higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T190**(E)**(J27)T

NATIONAL CERTIFICATE: MULTI-DISCIPLINARY DRAWING OFFICE PRACTICE

BUILDING DRAUGHTING

(2050035)

27 July 2018 (X-Paper)
09:00–13:00

REQUIREMENTS: ONE A2 drawing sheet

Calculators, drawing instruments and CAD software may be used.

This question paper consists of 5 pages, 1 diagram sheet and 2 information sheets.

Copyright reserved

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
BUILDING DRAUGHTING
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. A balanced layout is very important and candidates will be penalised for bad planning.
6. Draw a 15 mm border around the DRAWING SHEET (both sides).
7. Clearly indicate question numbers.
8. ALL drawing work, including candidate information, must be done in pencil.
9. ALL drawing work must comply with the SABS Recommended Code of Practice for Building Drawing as well as the SANS 10111-1990.
10. ALL building regulations must comply with the National Building Regulations SANS 10400-1990.
11. Brick sizes should be taken as 220 × 110 × 75 mm and block sizes as 490 × 140 × 190 mm.
12. ALL abbreviations and symbols must comply with the latest National Building Regulations and ALL relevant SANS (SABS) codes.
13. Write neatly and legibly.

Copyright reserved

QUESTION 1

The requirements for building plans to be submitted to a local authority must be in accordance with the National Regulations.

Draw a table with the description in one column and complete the colour codes in the second column.

DESCRIPTION	COLOUR CODE
BRICKWORK	
NEW CONCRETE	
NEW WOOD	
NEW GLASS	
NEW STEEL	

NOTE: All information must be printed freehand or stencilled 3 mm high. **[5]**

QUESTION 2: FLOOR PLAN LAYOUT

The DIAGRAM SHEET (attached) shows an existing horse stable.

SPECIFICATIONS:	
House	
Roof pitch	10° for stable and 5° for shower/WC
Roof type	Gable roof with parapet; lean-to roof
Roof truss	Howe-type
Roof cover	Long-span sheeting
Roof overhang	350 mm all around
Ceiling height	2 465 mm (29 courses)
Foundation walls	1 block solid
Exterior walls	1 block wall, 15 mm plaster both sides (face brick around door and windows and for new shower/WC) (140 mm)
Interior walls	½ brick wall, 15 mm plaster both sides
Barge boards	225 × 10 mm fibre cement fascia

Your clients want you to draw/design a full set of working drawings for them to change this stable into a two-bedroom cottage.

Design brief:

The tack room and covered walkway must be changed into an open-plan kitchen/living room. Add a shower/WC to the right of the covered walkway of 2 980 × 1 000 mm with a lean-to roof. Add a sliding aluminium door (2,1 × 2,1 m) in the middle arch of the covered walkway and big aluminium windows (2 100 w × 1 500 h DDT) to the rest of the arches. Replace louvers in stable 1 and 2 and the tack room with aluminium windows (1 500 w × 900 h 15T9). Build up openings around the door and windows with face brick. Use face brick for the shower/WC as well. The covered walkway facing true north must face to the top of the page as per drawing standards.

Copyright reserved

Use the dimensions and information given on the attached plan and draw, to scale 1 : 100, a fully detailed working drawing of the floor plan layout of the dwelling.

The following must be included and indicated on the plan:

2.1	TWO bedrooms, kitchen, dining hall, living room and full bathroom	(6)
2.2	Room names and floor finishes	(2)
2.3	ALL external, internal and wall dimensions	(5)
2.4	Window and door symbols	(2)
2.5	Sanitary installation symbols must be in accordance with the SABS Code of Practice for Building Drawing	(2)
2.6	Window codes	(1)
2.7	Section arrows	(1)
2.8	Title and scale	(1)
2.9	True north	(1)
		[21]

QUESTION 3: SECTION THROUGH A HOUSE

Draw, to scale 1 : 50, a section A–A through the new cottage and a section B–B through the shower/WC.

Indicate the following specifications:

3.1	The pitch, roof cover, truss and ceiling	(8)
3.2	Gutter on fascia	(2)
3.3	Roof covering the stable: eaves projection = parapet; gable projection = 350 mm; and lean-to-roof = 420 mm	(6)
3.4	Strip foundation (to include sizes)	(2)
3.5	Concrete slab	(2)
3.6	Damp-proof course (to include minimum height above FGL)	(2)
3.7	Damp-proof membrane	(2)
3.8	Compacted fill	(2)
3.9	Screed	(2)

Copyright reserved

3.10 External and internal walls (2)

3.11 Finished ground level and finished floor level (2)

3.12 Dimension the ceiling height, roof overhang, total height and minimum damp-proof course distance from the ground level (4)

3.13 Title and scale (1)
[37]

QUESTION 4: ELEVATION

Draw, to scale 1 : 100, ALL views (north, south, east and west) from the design of the complete dwelling.

Indicate the following on each elevation:

4.1 Wall finish (face brick and plaster) (6)

4.2 Title and scale (1)
[7]

QUESTION 5: SITE PLAN

Draw the roof plan as it will show on the site plan. Only draw the house and show the drainage system. The boundary lines, pegs and building lines are not needed.

5.1 The complete cottage (show the roof as seen from the top) (2)

5.2 The drainage system to a septic tank (2 500 × 1 500) and French drain (6 m in length) (10)

5.3 The direction of true north (2)

5.4 Title and scale (2)
[16]

QUESTION 6: WINDOW SCHEDULE

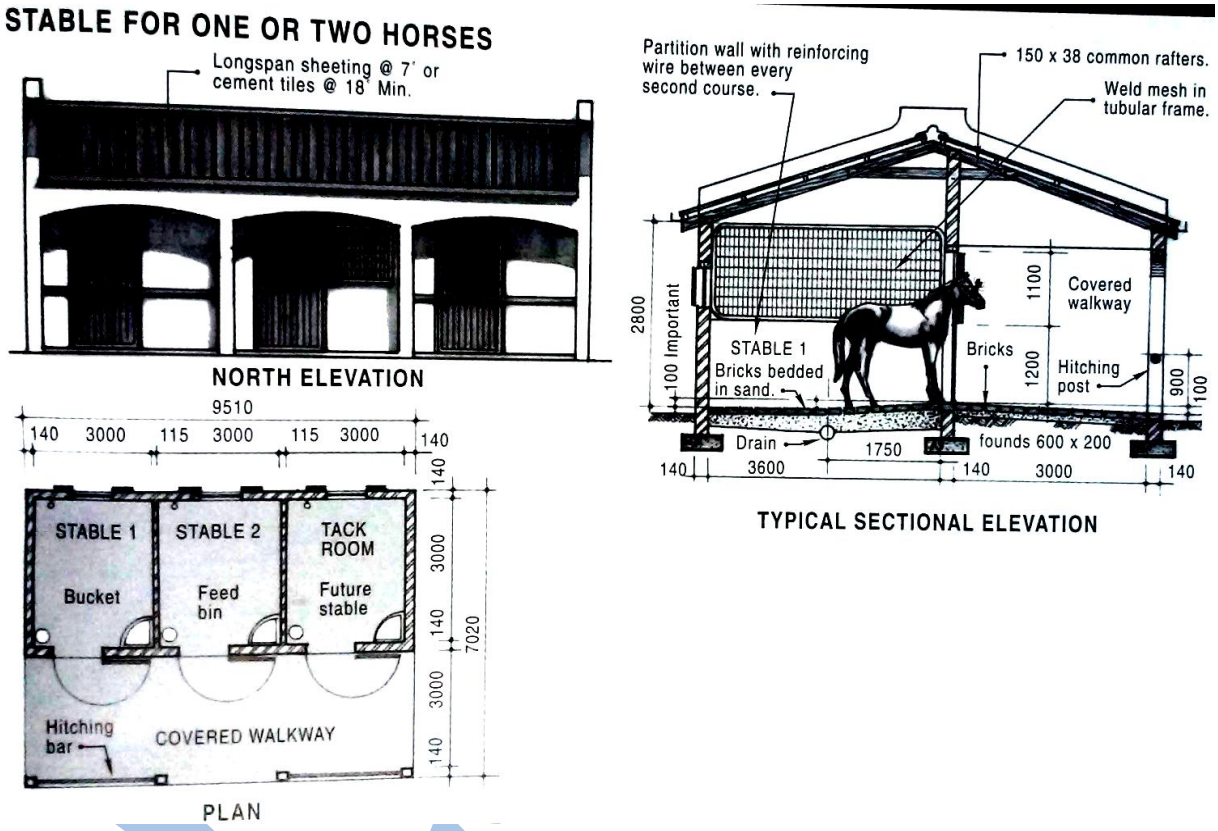
Refer to the design to draw the outside views of the windows and complete the window schedule.

NOTE: ALL information must be printed freehand or stencilled 3 mm high. **[14]**

TOTAL: 100

Copyright reserved

DIAGRAM SHEET



Source: *Building construction and graphic standards* (André Grobbelaar)

Copyright reserved

INFORMATION SHEET 1

Table 4: Howe-type roof trusses

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Roof covering	**Pitch degrees**			**Maximum clear span m**	**Maximum centre-to-centre truss spacing mm**	**Bolts at heel and splice joints (number × type)[a]**	**Member sizes and grade of timber in accordance with SANS 1783-2[b, c]**						**Number of bays**
	Minimum	**Maximum**	**Recommended**				**TC[d]**		**BC**		**Web**		
							Size mm	**Grade**	**Size mm**	**Grade**	**Size mm**	**Grade**	
Tiles and slates with 38 mm × 38 mm battens spaced at centres that do not exceed 345 mm maximum and in accordance with the manufacturer's instructions	17,5	35	26	3,0 4,0 5,0 6,0 6,5 7,0 7,5 8,0	760 (650 where slates or tiles have a self-mass in excess of 55 kg/m^2)	2 × M12	114	5	114 114 114 114 114 152 152 152	5	114	5	2 4 4 4 6 6 6 6
Metal or fibre-cement sheets with 50 mm × 76 mm purlins on edge spaced at centres that do not exceed 1 200 mm	15	30	17,5	3,0 4,0 5,0 6,0 6,5 7,0 7,5 8,0	1 200	2 × M12	114	5	114 114 114 114 114 152 152 152	5	114	5	2 4 4 4 6 6 6 6
Metal tiles with 38 mm × 38 mm battens spaced in accordance with the manufacturer's instructions	15	30	20	3,0 4,0 5,0 6,0 6,5 7,0 7,5 8,0	1 000	2 × M12	114	5	114 114 114 114 114 152 152 152	5	114	5	2 4 4 4 6 6 6 6

TC = top chord or rafter
BC = bottom chord or tie beam

[a] Heel joints shall have 2 × M12 bolts per joint with 40 mm washers at each end.
[b] All timber members shall have a thickness of 38 mm (36 mm if planed).
[c] 38 mm × 114 mm grade 7 members may be substituted for 38 mm × 152 mm grade 5 material if required.
[d] The maximum overhang of a 114 mm TC is 600 mm. The TC needs to be increased to 152 mm if the overhang is greater than 600 mm but less than or equal to 900 mm.

Copyright reserved

INFORMATION SHEET 2

Table 1: Room area		
Type of occupancy	**Room**	**Minimum plan area**
All occupancies	Any habitable room other than a kitchen, scullery and laundry	6 m² with no linear dimension of less than 2 m
B, D or J	Change rooms and dining rooms	Population 1–15: 0,8 m² per person but not less than 6 m² Population 16–100: 0,6 m² per person but not less than 12 m² Population more than 100: 0,5 m² per person but not less than 60 m²

Table 2: Rooms and their dimensions	
Room or space	**Minimum height**
Bedroom	2,4 m above a floor area of at least 6 m² with a clear height of at least 1,8 m at any point more than 0,75 m from the edge of the floor space
Any other habitable room in a dwelling house or a dwelling unit	2,4 m above a minimum of 70% of the floor area and not less than 2,1 m above the remaining floor area
All habitable rooms other than those listed above	2,4 m
Passage or entrance hall	2,1 m
Bathroom, shower room, laundry or the room containing a toilet pan	2,1 m above any area where a person would normally be in a standing position
Open mezzanine floor which has an area not exceeding 25% of the area of the floor immediately below it	2,1 m above and below the mezzanine floor

SANS 10400-C: 2010

Copyright reserved