



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.

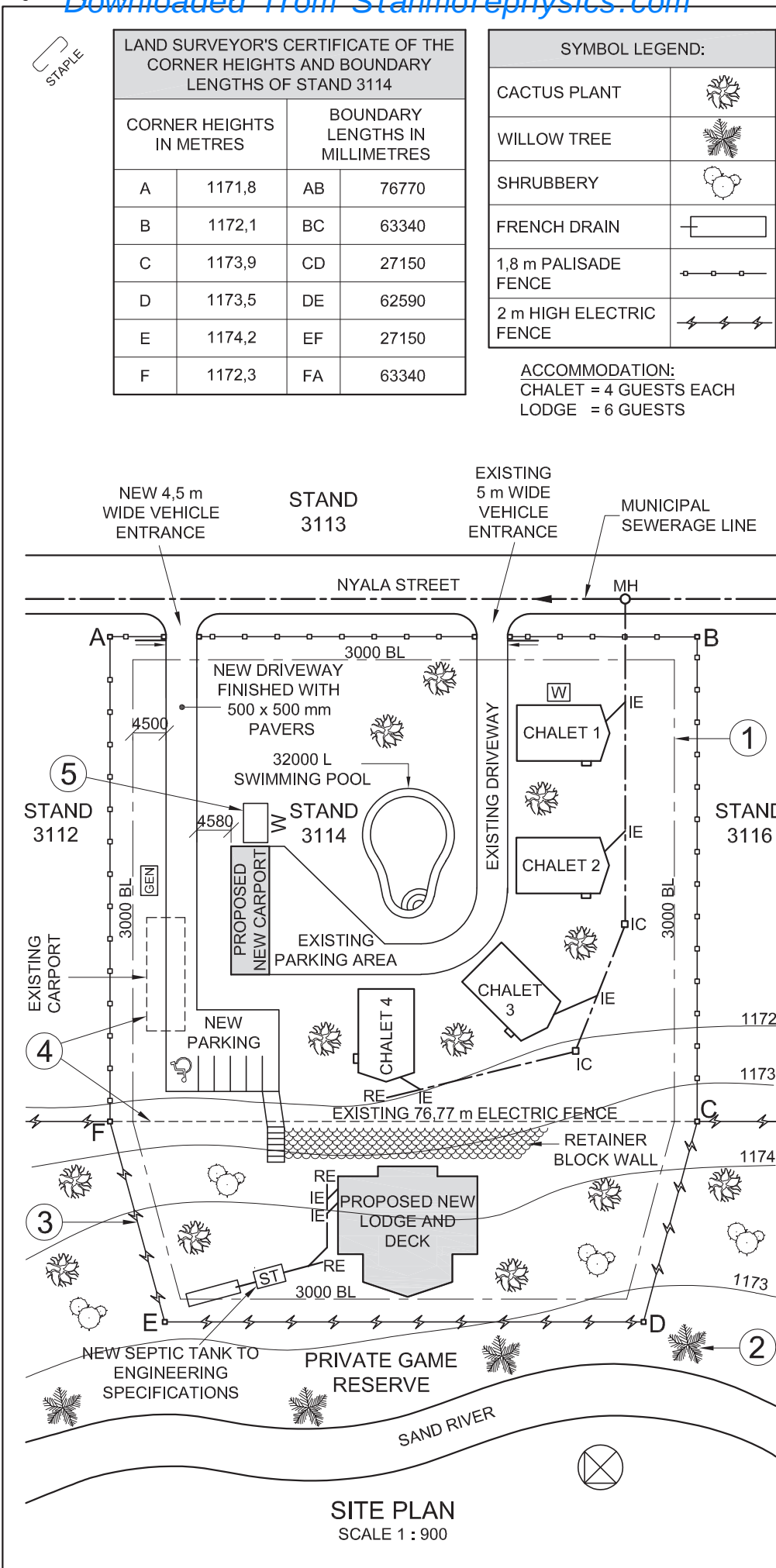
INSTRUCTIONS AND INFORMATION

- 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.

[30]

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

Copyright reserved

Please turn over



QUESTION 2: SOLID GEOMETRY

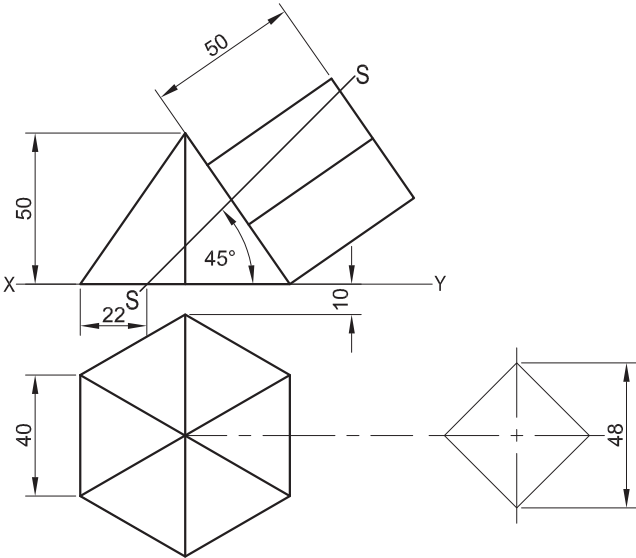
- Given:**
- The front view of a right regular hexagonal pyramid and a right square prism
 - The top view of the right regular hexagonal pyramid, with the axes and an auxiliary view for the right square prism
 - Cutting plane S-S

- 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

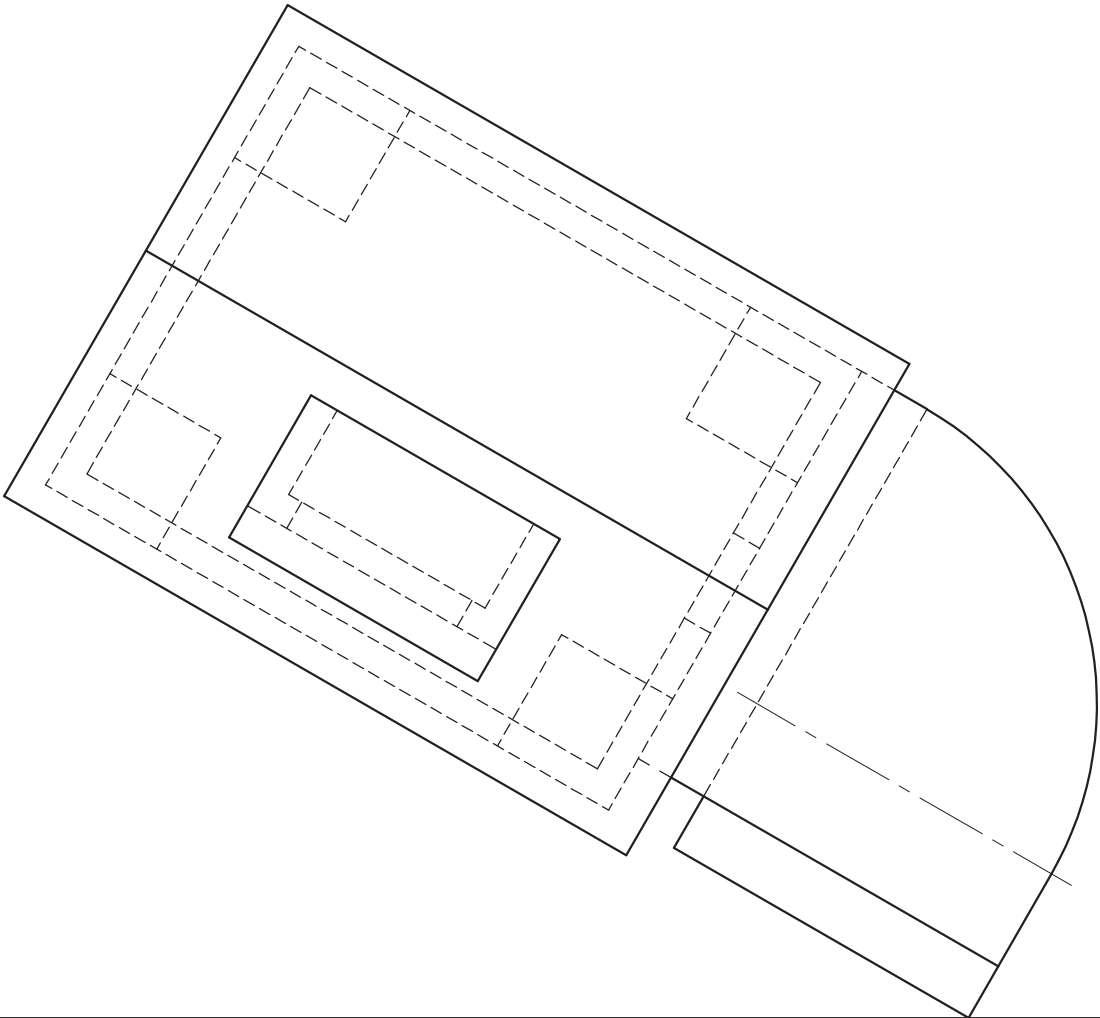
- Instructions:**
- Draw, to scale 1 : 1, the following views showing both solids:
- 2.1 The given front view
 - 2.2 A sectional top view
 - 2.3 A sectional left view

- Planning is essential.
- Show ALL construction.
- Show ALL hidden detail.

[38]



ASSESSMENT CRITERIA					
1	FRONT VIEW	7 ¹ / ₂			
2	SECTIONAL TOP VIEW	16 ¹ / ₂			
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 ¹ / ₂			
4	ROOF	7			
5	ARC	5 ¹ / ₂			
PENALTIES (-)					
TOTAL		40			

PP

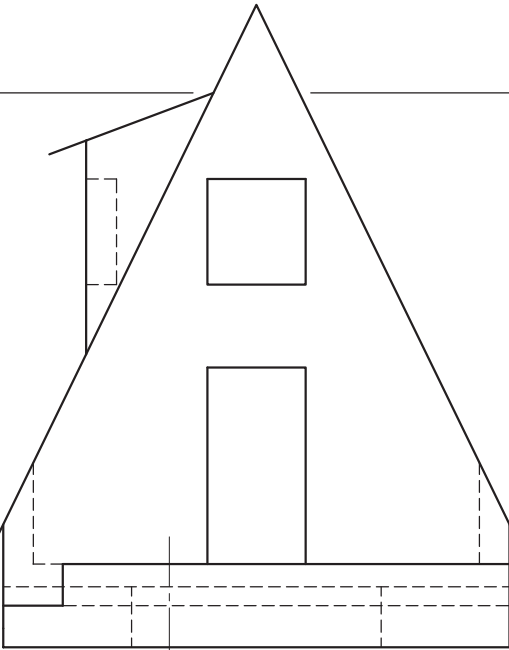
HL

GL

SP

HL

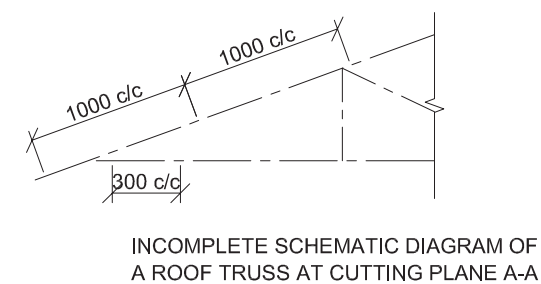
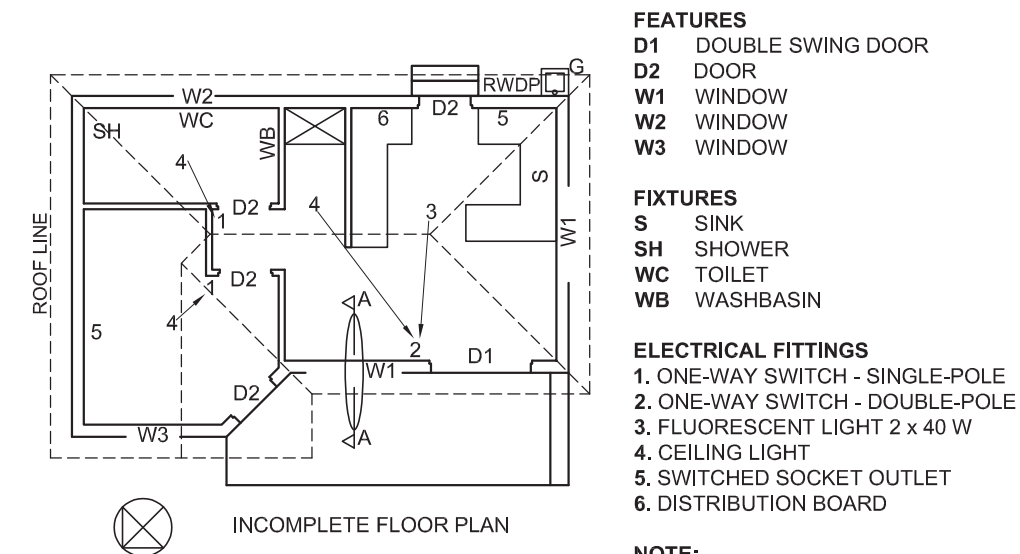
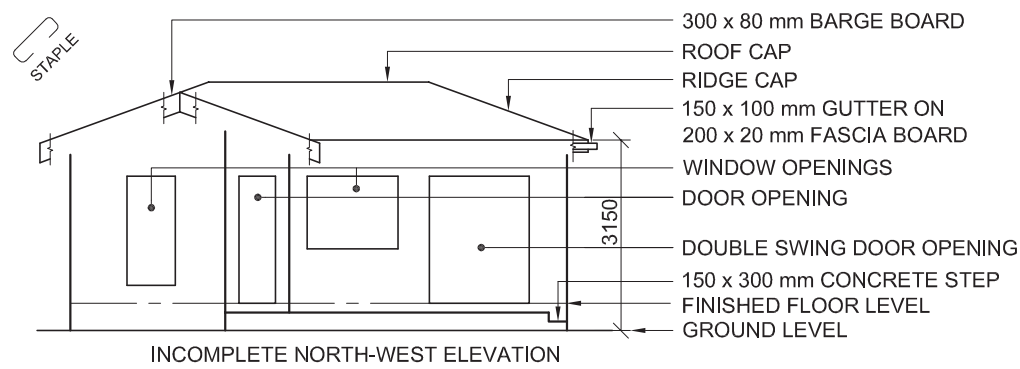
GL



EXAMINATION NUMBER

EXAMINATION NUMBER

4



ROOF NOTES:
20° ROOF PITCH

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

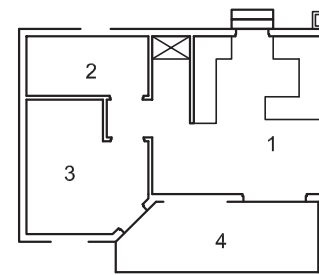
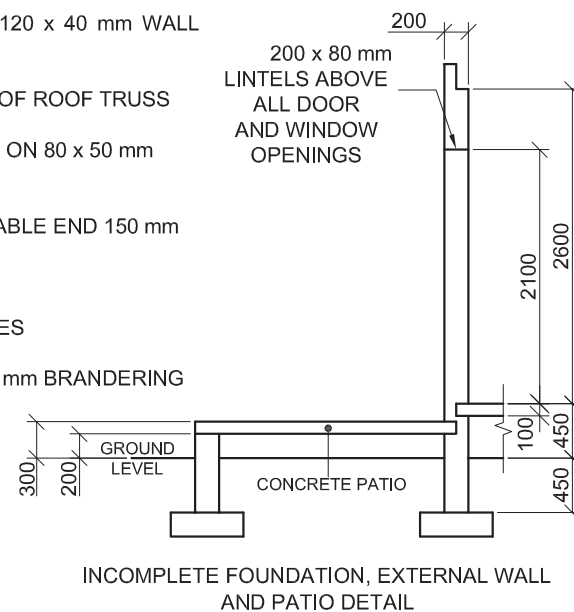
350 mm ROOF OVERHANG TO END OF ROOF TRUSS

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

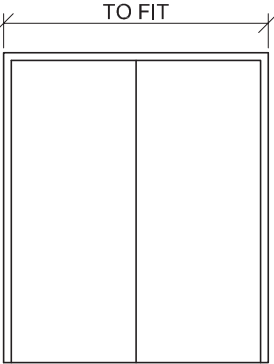
10 mm CEILING BOARDS ON 40 x 40 mm BRANDING STRIPS @ 300 mm c/c



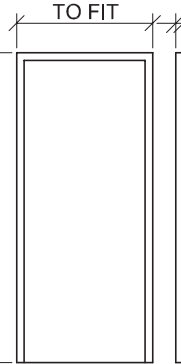
FLOOR FINISHES

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

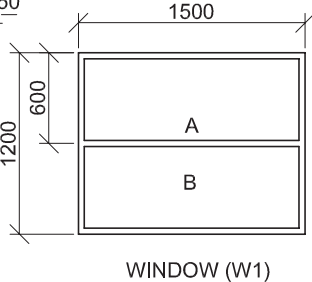
DOOR AND WINDOW SCHEDULE



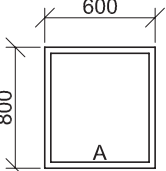
DOUBLE SWING DOOR
AND FRAME WITH TWO
DOORS (D1)



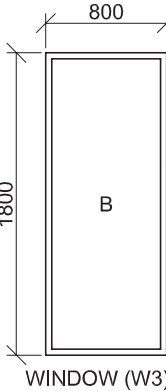
SINGLE DOOR
AND FRAME (D2)



WINDOW (W1)



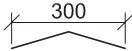
WINDOW (W2)



WINDOW (W3)

WINDOW NOTES:

- 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

The diagram shows four technical drawings of bathroom fixtures with their dimensions:

- TOILET (WC):** Front view shows a width of 500 mm and a height of 800 mm. The bowl height is 460 mm. Top view shows a width of 650 mm and a depth of 200 mm.
- SINK (S):** Front view shows a width of 1200 mm and a height of 850 mm. The basin width is 500 mm and the depth is 200 mm. Top view shows a width of 500 mm and a depth of 400 mm.
- SHOWER (SH):** Side view shows a height of 100 mm. Top view shows a width of 850 mm and a depth of 850 mm.
- WASHBASIN (WB):** Front view shows a width of 500 mm and a height of 800 mm. The basin height is 250 mm. Top view shows a width of 400 mm and a depth of 400 mm. The text "FLOOR LEVEL" is indicated next to the front view.

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.

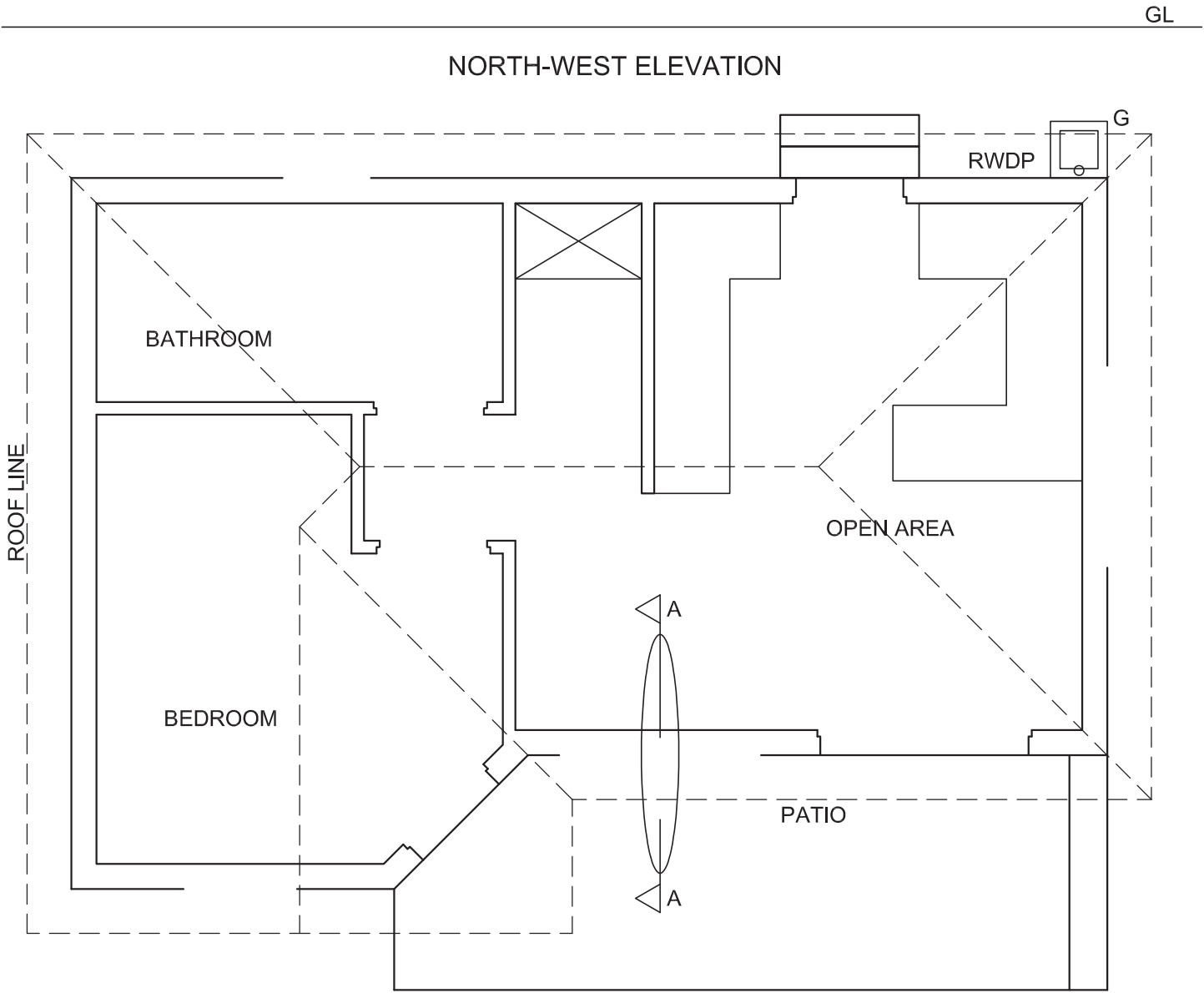
Label the following:

- 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*. [92]

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					
TOTAL			TOTAL		



SECTION A-A
SCALE 1 : 20

FLOOR PLAN
SCALE 1 : 50

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



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GRADE 12

ENGINEERING GRAPHICS AND DESIGN P1

NOVEMBER 2024

MARKING GUIDELINES

MARKS: 100

These marking guidelines consist of 7 pages.

ANSWERS		
1	DRAWING NUMBER	1
2	D <u>BRITS</u>	1
3	<u>CHEETAH</u> PRINTERS	1
4	POLOKWANE	1
5	<u>ADD WATER TANK</u>	1
6	1173,5	1
7	BUILDING LINE	1
8	WILLOW TREE	1
9	2000	1
10	TO BE REMOVED / DEMOLISHED	1
11	<u>WATER</u> STORAGE <u>TANK</u>	1
12	PAVERS	1
13	BUILT-IN CUPBOARD	1
14	BROWN	1
15	16,58 ✓ CONVERTED TO METRES ✓	2
16	NORTH-EAST / NE	2
17	22	2
18	See below	3
19		3
20		4
TOTAL		30

ANSWER 18

Show ALL calculations.

ADDING OF SIDES (+, +, ...) ✓

$$P = AB + BC + CF + FA$$

$$= (76,77 + 63,34 + 76,77 + 63,34)$$

$$= 280,22 \quad \text{✓} \quad \text{CONVERTED TO METRES} \quad \text{✓}$$

ANSWER 19

Show ALL calculations.

APPLYING CORRECT FORMULA ✓

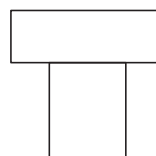
$$A = L \times B$$

$$= (17,5 \times 9,6) + (3,5 \times 10,7) + (7,7 \times 1,5) + (10,7 \times 2,4 / 2)$$

$$= 168 + 37,45 + 11,55 + 12,84$$

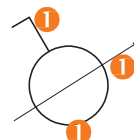
$$= 229.84 \text{ m}^2 \quad \text{✓} \quad \text{✓}$$

ANSWER 20.1



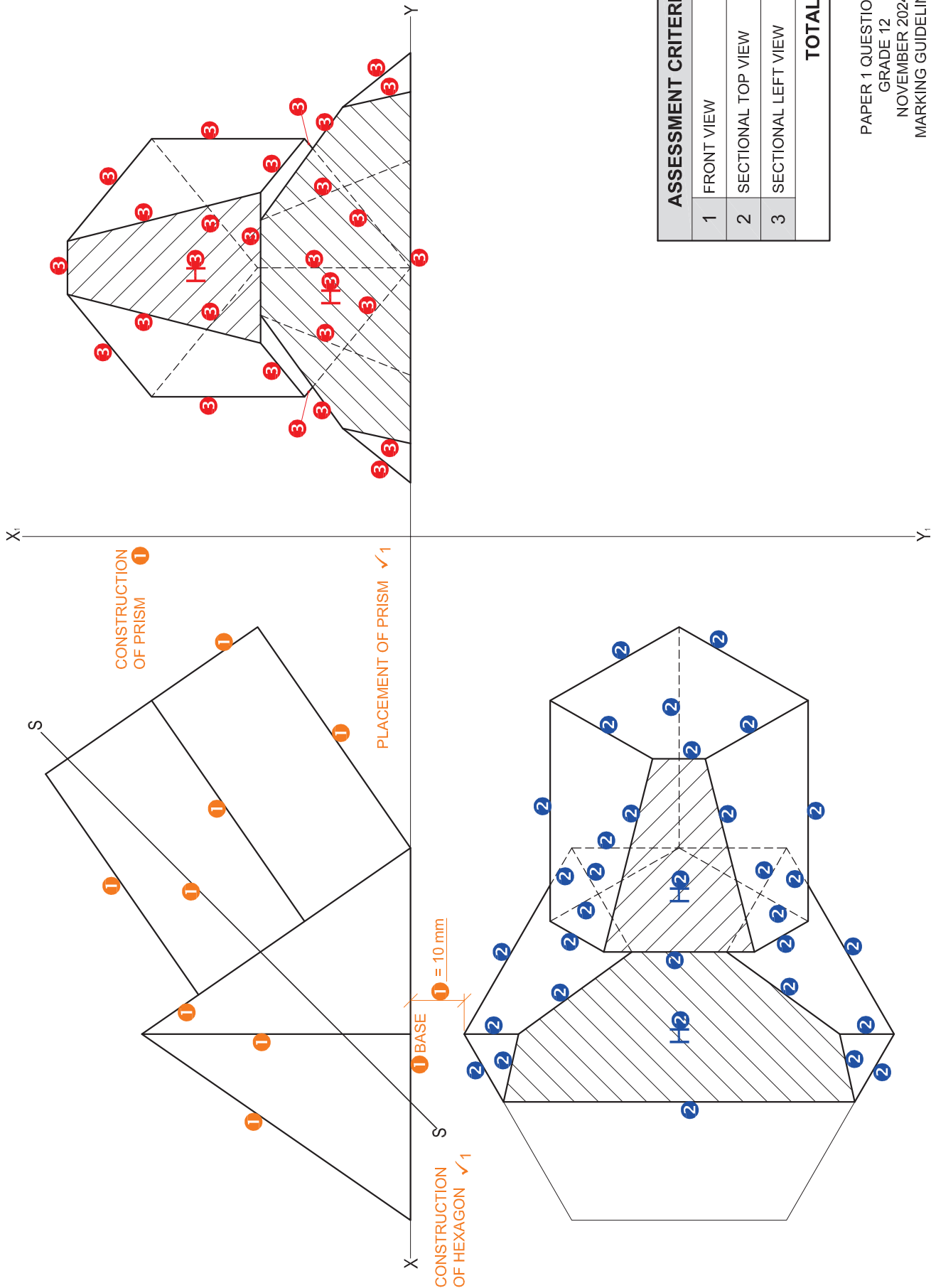
TOP RECTANGLE ✓
BOTTOM RECTANGLE ✓

ANSWER 20.2



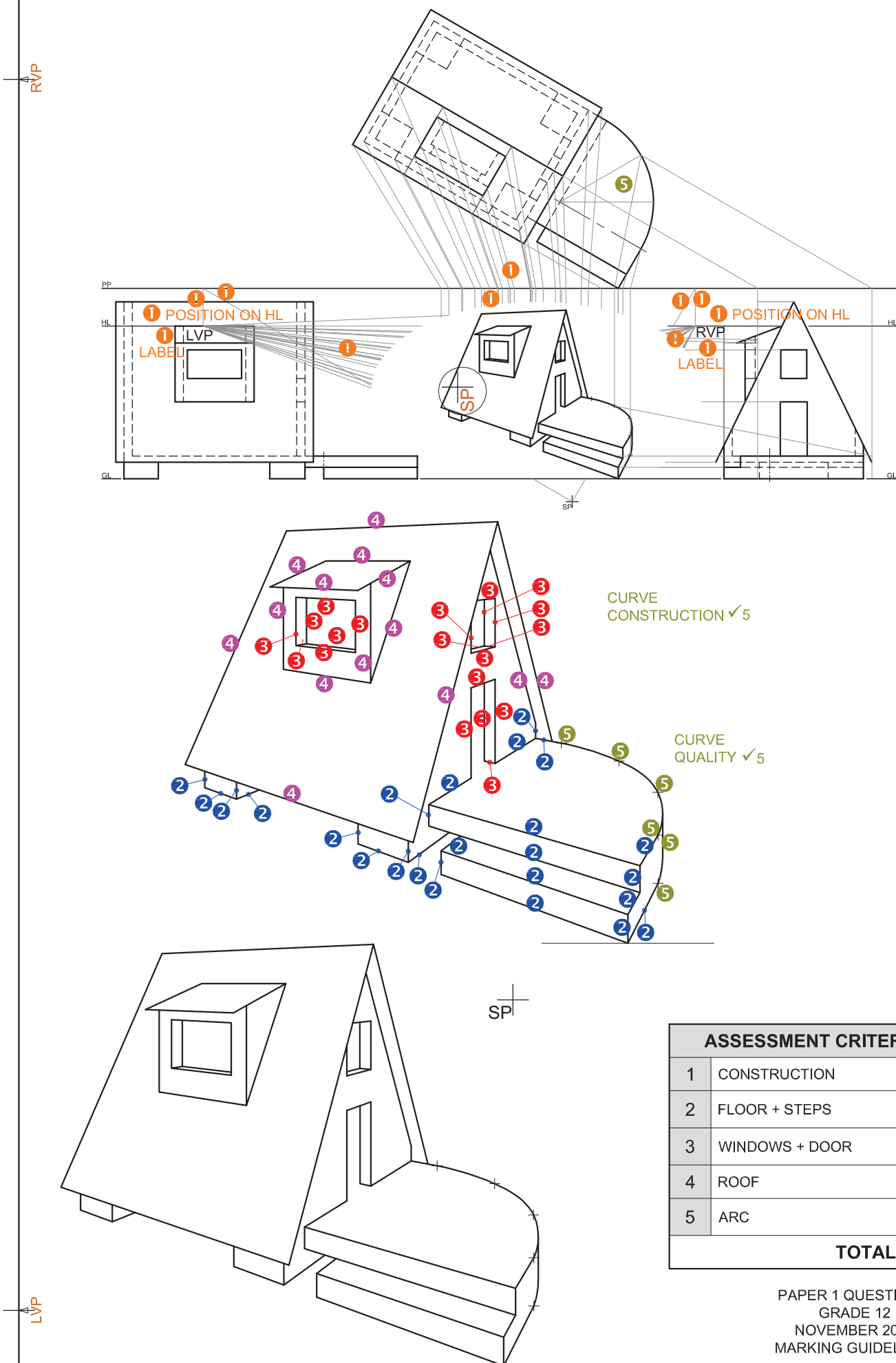
1 BOTH IN
FREEHAND

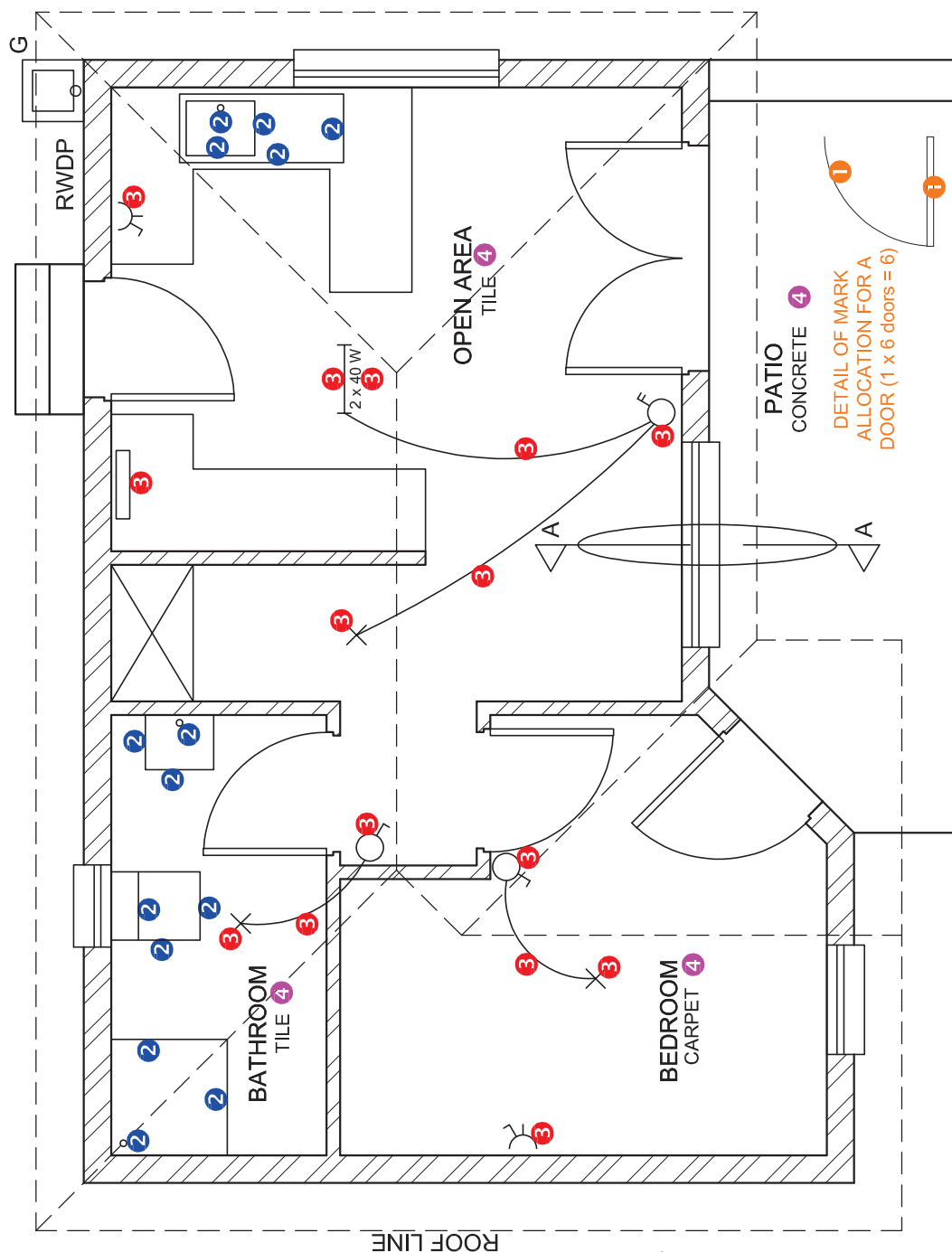
PAPER 1 QUESTION 1
 GRADE 12
 NOVEMBER 2024
 MARKING GUIDELINES



ASSESSMENT CRITERIA		
1	FRONT VIEW	7 ¹ / ₂
2	SECTIONAL TOP VIEW	16 ¹ / ₂
3	SECTIONAL LEFT VIEW	14
TOTAL		38

PAPER 1 QUESTION 2
GRADE 12
NOVEMBER 2024
MARKING GUIDELINES





ASSESSMENT CRITERIA	
FLOOR PLAN	
1	DOORS + WINDOWS 14
2	FIXTURES 7
3	ELECTRICAL $7\frac{1}{2}$
4	LABELS 2
5	HATCHING 3
SUBTOTAL 33 $\frac{1}{2}$	

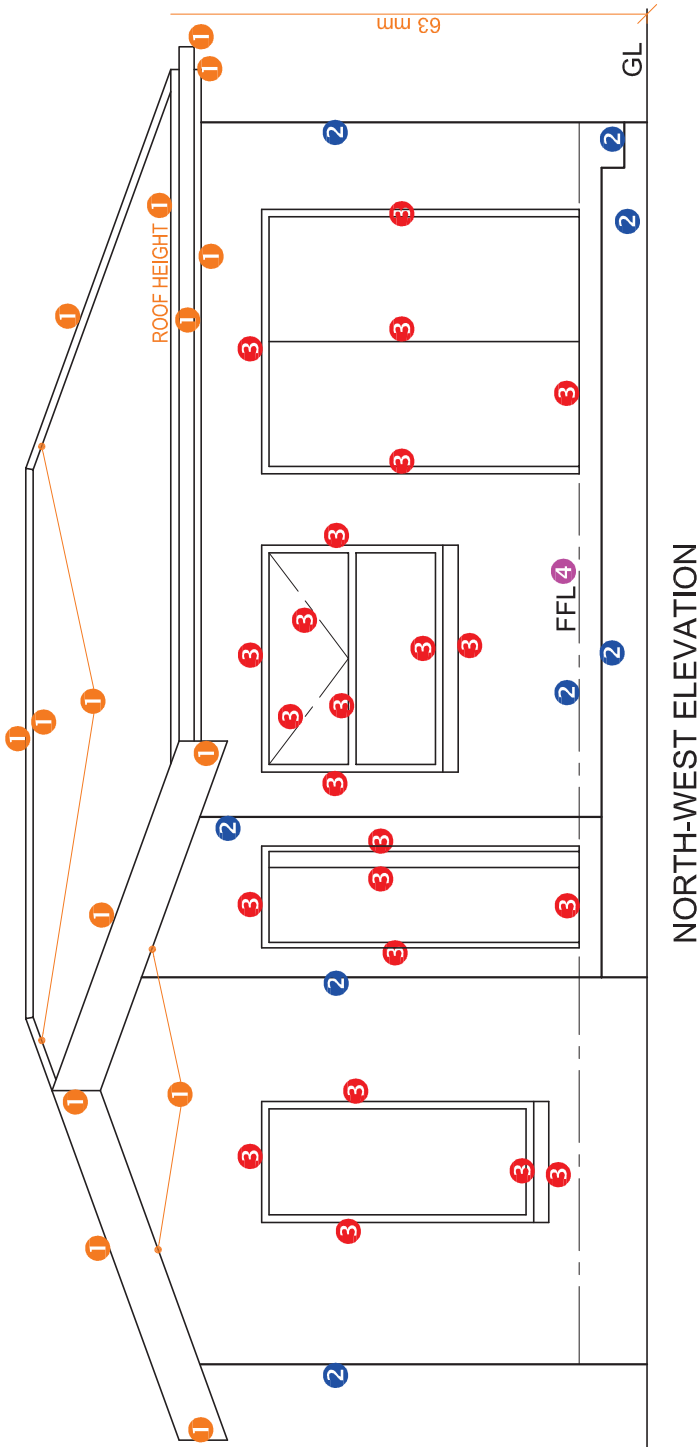
PAPER 1 QUESTION 4
GRADE 12
NOVEMBER 2024
MARKING GUIDELINES

5. HATCHING ALLOCATION	
1	SSANS COMPLIANT (TYPE)
2	HATCHING CORRECTLY APPLIED
3	TOTAL

FLOOR PLAN
SCALE 1 : 50

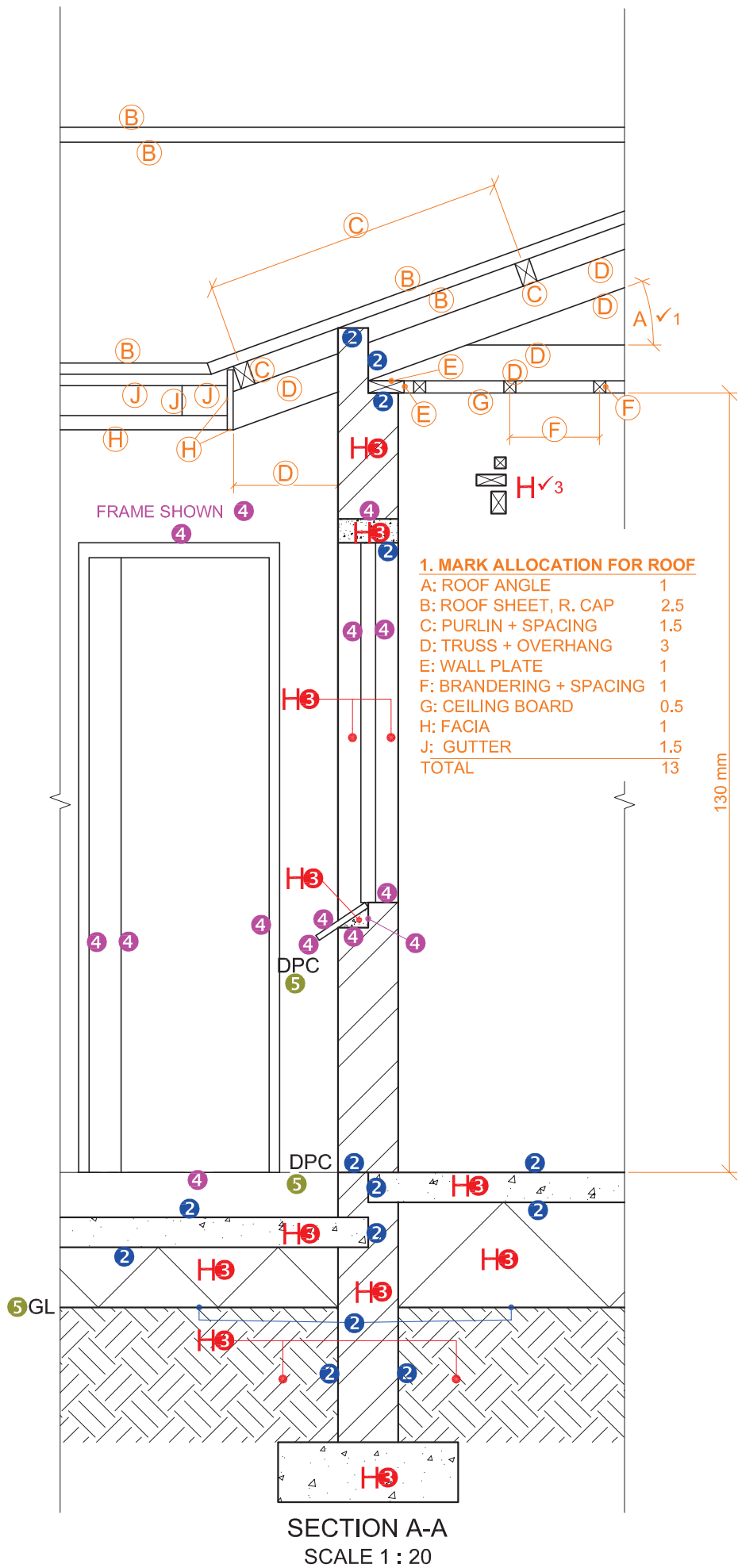
DETAIL OF MARK ALLOCATION FOR A DOW (2 x 4 windows = 8)

ALLOCATION FOR A WINDOW (2 x 4 windows = 8)



ASSESSMENT CRITERIA	
NORTH-WEST ELEVATION	
1	ROOF + RWDP 7 ¹ / ₂
2	WALLS + STEPS 4
3	DOORS + WINDOWS 11 ¹ / ₂
4	LABELS 1 ¹ / ₂
SUBTOTAL	
23 ¹ / ₂	

PAPER 1 QUESTION 4
GRADE 12
NOVEMBER 2024
MARKING GUIDELINES



1. MARK ALLOCATION FOR ROOF

A: ROOF ANGLE	1
B: ROOF SHEET, R. CAP	2.5
C: PURLIN + SPACING	1.5
D: TRUSS + OVERHANG	3
E: WALL PLATE	1
F: BRACING + SPACING	1
G: CEILING BOARD	0.5
H: FACIA	1
J: GUTTER	1.5
TOTAL	13

ASSESSMENT CRITERIA		
DETAILED SECTION		
1	ROOF DETAIL	13
2	SLAB + WALL	7
3	HATCHING	6 ¹ / ₂
4	WINDOW + DOOR	7
5	LABELS	1 ¹ / ₂
SUBTOTAL		35

PAPER 1 QUESTION 4
GRADE 12
NOVEMBER 2024
MARKING GUIDELINES