higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL CONSTRUCTION N4

(8060004)

14 April 2020 (X-paper)
09:00–13:00

REQUIREMENTS: ONE A2 drawing sheet

This question paper consists of 4 pages.

233Q1A2014

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
BUILDING AND STRUCTURAL CONSTRUCTION N4
TIME: 4 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. Strictly adhere to the following:

   4.1 Do QUESTIONS 1, 2 and 3 on the front of the DRAWING SHEET.

   4.2 Neatly print QUESTION 4 on the DRAWING SHEET. Do not use an ANSWER BOOK.

   4.3 Do QUESTIONS 5, 6 and 7 on the back of the DRAWING SHEET.

5. Make all drawings and labels in pencil with bold outlines.

6. Neatly print all written answers and labels in pencil.

7. Make drawings in accordance with National Standards and fully label with descriptive notes and dimensions.

8. Work neatly.

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QUESTION 1

Draw, to scale 1:2, the complete detail where the strut of a steel roof truss meets the rafter at an angle of ninety degrees.

Specifications:

Rafter:	70 × 70 × 8 rolled steel angle
Strut:	60 × 60 × 6 rolled steel angle
Rafter cleat:	70 × 70 × 6 rolled steel angle
	6 mm fillet welded all round to the top of the rafter
Steel purlin:	70 × 70 × 8 rolled steel angle bolted to the cleat
Hook bolt:	6 mm diameter
Roof sheeting:	IBR profile sheeting
Gusset plate:	8 mm thick

Bolt holes

Rafter:	35 mm from the edges and 100 mm pitch
Strut:	35 mm from the edges and 75 mm pitch

Include all centre lines, labels, welding symbols and hatching lines. **[17]**

QUESTION 2

Draw, to scale 1:5, the constructional details at the bottom of a standard steel window. The window will be built into a 270 mm wide brick cavity wall with external face bricks and internal plaster bricks. The external sill is constructed of brick-on-edge face bricks while the internal sill comprises a 15 mm thick fibre-cement sill. The damp-proofing must be secured to the underside of the window frame, vertically down and horizontal under the first brick course below the sill. Include the internal plaster, tie wire, labels and hatching key symbols. **[15]**

QUESTION 3

Draw, to scale 1:10, an isometric view of an external corner of a one-and-a-half brick wall built in English bond. The right-hand side of the wall must end with racking-back bricks and be 1 265 mm long. The left-hand side must be 1 100 mm long with a stop end. The wall must be built THREE courses high with one course projected above. Complete the drawing in bold outlines and include the dimensions. **[15]**

QUESTION 4

4.1 Name the FOUR materials used to make concrete. (4)

4.2 Name THREE types of materials used for ceilings. (3)

4.3 Name TWO types of rivets used to connect two plates. (2)

[9]

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QUESTION 5

A semicircular face-brick arch must be constructed at the entrance of a stoep.

Draw, to scale 1:10, the front view of the arch with THREE courses of brickwork below the arch. The span of the arch is 950 mm. All voussoirs must be evenly spaced with the key brick in the centre of the arch. Provide the drawing with all labels and dimensions. **[12]**

QUESTION 6

A single dwelling consists of 220 mm wide solid walls and a timber roof.

Draw, to scale 1:10, a vertical section through one of the eaves.

Specifications:

Concrete foundation:	600 × 200 mm
Natural ground level:	FIVE brick courses above the top of the foundation concrete
Concrete floor:	25 mm cement screed on 75 mm concrete slab on damp-proof membrane on well-compacted clean filling
Roof construction:	Flush eaves with corrugated-iron roof sheeting on 75 × 50 mm purlins at 900 mm centres on 114 × 38 mm rafters, tie beam and wall plate, pitch 30°
Ceiling:	12 mm tongue-and-groove timber strip ceiling boards on 50 × 50 mm brandering at 400 centres, 75 mm timber cove cornice
Rainwater goods:	100 × 75 square gutter fixed to a 32 mm × 230 mm facia board nailed to the sprocket ends, 75 mm diameter downpipe and shoe

Use a floor-to-ceiling height of 1 250 mm. Include all labels and key symbols. **[22]**

QUESTION 7

Draw, to scale 1:5, the horizontal sectional view of a double rebated steel doorframe built into a 330 mm wide brick wall. The position of the door must be shown in one of the rebates and the double fixing lug at the back of the doorframe. The completed drawing must be fully labelled and dimensioned. Include all relevant cross-hatching symbols. Supply the drawing with a title and scale. **[10]**

TOTAL: 100

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