higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEELWORK DETAILING (CAD COMPONENT)

(Second Paper)

NQF LEVEL 4

(12050674)

15 March 2015 (X-Paper)

09:00 – 13:00

REQUIREMENTS: Yellow cover folder BOE 8/15 and A4 drawing paper.
Hot rolled structural steel sections BOE 8/2

Insert all loose answer sheets in folder: do not staple.

Calculators may be used.

This question paper consists of 5 pages.

NCV

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TIME: 4 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. Write neatly and legibly.
5. Start each question on a new page.
6. Rule off across the page on completion of each question.
7. Drawings and sketches must be made **big** enough to show detail.

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QUESTION 1: REINFORCED CONCRETE DETAILING AND SPECIFICATIONS

1.1 Draw a plan view of a pile cap
A different number of piles can be used per pile cap. These piles must be equally spaced depending on the shape and number of piles.
Design and draw to a scale of 1 : 10 the plan view of a pile cap with four piles:

Show all dimension and add a title block to the drawing

Pile diameter:	Ø 300 mm	
Pile spacing:	Equi - spaced	
Column dimensions:	400 x 400 mm	
Pile cap dimensions:	1900 mm × 1900 mm × 400 mm	(10)

1.2 Make a neat scale drawing of the following culverts using the following details:

1.2.1 Circular Culvert

1.2.2 Box Culvert

1.2.3 Portal Culvert

Total height of all culverts:	2 m	
Scale:	1 : 20	
Size not given:	Use your own discretion	(12)
		[22]

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QUESTION 2: STRUCTURAL STEELWORK DETAILING AND SPECIFICATIONS

2.1 Draw to scale 1 : 1, a fully labeled section through the following steel profile: Rolled steel channel, 120 × 55 × 13 kg/m. Neatly print the size and scale of the profile centrally beneath the drawing. (8)

2.2 Refer to FGURE 1, DIAGRAM SHEET 1. Draw, to scale 1 : 5 typical details of the following:

2.2.1 Detail A

2.2.2 Detail B

SPECIFICATION:
Top and bottom booms: rolled steel angle profiles: 90 × 90 × 8
All internal members: rolled steel angle profiles: 70 × 70 × 8
Gusset Plates 10 mm thick
Use your discretion for bolt hole centres and edge distances

All bolt holes are drilled on the centre lines of the angles and all bolts are M16. Insert suitable dimensions.

Print a suitable title and scale central below the details (15)

2.3 Refer to FIGURE on the DIAGRAM SHEET (attached) and make fully detailed drawings (scale 1 : 10) of the columns marked C1 and C2 and supply enough information for the manufacturing of the columns in the workshop. All plates are 10mm thick and bolts are M20.

Show the following information:

2.3.1 Lengths and sizes of columns

2.3.2 Dimensions of the columns over cap and base plates

2.3.3 Dimensions for the drilling of bolt holes

2.3.4 View width dimensions of cap and base plates

(30)

[53]

TOTAL: 75

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DIAGRAM SHEET

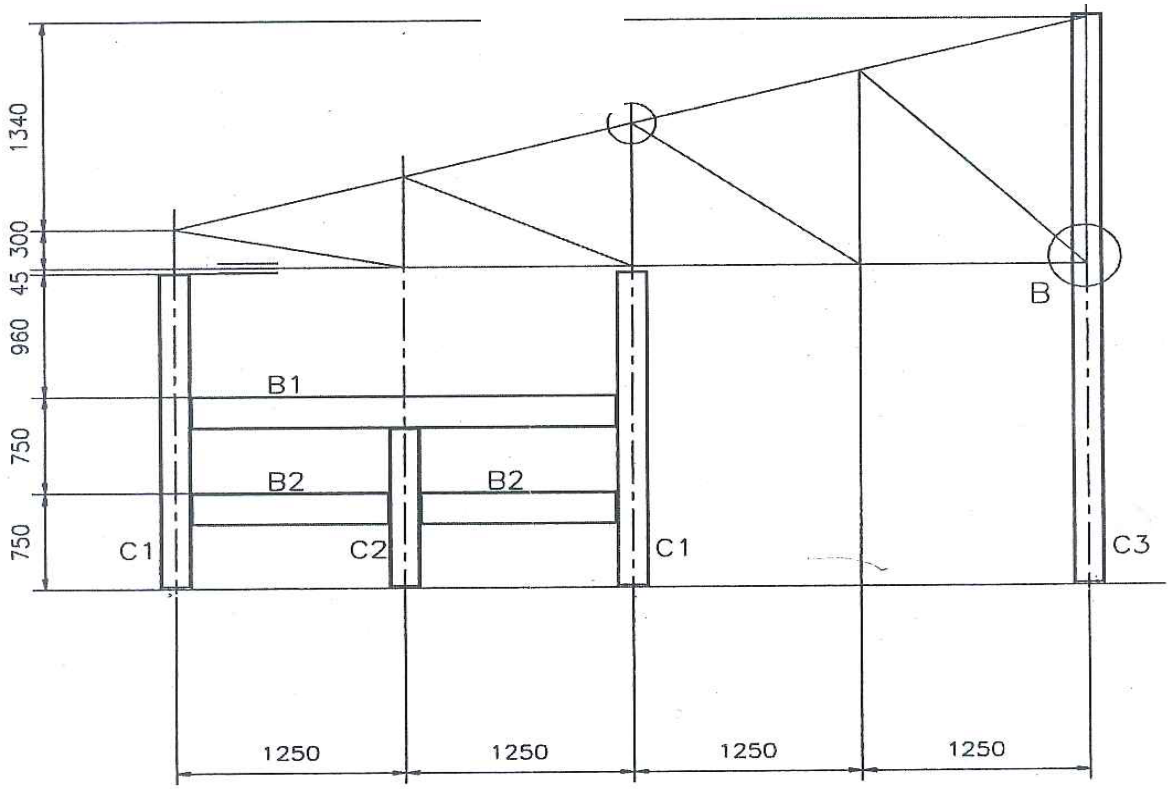

FIGURE 1

B1 – UB 254 × 146 × 31 kg/m
B2 – UB 254 × 146 × 31 kg/m
C1 – UC 203 × 203 × 46 kg/m
C2 – UC 203 × 203 × 46 kg/m
C3 – UC 203 × 203 × 46 kg/m
End Plate – 10 mm with 4 × M20 bolts (Use 200 mm × 203 mm plate)
Base Plate – 20 mm with 2 × M20 bolts (Use 200 mm × 203 mm plate)

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