



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T90(E)(A8)T
APRIL EXAMINATION

NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL CONSTRUCTION N4

(8060004)

8 April 2016 (X-Paper)
09:00–12:00

REQUIREMENTS: One A2 drawing paper

This question paper consists of 5 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
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NATIONAL CERTIFICATE
BUILDING AND STRUCTURAL CONSTRUCTION N4
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. Write neatly and legibly.
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QUESTION 1

- 1.1 Draw to scale 1 : 10 the front view of a two-ring rough segment arch, with 1 200 m span and rise which is one sixth of the span. Show brickwork on one half side of the arch and clearly illustrate the construction method on the remaining half of the arch.

NOTE: NO surrounding brickwork needs to be shown. (15)

- 1.2 Give a brief description of the construction and purpose of centring for arches.

(5)
[20]

QUESTION 2

- 2.1 Draw to scale 1 : 1, the detail of the following ceiling construction and show how you would secure 19 mm thick wood-fibre board with v-shaped joints to the following:

2.1.1 38 mm x 38 mm brading by means of nails

2.1.2 aluminium T-sections

(2 x 4) (8)

- 2.2 Draw to scale 1 : 10, a timber fink-truss roof on a 220 mm thick stock-brick wall. The roof truss is supported by a wall plate on top of the brick wall, and finished off by beam filling. The struts are connected to the tie beam and rafter by means of gang-nail connector plates.

The roof covering consists of galvanised corrugated, iron sheeting and galvanised ridging with a 228 mm x 38 mm ridge board. The roof has a 300 mm open eaves and is finished off with a square gutter.

Specifications:

Rafter: 152 mm x 38 mm

Tie beam: 152 mm x 38 mm

Wall plate: 114 mm x 38 mm

(12)
[20]

QUESTION 3

A 254 mm x 254 mm x 72,9 kg/m stanchion, with 5,6 mm and 14,2 mm web and flange thicknesses respectively, is secured to a 1,100 m x 1,100 m x 0,450 m thick chamfered edge foundation by a base plate 530 mm x 530 mm x 40 mm thick, by means of M22 holding-down hook bolts, cast 150 mm into the concrete slab. 15 mm thick gusset plates are welded to the stanchion flanges, and are secured to the base plate by 150 mm x 90 mm x 10 mm thick angle-iron cleats, riveted to the gusset plates and base plates by means of 20 mm rivets.

- 3.1 Draw to scale 1 : 10, a vertical section through two holding-down bolts, with one column flange facing forward and clearly show the method employed to provide for the adjustment of the holding-down bolts' position, during installation. (10)
- 3.2 Draw to scale 1 : 10, a top view of the stanchion assembly fitted to the foundation. (10)
[20]

QUESTION 4

Illustrate by means of rough drawings (to no particular scale) the following roof forms and features:

- 4.1 Saw-tooth roof truss
- 4.2 Overhang with closed eaves
- 4.3 Apron with underflashing
- 4.4 Vink roof truss
- 4.5 Connector plate
- (5 x 3) [15]

QUESTION 5

- 5.1 Draw to scale 1 : 10, the isometric views of a two-brick corner built to English bond. Both projections are to be approximately 1 000 mm long. The lower projection must be four courses high and the upper projection must be one course. (10)
- 5.2 Give FIVE reasons why foundations are necessary for buildings. (5)
[15]

QUESTION 6

Draw to scale 1 : 2 a vertical section through only the bottom section of a steel casement window set in a one-brick wall, plastered on the inside with a quarry tile sill and a terrazzo inside-window board. Show clearly the damp-proof course and also a portion of the clear sheet glass with putty in the steel frame.

[10]

TOTAL: 100

