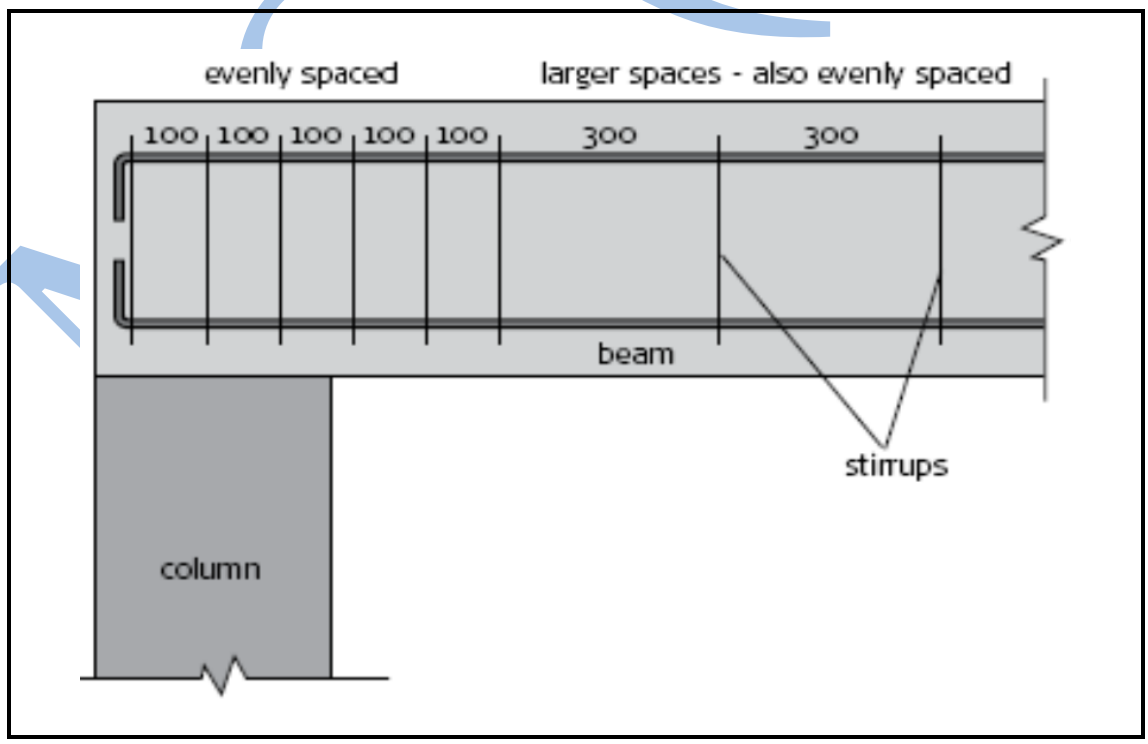



**FIGURE 4** (12)

2.4 State FOUR factors that determine the fire-resistant ability of concrete. (4)

2.5 The members of trusses are made of either rolled steel sections or built-up sections depending on the span length, intensity of loading, etc. FIGURE 5 shows three categories, namely light, heavy and built-up sections.

Name TWO profiles shown in each section and give ONE application of each.

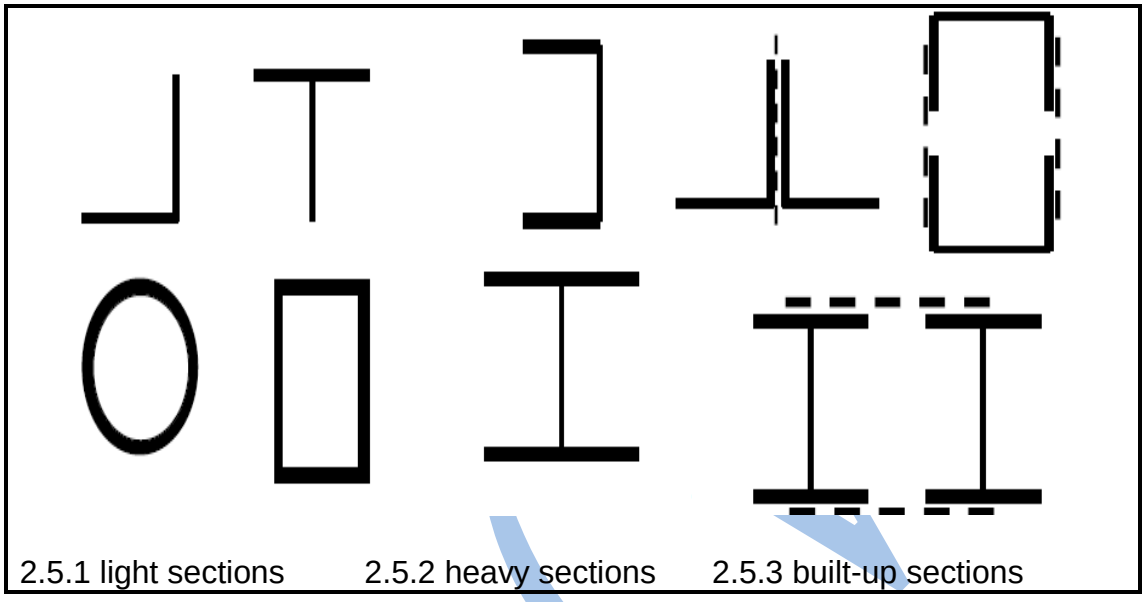



**FIGURE 5** (3 × 3) (9)

2.6 Differentiate between hat and stiffened-hat sections; Z and stiffened-Z sections; channels and stiffened channels of cold-formed profiles. (6)
**[40]**

## QUESTION 3: BOLTS IN STRUCTURAL STEEL WORK

3.1 Name the parts shown in FIGURE 6 by writing only the answer next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

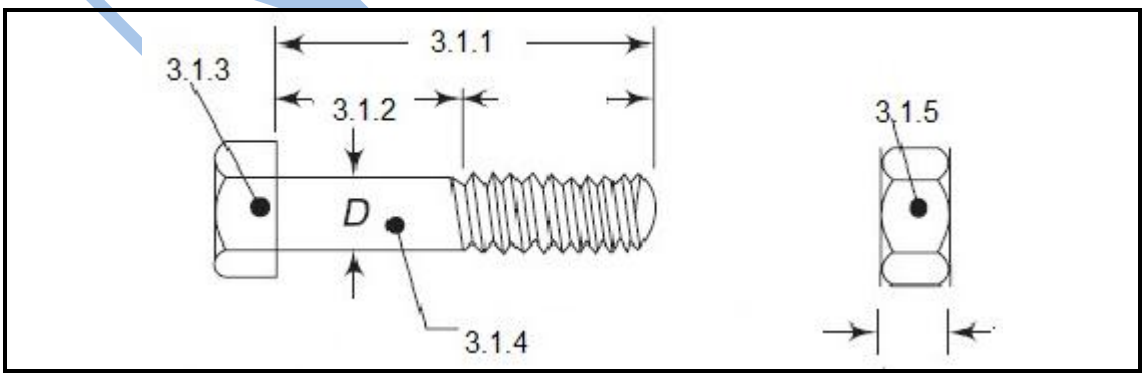



**FIGURE 6** (5 × 1) (5)

3.2 List FIVE factors that determine the classification of bolts. (5)
**[10]**

## QUESTION 4: WELDING SYMBOLS AND JOINTS

4.1 Explain why it is important to understand and accurately show weld symbols. (1)

4.2 Name FOUR basic weld positions. (4)

4.3 Interpret the following joint designation:




(5)
**[10]**

**TOTAL: 100**

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