higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T220**(E)**(A5)T

NATIONAL CERTIFICATE

BUILDING DRAWING N3

(8090023)

5 April 2019 (X-Paper)
09:00–13:00

REQUIREMENTS: A2 drawing sheets

This question paper consists of 7 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
BUILDING DRAWING N3
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. Use both sides of the DRAWING SHEETS.
5. Fully dimension and neatly finish off ALL drawings with descriptive titles and notes to conform to the SANS Recommended Practice for Building Drawings.
6. Maintain a balanced layout.
7. Use your discretion where dimensions are NOT given.
8. Make ALL drawings to the required scale.
9. Clearly cross out ALL work you do NOT want to be marked.
10. Work neatly.

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QUESTION 1: BRICKWORK

Draw, to scale 1:10, the front elevation of a wall built in English bond. Show a stopped end on the one side and toothing on the other side.

SPECIFICATIONS:

Wall height: FIVE courses

Wall length: FIVE bricks

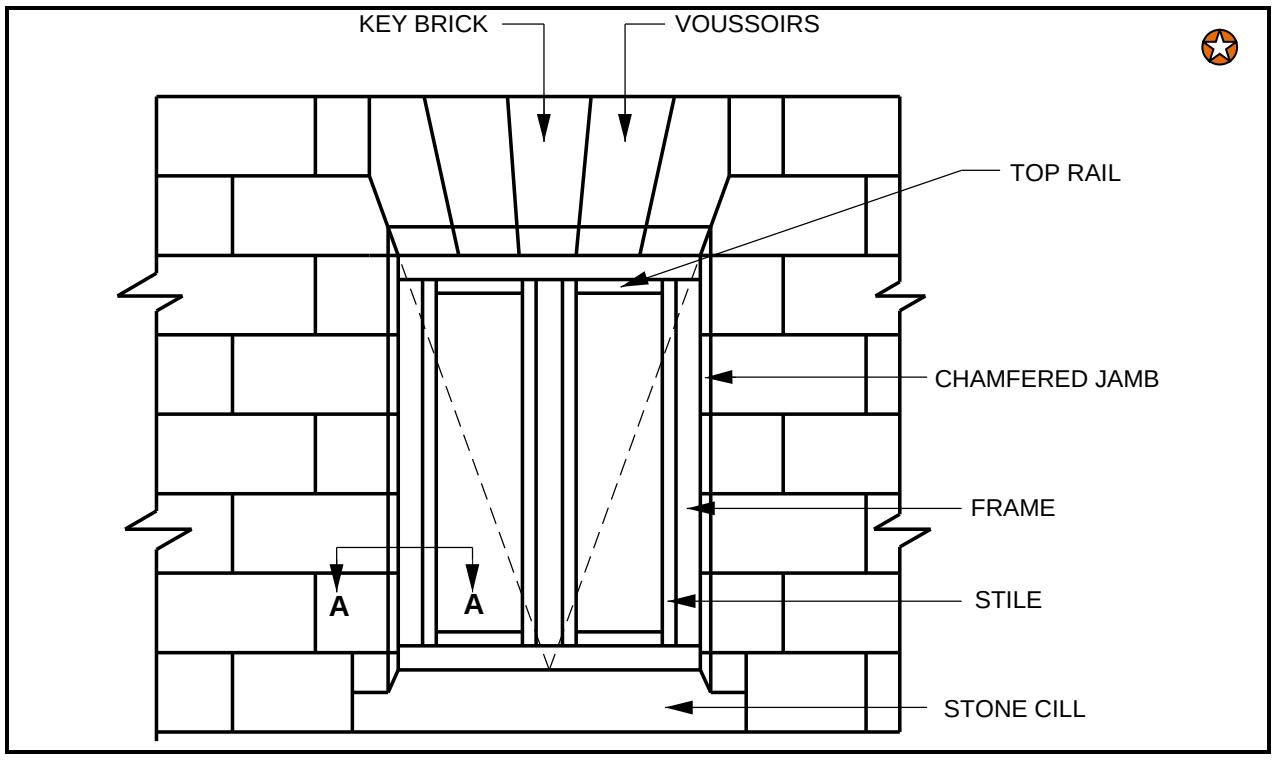
Bricks: 220 mm × 110 mm × 75 mm

Queen closers: 220 mm × 55 mm × 75 mm **[8]**

QUESTION 2: MASONRY

The drawing below shows the front elevation of a window built into a brick wall with ashlar cladding. The wall is plastered on the inside.

Draw, to scale 1:5, the horizontal section as indicated by A-A.



ELEVATION OF WINDOW WITH ASHLAR SURROUNDING

SPECIFICATIONS:

Wall:	330 mm
Bricks:	220 mm × 110 mm × 75 mm
Ashlar:	220 mm × 110 mm × 150 mm
Frame:	100 mm × 75 mm
Stile:	50 mm × 44 mm
Plaster:	19 mm
Binders:	8 mm high-tensile steel bars at every fourth ashlar **[10]**

QUESTION 3: FLOORS

A room needs a reinforced concrete slab with a suspended ceiling. The slab carries 110 mm into the external brick walls on both sides. The ceiling is suspended by means of galvanised steel hangers nailed to the slab with high-tensile steel nails. The steel hangers are spaced at 400 mm centres. Galvanised metal channels are fixed to the bottom ends of the hangers to receive the gypsum plaster boards.

Draw, to scale 1:10, a vertical section through ONE end of the slab, the wall and the ceiling. Show the detail up to the FOURTH hanger. Also show THREE courses of brickwork above the slab and SIX courses of brickwork below the slab.

SPECIFICATIONS:

Wall:	220 mm
Slab:	150 mm
Slab reinforcement:	12 mm diameter main bars at 250 mm centre to centre – the main bars are bent over to the top of the slab at both ends. The top part of the bended section must receive TWO distribution bars.
Concrete cover:	25 mm
Distribution bars:	8 mm at 335 mm centre to centre
Brick force:	On FOUR courses of brickwork directly below the slab
Ceiling boards:	12 mm gypsum boards
Cornice:	75 mm cover

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Galvanised steel hangers:	30 mm × 2 mm
Metal channels:	65 mm × 30 mm **[20]**

QUESTION 4: ROOFS

A house needs a pitch roof covered with fibre-cement slates.

Draw, to scale 1:10, a vertical section through the flush eaves of the roof. The drawing must include the fibre-cement slates up to the SEVENTH batten, part of the external wall, the rainwater goods and part of the ceiling up to the SECOND batten.

SPECIFICATIONS:

Roof pitch:	30 degrees
Roof truss:	SA roof truss with gang-nailed plates
Roof members:	ALL members 114 mm × 38 mm
Wall plate:	114 mm × 38 mm
Eave:	Flush eave
Roof covering:	Fibre-cement slates
External wall:	270 mm cavity plastered internally only
Underlay:	230 micron
Battens:	38 mm × 38 mm at 146 mm centre to centre
Tilting batten:	50 mm × 50 mm
Ceiling cover:	10 mm Rhino board
Brandering:	38 mm × 38 mm at 400 mm centre to centre
Cove cornice:	75 mm
Gutter:	100 mm PVC
Plaster:	19 mm **[20]**

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QUESTION 5: STAIRS

Draw, to scale 1:10, a vertical section through part of a straight-flight reinforced concrete staircase to show TWO different methods of fixing a balustrade in a concrete staircase. The drawing must include at least THREE steps, part of the balustrade and ALL other details regarding the stairs.

SPECIFICATIONS:

Tread:	300 mm
Rise:	150 mm
Waist:	150 mm
Cover:	25 mm
Screed:	19 mm
Main bars:	16 mm
Distribution bars:	8 mm
Finishing:	19 mm terrazzo to treads and risers
Balusters:	50 mm × 50 mm wrought iron
Handrail:	100 mm × 75 mm hardwood
Handrail height:	900 mm measured from the nosing line
Metal rail:	50 mm × 50 mm wrought iron fixed 100 mm from the nosing line

[16]

QUESTION 6: JOINERY

Draw, to scale 1:2, a horizontal section through a single rebated solid jamb. The drawing must include the jamb with the surrounding construction details and part of the internal wall.

SPECIFICATIONS:

Wall:	solid wall 110 mm
Backing or rough grounds:	110 mm × 32 mm
Jamb lining:	148 mm × 32 mm
Wall plug:	own design

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Plaster:	19 mm both sides	
Rebate:	12 mm × 48 mm on ONE side only	
Architrave:	100 mm × 22 mm	
Skirting:	100 mm × 22 mm	**[12]**

QUESTION 7: PLUMBING

Draw, to scale 1:5, a longitudinal section through a wash-down water closet. The drawing must include the water seal, the flush-down connection and the outlet.

SPECIFICATIONS:

Height of closet:	400 mm	
Length in longitudinal section:	450 mm	
Water seal:	50 mm	
Flush rim:	60 mm	
Flush-pipe connection:	40 mm	
Outlet:	100 mm	**[8]**

QUESTION 8: PLASTER CEILINGS

Draw, to scale 1:5, a vertical section to demonstrate how a cover strip is fixed to an expansion joint of a Rhino ceiling. The drawing must include part of the tie beam, THREE battens, part of the ceiling board and the cover strip.

SPECIFICATIONS:

Tie beam:	114 mm × 38 mm	
Battens:	38 mm × 38 mm at 400 mm centre to centre	
Cover strip:	50 mm × 6 mm	
Ceiling board:	10 mm Rhino	**[6]**

TOTAL: 100

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