higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T220**(E)**(J25)T

NATIONAL CERTIFICATE

BUILDING DRAWING N3

(8090023)

25 July 2019 (X-Paper)
09:00–13:00

REQUIREMENTS: ONE A2 drawing sheet

This question paper consists of 8 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 SHEET.
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. Draw 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 Flemish bond. Show a stopped end on the one side and toothing on the other side.

Specifications:

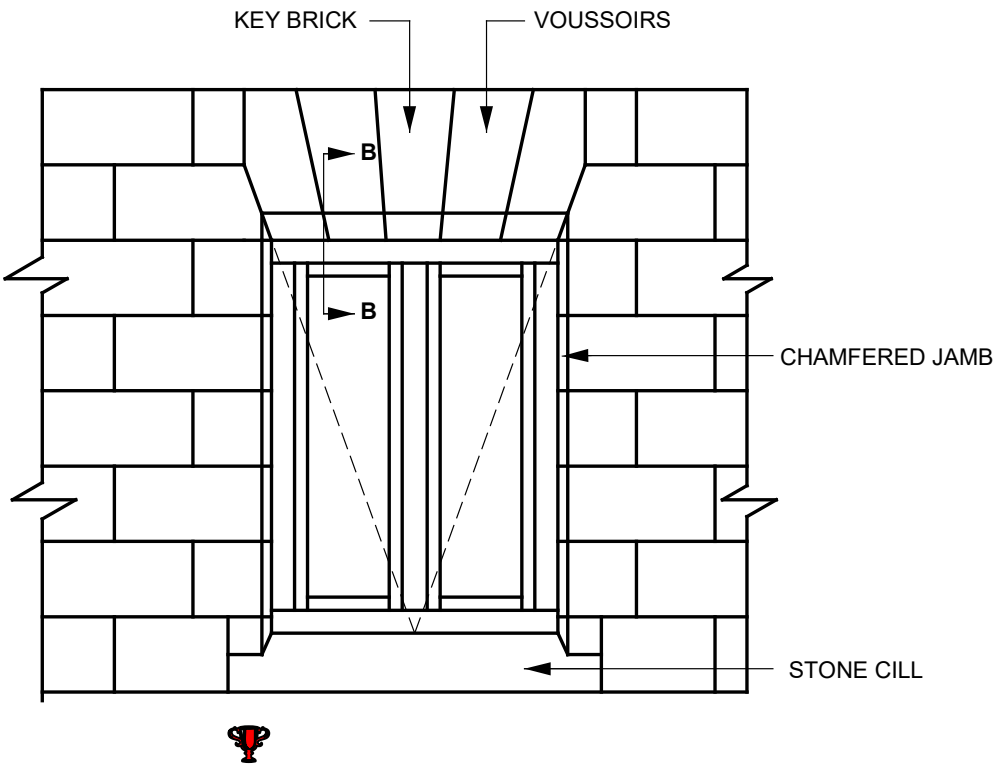
Wall height:	6 courses
Wall length:	5 bricks
Bricks:	220 mm × 110 mm × 75 mm
Queen closers:	220 mm × 55 mm × 75 mm

[8]

QUESTION 2: MASONRY

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

Draw, to scale 1:5, the vertical section as indicated by B-B. The wall is plastered on the inside.



ELEVATION OF WINDOW AND ASHLAR SURROUND

Specifications:

Wall:	330 mm
Bricks:	220 mm × 110 mm × 75 mm
Ashlar:	220 mm × 110 mm × 150 mm
Lintels:	110 mm × 75 mm precast concrete
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

Draw, to scale 1:5, a vertical section through an L-beam and a T-beam to show the difference in steel arrangement.

Specifications:

L-beam:	200 mm × 300 mm floor included
Floor or slab:	100 mm
Main bars:	12 mm at 200 mm centres alternate cranked up into the slab
Distribution bars:	6 mm at 150 mm centres
Bottom beam steel:	3 × 20 mm
Top beam steel:	2 × 16 mm
Stirrups:	8 mm
Cover:	25 mm

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T-beam:	200 mm × 300 mm floor included
Floor or slab:	100 mm
Main bars:	12 mm at 200 mm centres
Distribution bars:	6 mm at 150 mm centres
Bottom beam steel:	3 × 20 mm
Top beam steel:	2 × 16 mm
Stirrups:	8 mm
Cover:	25 mm

[18]

QUESTION 4: ROOFS

A room must be provided with a flat roof covered with fibre-cement sheets.

Draw, to scale 1:10, a complete vertical section through the roof. The drawing must include the fibre-cement sheets, the purlins, the rafters, the ceiling, part of the walls on both sides, a coping on one of the walls and the flashing.

Specifications:

Roof pitch:	11 degrees
Roof cover:	fibre-cement sheets
Purlins:	75 mm × 50 mm
Rafters:	114 mm × 38 mm
Wall plate::	114 mm × 38 mm carries 110 mm into wall
Coping:	polish cement coping
Flashing:	own discretion
Ceiling:	level ceiling
Hangers:	38 mm × 38 mm at 400 mm centres
Battens:	38 mm × 38 mm
Ceiling board:	10 mm Rhino
Cornice:	75 mm coved
Wall:	220 mm

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Internal measurements between walls:	5 000 mm
Overhang:	300 mm closed
Overhang finish:	3 mm fibre-cement board
Quadrant:	12 mm
Fascia:	230 mm × 32 mm
Gutter:	100 mm
Downpipe:	75 mm
Plaster:	NOT required **[20]**

QUESTION 5: STAIRS

Draw, to scale 1:10, a vertical section through part of a straight flight reinforced concrete stairs. The drawing must include only the landing with THREE steps on both sides of the landing. Also show the steel arrangement.

Specifications:

Tread:	220 mm
Rise:	150 mm
Landing:	125 mm in thickness
Landing:	900 mm in length
Waist:	150 mm
Cover:	25 mm
Finishing:	20 mm thick marble
Tensile bars:	12 mm
Distribution bars:	8 mm
Handrail:	NOT required
Balusters:	NOT required **[16]**

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QUESTION 6: JOINERY

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

Specifications:

Wall:	Solid wall 220 mm
Backing or rough grounds:	220 mm × 32 mm
Jamb lining:	258 mm × 32 mm
Wall plug:	own design
Plaster:	19 mm both sides
Rebate:	12 mm × 48 mm on both sides
Architrave:	75 mm × 22 mm
Skirting:	75 mm × 22 mm

[12]

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QUESTION 7: PLUMBING

Produce a neat proportional sketch of a single stub stack in a single-storey building to show how the sanitary waste fittings are connected to the stack. The sanitary fixtures consist of a sink, a water closet, a wash basin and a bath.

Specifications:

Stack:	100 mm
Sink:	waste pipe 40 mm
Wash basin:	waste pipe 40 mm
Bath:	waste pipe 40 mm
Bath:	overflow 40 mm
Water closet:	waste pipe 40 mm
Gulley:	own design

[10]

QUESTION 8: PLASTER CEILINGS

Draw, to scale 1:5, a vertical section to demonstrate how a coved cornice is fixed to a Rhino ceiling. The drawing must include part of the tie beam, part of the rafter, TWO battens, part of the ceiling board, the wall plate and part of the wall.

Specifications:

Tie beam:	114 mm × 38 mm
Rafter:	114 mm × 38 mm
Battens:	38 mm × 38 mm at 400 mm centre to centre
Wall plate:	114 mm × 38 mm
Ceiling board:	10 mm Rhino
Cornice:	75 mm coved

[6]

TOTAL: 100

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