higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEEL WORK DETAILING (CAD COMPONENT)

(Second Paper)

NQF LEVEL 3

(12050663)

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

REQUIREMENTS: **Yellow cover folder (BOE 8/15)**
A4 drawing sheets
Hot-rolled structural steel sections (BOE 8/2)

Calculators may be used.

This question paper consists of 4 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. Insert ALL loose DRAWING SHEETS in the folder and do NOT staple.
5. Start each question on a NEW page.
6. Rule off across the page on completion of each question.
7. Make drawings and sketches big enough to show detail.
8. Write neatly and legibly.

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QUESTION 1: REINFORCED-CONCRETE DETAILING AND SPECIFICATIONS

1.1 Use the information below and draw a longitudinal view of a rectangular pile cap supported by FOUR piles using CAD.

Pile diameter:	500 mm
Pile spacing:	3,450 m c/c
Column dimensions:	400 × 400 mm
Pile-cap dimensions:	4,45 m × 2,8 m × 1 m

The pile extends 150 mm into the pile cap. Each pile is reinforced with 8Y16s. The bottom reinforcement in the pile cap is Y25@300 c/c. (20)

1.2 A hexagon concrete column with 400 mm sides, eight Y20 longitudinal bars and R6 helical binders at 150 mm centre must be constructed.

Draw, to scale 1:10, a vertical longitudinal section and a horizontal cross section through the column to show the constructional details. Show at least 500 mm of the length of the column and label the drawing. (15)
[35]

QUESTION 2: STRUCTURAL STEEL WORK DETAILING AND SPECIFICATIONS

2.1 FIGURE 1 shows a typical section through a steel portal frame for a church building.

Use a suitable scale to make a neat drawing detailing the connection at 1.

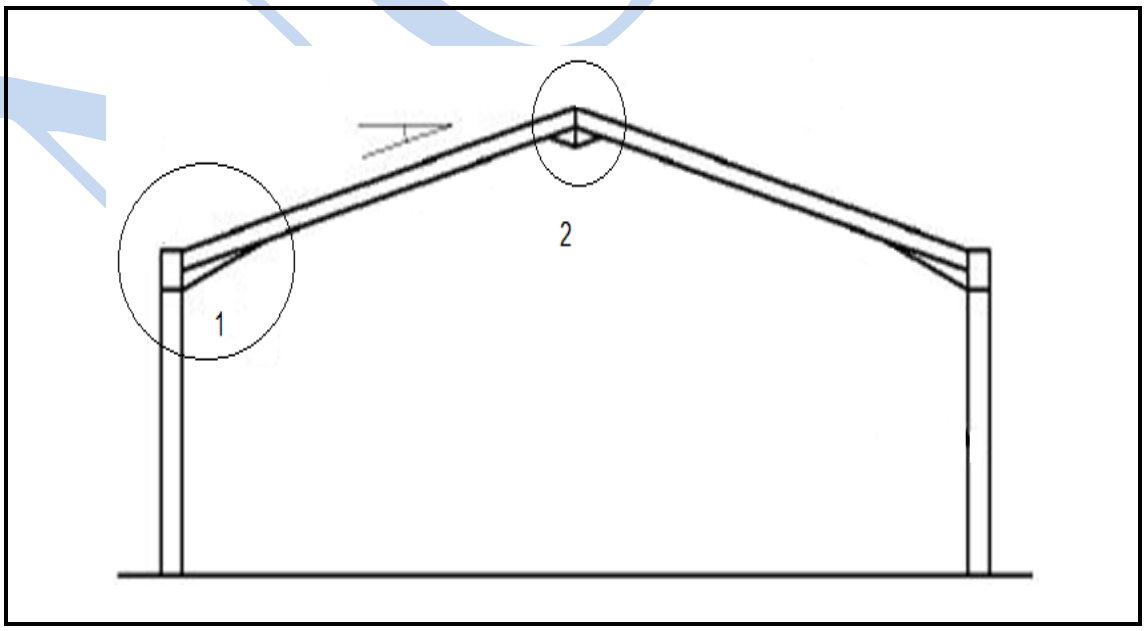


FIGURE 1 (15)

2.2 Draw, to scale 1:1, a fully labelled section through TWO rolled-steel channels 175 × 55 × 13 kg/m (back to back). ALL bolt holes are drilled on the centre lines of the angles and ALL bolts are M20. Neatly print the size and scale of the profile centred beneath the drawing. (10)
[25]

QUESTION 3: STRUCTURAL STEEL WORK DETAILING

3.1 Explain the functions of welding symbols. (2)

3.2 FIGURE 2 shows the basic elements of a complete welding symbol.

Explain in detail the meaning of these elements.

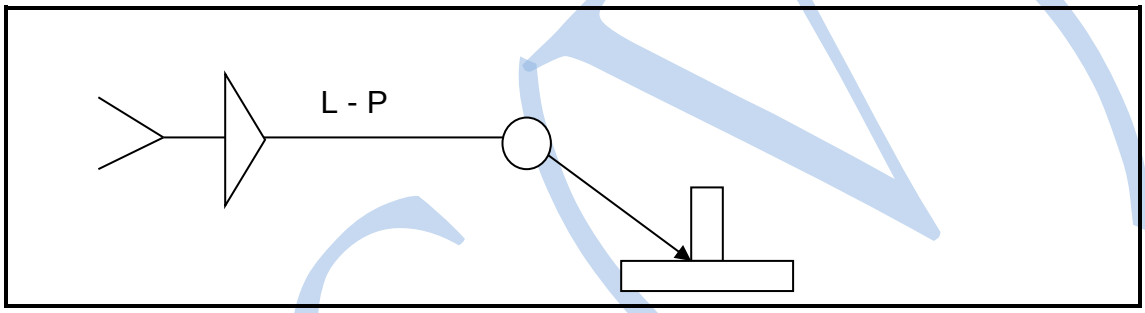
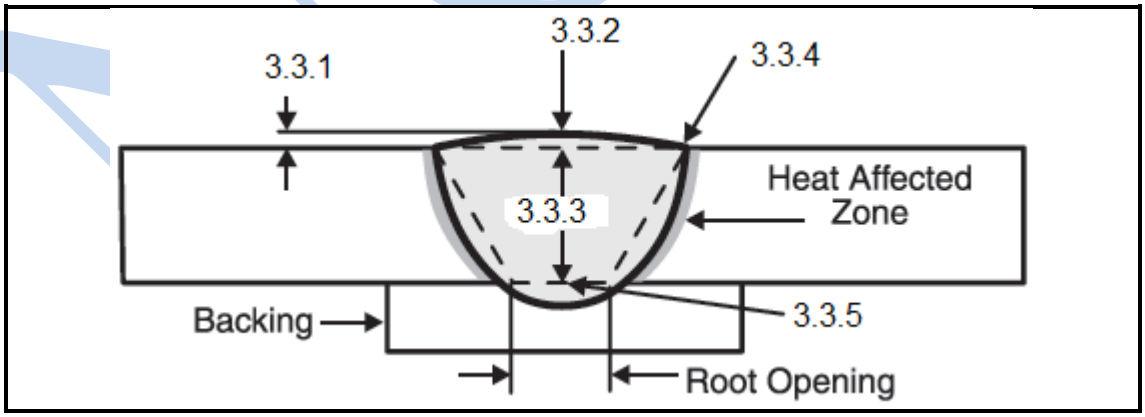


FIGURE 2 (8)

3.3 Study the full-penetration weld below and complete the missing elements by writing only the name next to the question number (3.3.1–3.3.5) in the ANSWER BOOK.



(5 × 1) (5)
[15]

TOTAL: 75

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