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basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

NATIONAL  
SENIOR CERTIFICATE

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P1

NOVEMBER 2024

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label

DO NOT FOLD THE QUESTION PAPER IN HALF.

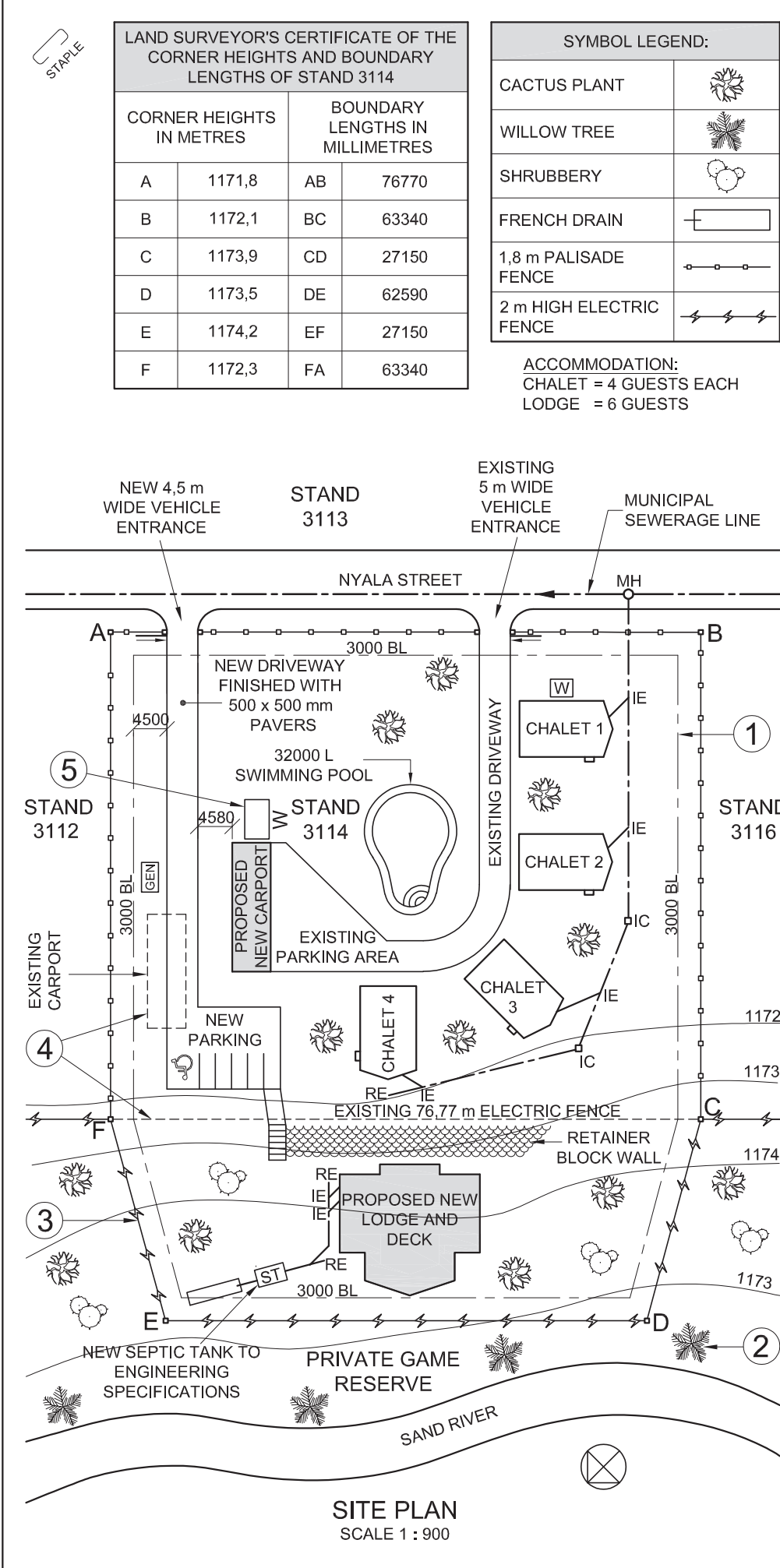
INSTRUCTIONS AND INFORMATION

- 1. This question paper consists of FOUR questions.
- 2. Answer ALL the questions.
- 3. ALL drawings are in first-angle orthographic projection, unless otherwise stated.
- 4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
- 5. ALL answers must be drawn accurately and neatly.
- 6. ALL the questions must be answered on the QUESTION PAPER, as instructed.
- 7. ALL the pages, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
- 8. Time management is essential in order to complete all the questions.
- 9. Print your examination number in the block provided on every page.
- 10. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY															
QUESTION	MARKS OBTAINED			$\frac{1}{2}$	SIGN	MODERATED			$\frac{1}{2}$	SIGN	RE-MARKING			$\frac{1}{2}$	SIGN
1															
2															
3															
4															
TOTAL															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER



NOTE:  
Contractors must verify all dimensions and levels on site before commencing work. Architects to be notified immediately of any discrepancies.

ARCHITECT'S SIGNATURE: .....

CLIENT'S SIGNATURE: .....

ANSWER 20  
In the space below, draw, in neat freehand, the *SANS 10143* graphical symbol for:  
(a) The front view of a BIDET  
(b) An electrical REGULATING SWITCH/DIMMER

(a) BIDET

(b) Electrical REGULATING SWITCH/DIMMER

2	22/11/2023	ADD WATER TANK
1	17/11/2023	MOVE FRENCH DRAIN
REVISION	DATE	DESCRIPTION

HSJ ARCHITECTS  
27 ORIBI DRIVE  
KRUGER HILL  
POLOKWANE  
4059

www.safari-plus.co.za  
019 405 9777

PRINTED BY:  
CHEETAH PRINTERS

DATE OF PRINT:  
26/10/2023

DRAWING TITLE:  
SITE PLAN

PROJECT:  
PROPOSED NEW LODGE, DECK AND CARPORT FOR MR D BRITS, ON STAND 3114, 7 NYALA STREET, TUGELA RIVER, LIMPOPO

PROJECT NUMBER:  
40-1302

DRAWING NUMBER:  
0214-59

DATE:  
29/09/2023

DRAWN:  
STEVEN

CHECKED:  
PALESA

REFERENCE CODE:  
FJM-2614/L

SCALE:  
1 : 900

QUESTION 1: ANALYTICAL (CIVIL)

Given:  
The site plan of an existing resort with a proposed new lodge and deck, as well as a new carport, a title panel and a table of questions. The drawing is not presented to the indicated scale.

Instructions:  
Complete the table below by neatly answering the questions, which refer to the accompanying drawing, title panel and civil content.

QUESTIONS		ANSWERS		
1	What does the number 0214-59 refer to?	1		
2	Who is the client?	1		
3	Who printed the drawing?	1		
4	In which town is the architectural firm situated?	1		
5	What was the second revision?	1		
6	How high is corner D above sea level in metres?	1		
7	Name the feature at 1.	1		
8	Name the natural feature at 2.	1		
9	What is the height of the feature at 3 in millimetres?	1		
10	What must happen to the features at 4?	1		
11	Name the symbol at 5.	1		
12	What is the finish on the new driveway?	1		
13	What does the abbreviation <i>B/C</i> on floor plans stand for?	1		
14	In what colour must new drain pipes be indicated on drainage installation drawings?	1		
15	What is the shortest distance from the proposed new carport to the boundary line with STAND 3112 in metres?	2		
16	With reference to the north point, in what direction does the sewerage flow in the municipal sewerage line?	2		
17	What is the proposed total number of guests that would be accommodated at the resort?	2		
18	In the space below (ANSWER 18), determine the total perimeter of the area ABCF in metres.	3		
19	In the space below (ANSWER 19), determine the total area of the new lodge and deck in square metres.	3		
20	In the space in the title panel (ANSWER 20), draw, in neat freehand, the <i>SANS 10143</i> graphical symbol for: (a) the front view of a BIDET, and (b) an electrical REGULATING SWITCH/DIMMER.	4		
TOTAL		30		

ANSWER 18  
Show ALL calculations.

ANSWER 19  
Show ALL calculations.

EXAMINATION NUMBER

EXAMINATION NUMBER

2

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Please turn over

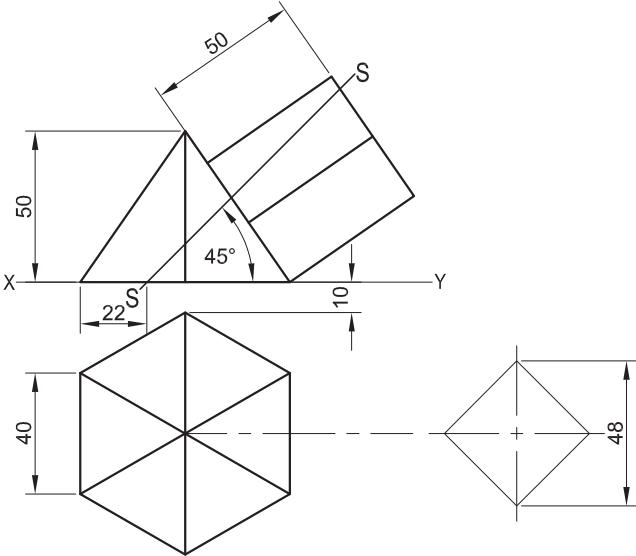


QUESTION 2: SOLID GEOMETRY

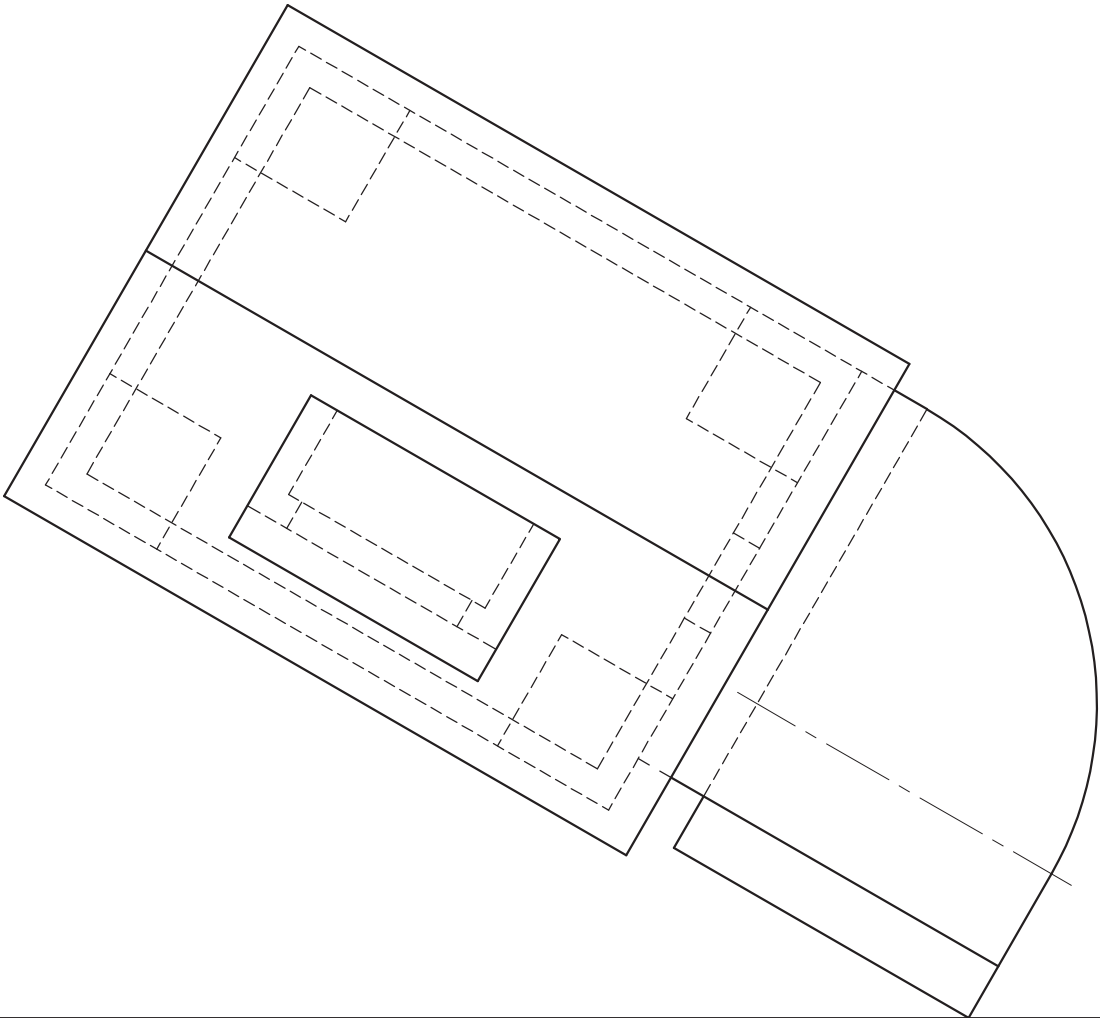
- Given:**
- The front view of a right regular hexagonal pyramid and a right square prism
  - The top view of the right regular hexagonal pyramid, with the axes and an auxiliary view for the right square prism
  - Cutting plane S-S

- Specifications:**
- The lower base of the right square prism rests against the right side triangular face of the hexagonal pyramid
  - Both solids are cut by cutting plane S-S

- Instructions:**  
Draw, to scale 1 : 1, the following views showing both solids:
- 2.1 The given front view
  - 2.2 A sectional top view
  - 2.3 A sectional left view
- Planning is essential.
  - Show ALL construction.
  - Show ALL hidden detail.
- [38]



ASSESSMENT CRITERIA				
1	FRONT VIEW	7 <sup>1</sup> / <sub>2</sub>		
2	SECTIONAL TOP VIEW	16 <sup>1</sup> / <sub>2</sub>		
3	SECTIONAL LEFT VIEW	14		
PENALTIES (-)				
TOTAL		38		
EXAMINATION NUMBER				
EXAMINATION NUMBER				3



QUESTION 3: PERSPECTIVE

**Given:**  
Three views of an A-frame house on blocks and the information needed to draw a two-point perspective drawing  
PP – Picture plane  
HL – Horizon line  
GL – Ground line  
SP – Station point

**Instructions:**  
Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL construction.
- Show depth at the door and windows.
- NO internal or hidden detail is required.

[40]

ASSESSMENT CRITERIA					
1	CONSTRUCTION	6			
2	FLOOR + STEPS	12			
3	WINDOWS + DOOR	9 <sup>1</sup> / <sub>2</sub>			
4	ROOF	7			
5	ARC	5 <sup>1</sup> / <sub>2</sub>			
PENALTIES (-)					
TOTAL		40			

PP

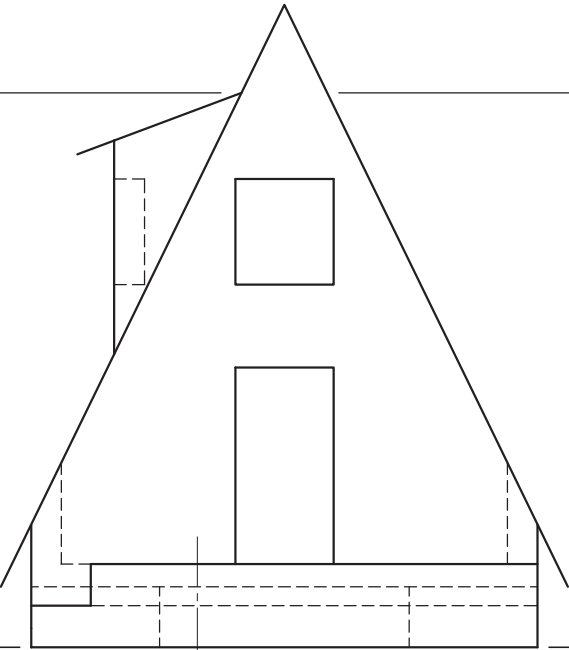
HL

GL

SP

HL

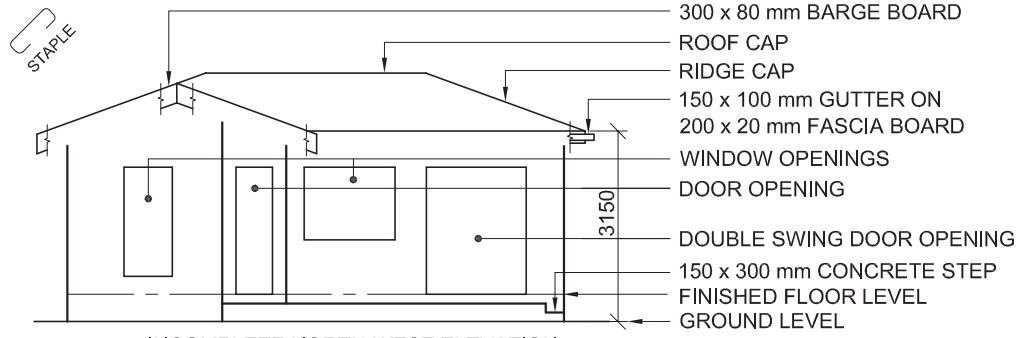
GL



EXAMINATION NUMBER

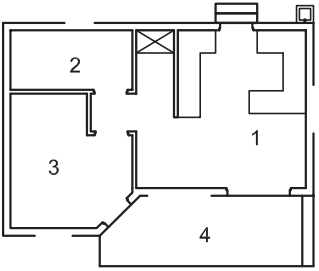
EXAMINATION NUMBER

4



300 x 80 mm BARGE BOARD  
ROOF CAP  
RIDGE CAP  
150 x 100 mm GUTTER ON  
200 x 20 mm FASCIA BOARD  
WINDOW OPENINGS  
DOOR OPENING  
3150  
DOUBLE SWING DOOR OPENING  
150 x 300 mm CONCRETE STEP  
FINISHED FLOOR LEVEL  
GROUND LEVEL

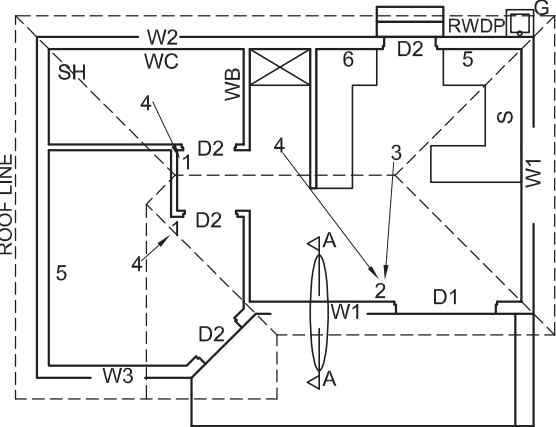
INCOMPLETE NORTH-WEST ELEVATION



ROOM DESIGNATIONS

**FLOOR FINISHES**

1. OPEN AREA:	TILE
2. BATHROOM:	TILE
3. BEDROOM:	CARPET
4. PATIO:	CONCRETE



INCOMPLETE FLOOR PLAN

**FEATURES**

D1 DOUBLE SWING DOOR  
D2 DOOR  
W1 WINDOW  
W2 WINDOW  
W3 WINDOW

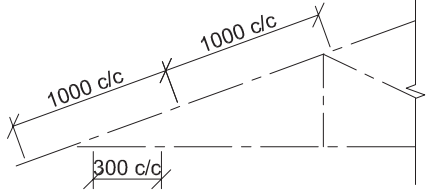
**FIXTURES**

S SINK  
SH SHOWER  
WC TOILET  
WB WASHBASIN

**ELECTRICAL FITTINGS**

1. ONE-WAY SWITCH - SINGLE-POLE  
2. ONE-WAY SWITCH - DOUBLE-POLE  
3. FLUORESCENT LIGHT 2 x 40 W  
4. CEILING LIGHT  
5. SWITCHED SOCKET OUTLET  
6. DISTRIBUTION BOARD

**NOTE:**  
THE ARROW SHOWS THE LIGHT CONNECTION TO THE SWITCH.



INCOMPLETE SCHEMATIC DIAGRAM OF A ROOF TRUSS AT CUTTING PLANE A-A

**ROOF NOTES:**  
20° ROOF PITCH

120 x 40 mm ROOF TRUSSES ON 120 x 40 mm WALL PLATES

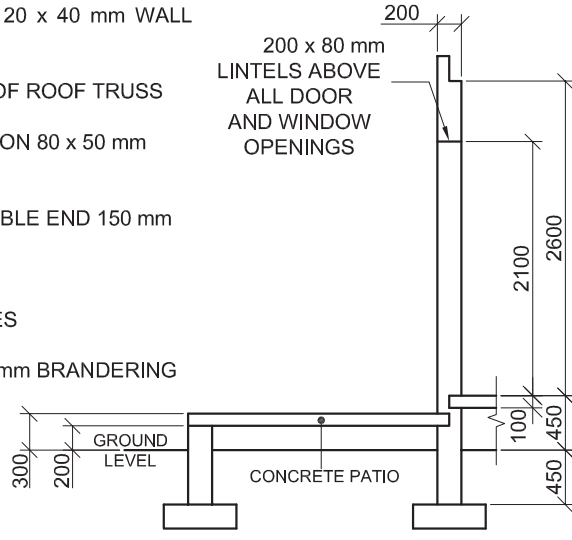
350 mm ROOF OVERHANG TO END OF ROOF TRUSS

40 mm CORRUGATED ROOF SHEET ON 80 x 50 mm PURLINS @ 1000 mm c/c

300 x 80 mm BARGE BOARDS ON GABLE END 150 mm PAST FASCIA BOARDS

200 x 20 mm FASCIA BOARDS WITH 150 x 100 mm GUTTERS ON ALL SIDES

10 mm CEILING BOARDS ON 40 x 40 mm BRANDERING STRIPS @ 300 mm c/c



INCOMPLETE FOUNDATION, EXTERNAL WALL AND PATIO DETAIL

**DOOR AND WINDOW SCHEDULE**

TO FIT	TO FIT	50	1500	800
			A	
			B	
DOUBLE SWING DOOR AND FRAME WITH TWO DOORS (D1)		SINGLE DOOR AND FRAME (D2)		
<b>WINDOW NOTES:</b>				
• A = OPENING SIDE				
• B = FIXED PANEL				
• ALL FRAMES = 50 mm THICK				
• 200 x 20 mm FIBRE CEMENT SILL UNDER ALL WINDOWS				

ROOF COMPONENTS	
	ROOF CAP AND RIDGE CAP
	300 x 80 mm BARGE BOARD
	200 x 20 mm FASCIA BOARD
	150 x 100 mm GUTTER
	80 x 50 mm PURLINS

ELECTRICAL SYMBOLS	

**FIXTURES**

TOILET (WC)	SINK (S)	SHOWER (SH)	WASHBASIN (WB)

**QUESTION 4: CIVIL DRAWING**

**Given:**

- The incomplete north-west elevation of a **new house**, showing the walls, the window and door openings, the patio and step, roof and labels
- The incomplete floor plan showing the walls, roof line, patio, step, positions of the doors and windows, fixtures and electrical layout
- An incomplete schematic diagram of a roof truss at cutting plane A-A and roof notes
- The incomplete foundation, external wall and patio detail
- Room designations and floor finishes
- A door and window schedule
- A table of roof components
- A table of electrical symbols
- A table of fixtures
- The incomplete floor plan and position of the ground level of the **new house**, drawn to scale 1 : 50, and the incomplete foundation and break lines for the detailed section, drawn to scale 1 : 20, on page 6

**Instructions:**  
Answer this question on page 6.

4.1 Using the given incomplete floor plan and ground level, draw, to scale 1 : 50, the following views of the **new house**:

4.1.1 **THE COMPLETE FLOOR PLAN**  
**Add the following features to the drawing:**

- ALL doors and windows
- ALL fixtures as indicated by the abbreviations
- ALL electrical fittings as indicated by the numbers
- ALL hatching detail

4.1.2 **THE COMPLETE NORTH-WEST ELEVATION**  
**Show the following features on the drawing:**

- The walls, windows, doors (with all three doors in the closed position), patio and step detail
- The roof detail including fascia board, barge boards and gutter
- The finished floor level

4.2 Using the incomplete foundation and break lines on page 6, draw, to scale 1 : 20, a **DETAILED SECTION** on cutting plane A-A of the area in the ellipse shown on the incomplete floor plan.

**Show the following features on the drawing:**

- The complete foundation, external wall, slab, patio and window detail
- The roof detail including the fascia board and gutter
- The door and frame, roof, fascia board and gutter detail, to the left (north-east) of cutting plane A-A
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

**Label the following:**

- The floor finishes
- Ground level, finished floor level and damp-proof course (use the correct abbreviations and show them on ALL relevant views)

**NOTE:**  
ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in **SANS 10143**.

5



MARK ALLOCATION FOR SECTION OF ROOF			FOR OFFICIAL USE ONLY		
A			INCORRECT SCALE(S) USED		
B			NON-ALIGNMENT OF VIEWS		
C			VIEW(S) ROTATED		
D			SECTION VIEWED INCORRECTLY		
E			INCORRECT LETTERING		
F					
G					
H					
J					
<b>TOTAL</b>			<b>TOTAL</b>		

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	14			
2	FIXTURES	7			
3	ELECTRICAL	7 $\frac{1}{2}$			
4	LABELS	2			
5	HATCHING	3			
SUBTOTAL		33 $\frac{1}{2}$			
NORTH-WEST ELEVATION					
1	ROOF + RWDP	7 $\frac{1}{2}$			
2	WALLS + STEPS	4			
3	DOORS + WINDOWS	11 $\frac{1}{2}$			
4	LABELS	$\frac{1}{2}$			
SUBTOTAL		23 $\frac{1}{2}$			
DETAILED SECTION					
1	ROOF DETAIL	13			
2	SLAB + WALL	7			
3	HATCHING	6 $\frac{1}{2}$			
4	WINDOW + DOOR	7			
5	LABELS	1 $\frac{1}{2}$			
SUBTOTAL		35			
TOTAL		92			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6