



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

ENGINEERING GRAPHICS AND DESIGN P1

MAY/JUNE 2024

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label

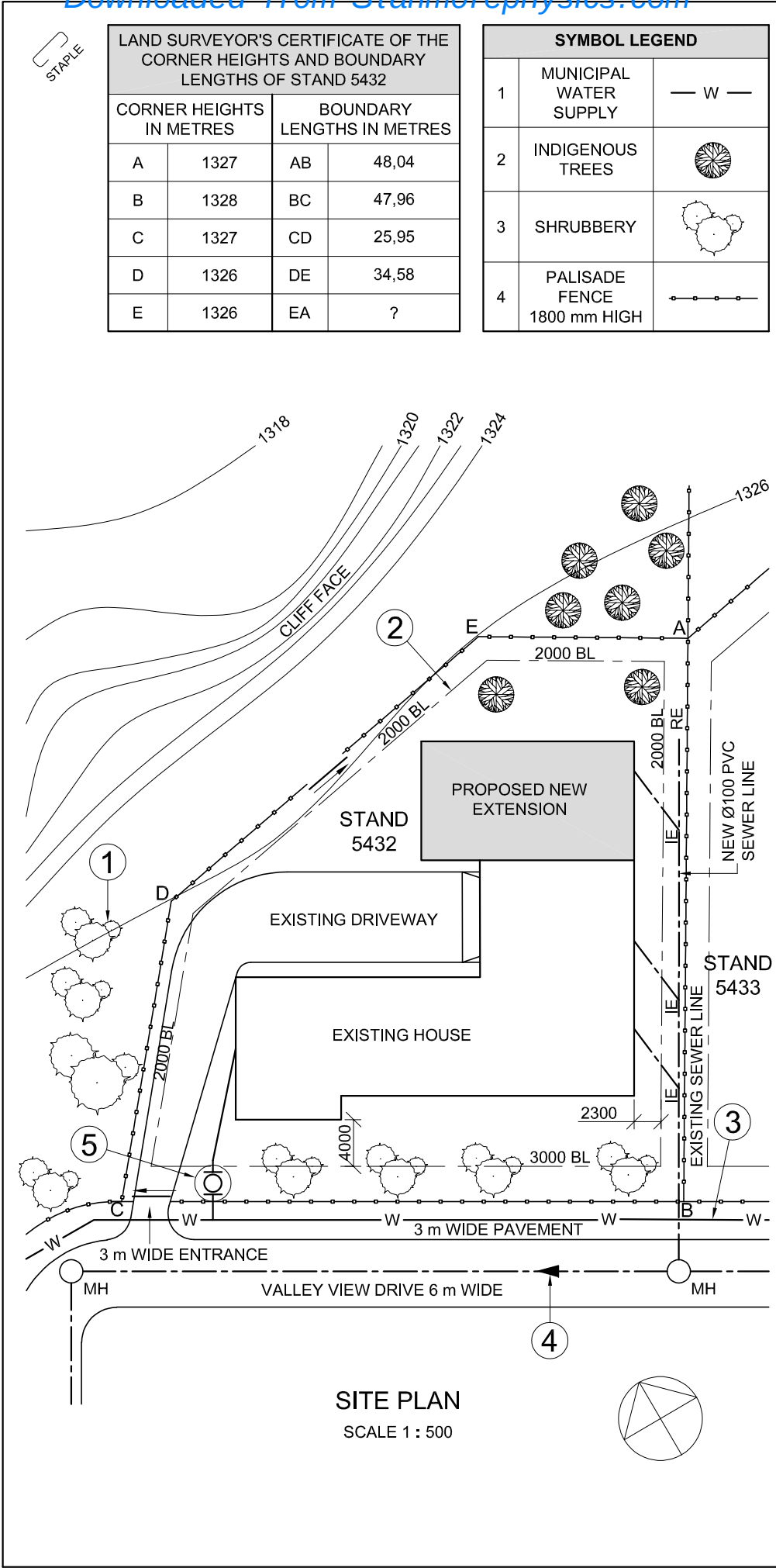
INSTRUCTIONS AND INFORMATION

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
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



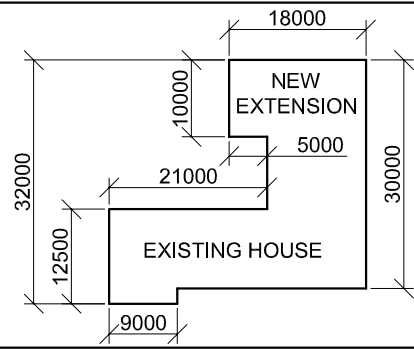
QUESTION 1: ANALYTICAL (CIVIL)

Given:
The site plan of an existing house with a proposed new extension, 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 was Jane responsible for?	1		
2	What scale is indicated for the site plan?	1		
3	On what date was the drawing printed?	1		
4	Who must notify the architect of any discrepancies before commencing with the work?	1		
5	What is the width of VALLEY VIEW DRIVE in metres?	1		
6	How many sliding gates are on STAND 5432?	1		
7	What does the abbreviation IE stand for?	1		
8	What natural feature lies outside and parallel to boundary line DE of STAND 5432?	1		
9	Name the feature at 1.	1		
10	What does the line at 2 indicate?	1		
11	Name the feature at 3.	1		
12	What is the height of the palisade fence in metres?	1		
13	What is the diameter of the new sewer line?	1		
14	What does the arrow at 4 indicate?	1		
15	Name the encircled feature at 5.	1		
16	How far is the existing house from VALLEY VIEW DRIVE in metres?	2		
17	In what colour should new concrete be indicated on elevations?	1		
18	Which elevation of the existing house faces VALLEY VIEW DRIVE?	2		
19	If the perimeter of STAND 5432 is 173560 mm, determine, in metres, the length of boundary line EA in the space below (ANSWER 19).	3		
20	In the space below (ANSWER 20), determine the combined total area of the existing house and new extension in square metres.	3		
21	In the space in the title panel (ANSWER 21), draw, in neat freehand, the front view and top view of the SANS 10143 graphical symbol for a WASH TUB.	4		
TOTAL		30		

ANSWER 19
Show ALL calculations.



ANSWER 20
Show ALL calculations.

EXAMINATION NUMBER	
EXAMINATION NUMBER	2



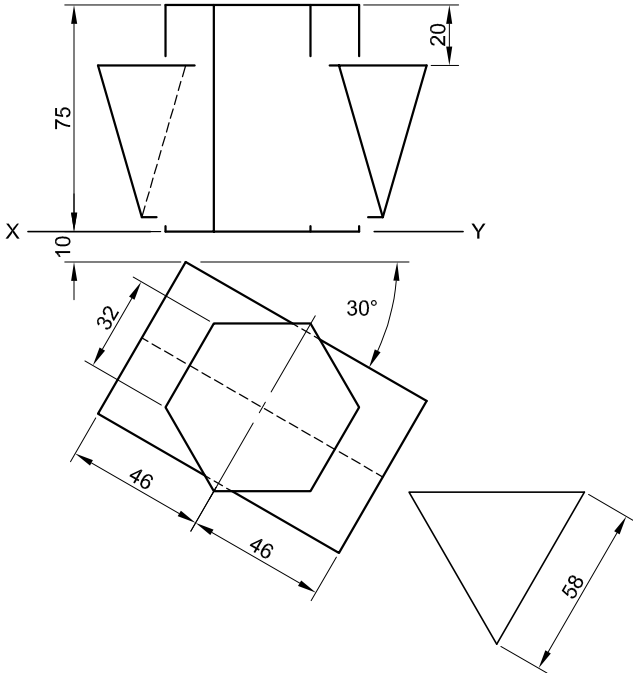
QUESTION 2: INTERPENETRATION

- Given:**
- The top view and incomplete front view of a right equilateral triangular prism that passes through a right regular hexagonal prism. The axes of both solids lie in a common vertical plane.
 - An auxiliary view of the triangular prism

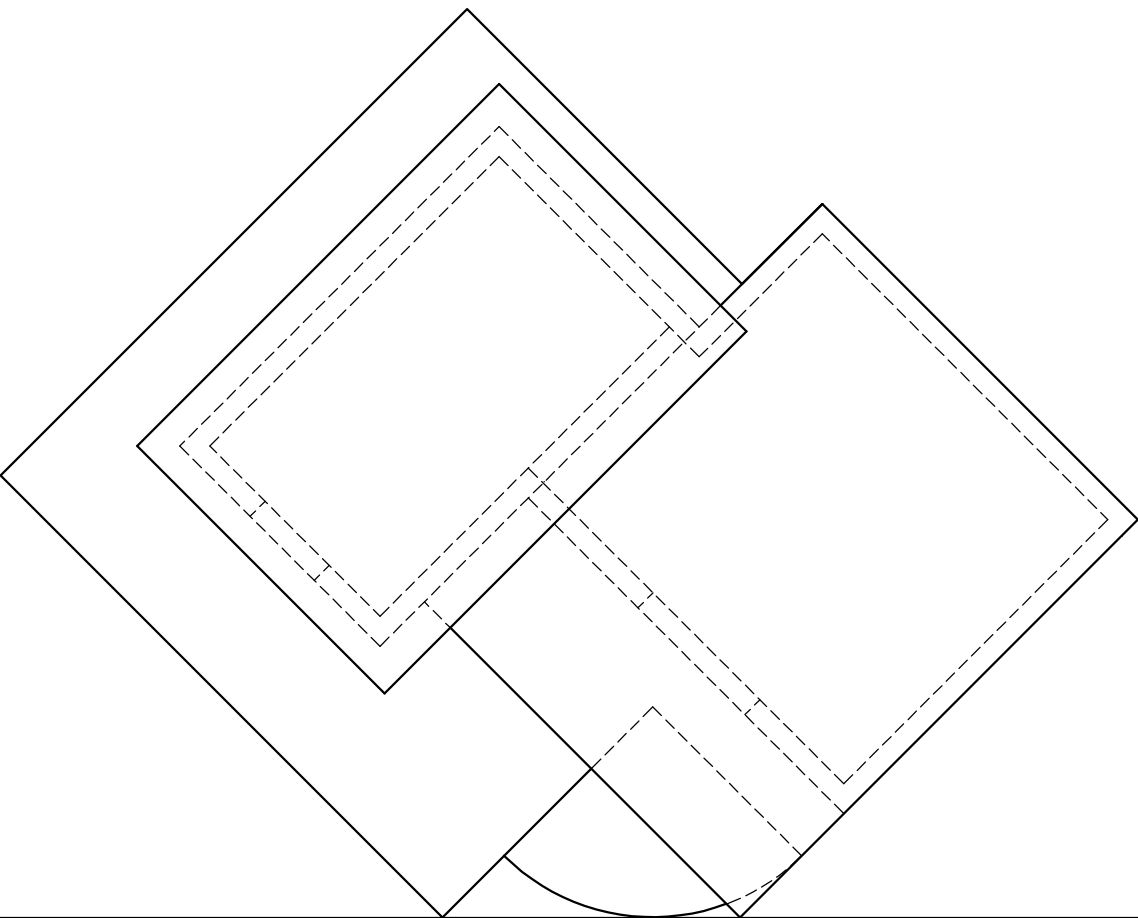
- Instructions:**
- Draw, to scale 1 : 1, the following views of the interpenetrating solids:
- 2.1 The given top view
 - 2.2 The complete front view, clearly showing both curves of interpenetration
 - 2.3 The complete right view, clearly showing both curves of interpenetration

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

[36]



ASSESSMENT CRITERIA					
1	TOP VIEW	10			
2	FRONT VIEW	14			
3	RIGHT VIEW	12			
PENALTIES (-)					
TOTAL		36			
EXAMINATION NUMBER					
EXAMINATION NUMBER					3



QUESTION 3: PERSPECTIVE

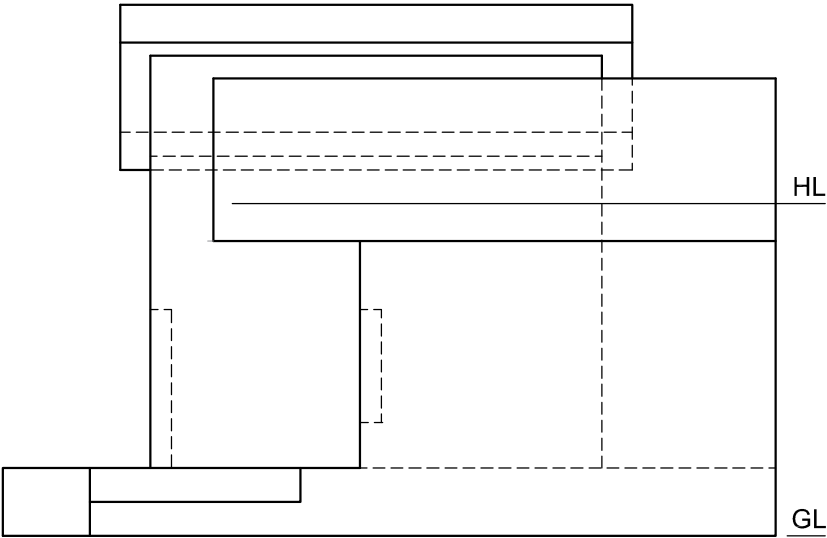
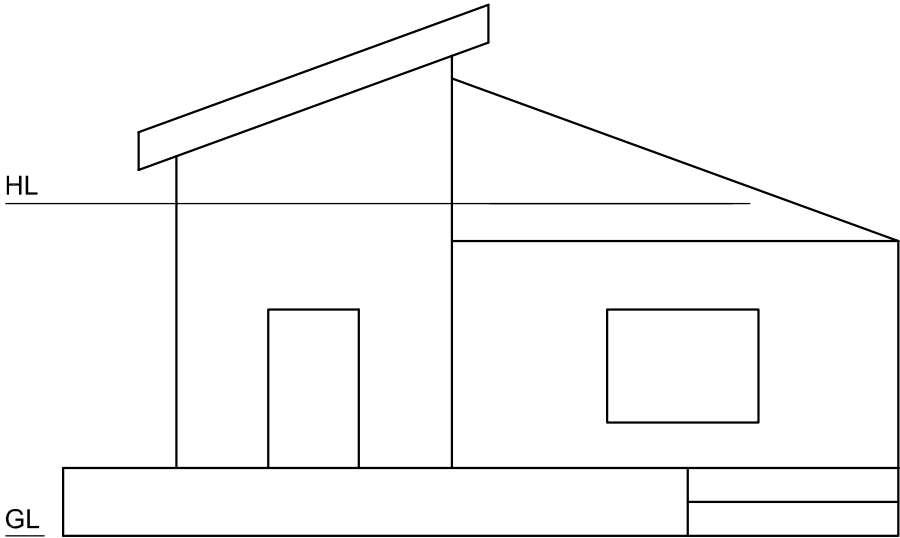
Given:
Three views of a building and the information needed to draw a two-point perspective drawing
PP – Picture plane
HL – Horizon line
GL – Ground line
SP – Station point

- 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 window.
 - NO interior detail is required.
- [39]

ASSESSMENT CRITERIA					
1	CONSTRUCTION	6			
2	WALL + BASE + STAIRS	12 ¹ / ₂			
3	WINDOW + DOOR	6			
4	ROOF	9			
5	ARC	5 ¹ / ₂			
PENALTIES (-)					
TOTAL		39			

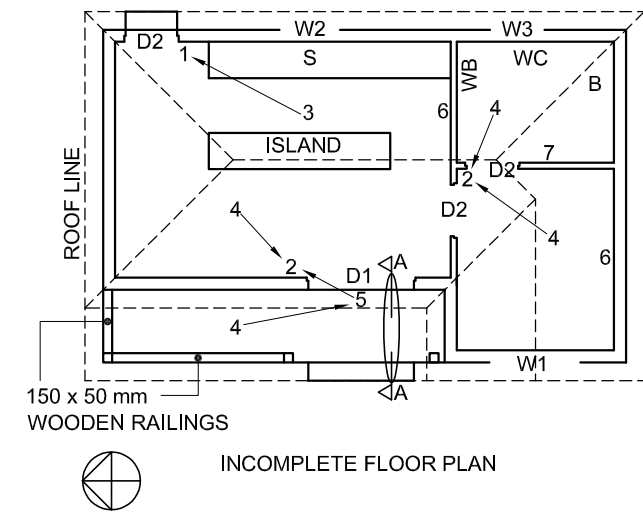
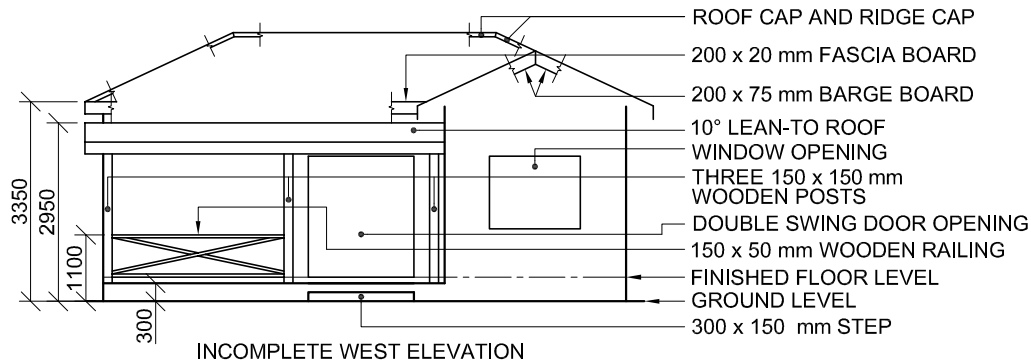
PP

PP



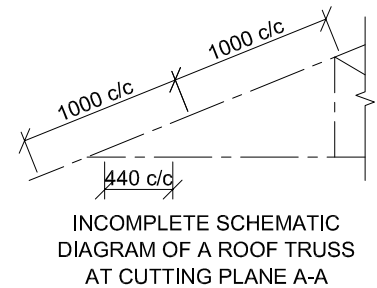
SP

EXAMINATION NUMBER	
EXAMINATION NUMBER	
4	

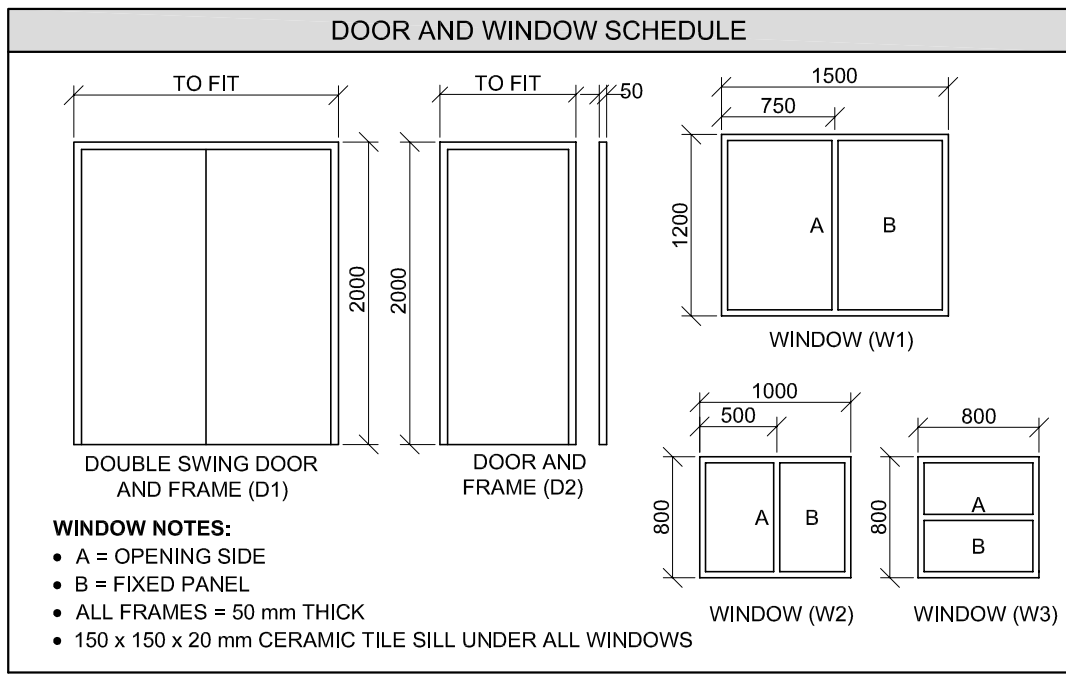
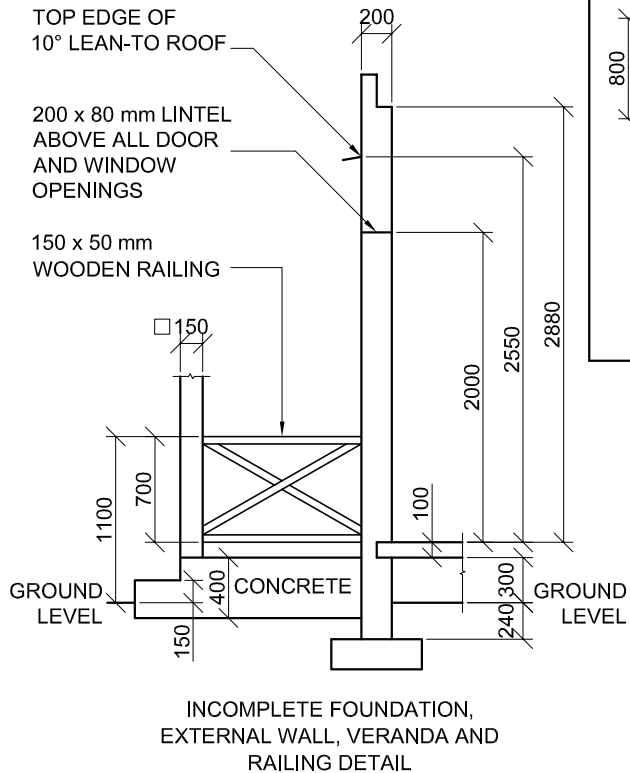


- FEATURES**
D1 DOUBLE SWING DOOR
D2 DOOR
W1 WINDOW
W2 WINDOW
W3 WINDOW
- FIXTURES**
WC TOILET
WB WASH-BASIN
B BATH
S SINK
- ELECTRICAL FITTINGS**
1. ONE-WAY SWITCH - SINGLE-POLE
2. ONE-WAY SWITCH - DOUBLE-POLE
3. FLUORESCENT LIGHT 2 x 60 W
4. CEILING LIGHT
5. WALL-MOUNTED LIGHT
6. SWITCHED SOCKET OUTLET
7. SOCKET OUTLET

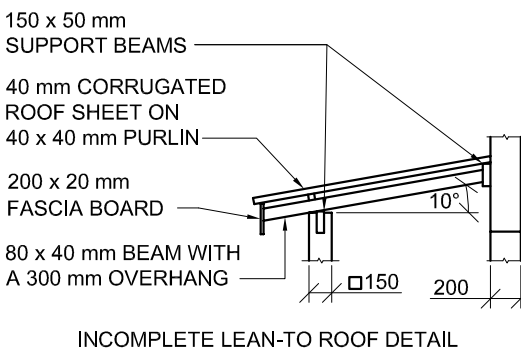
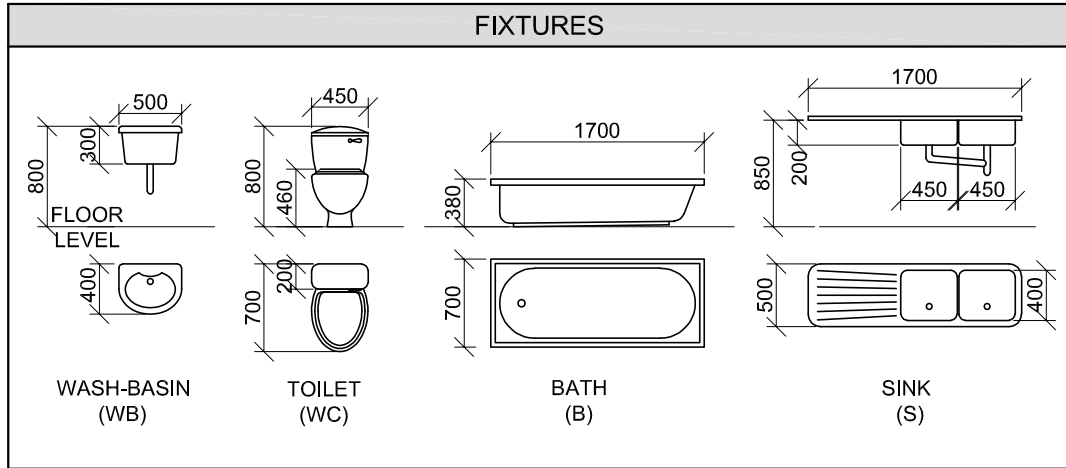
NOTE:
THE ARROW SHOWS THE LIGHT CONNECTION TO THE SWITCH.



- ROOF NOTES:**
25° ROOF PITCH
120 x 40 mm ROOF TRUSSES ON 120 x 40 mm WALL PLATES
300 mm ROOF OVERHANG TO END OF ROOF TRUSS
40 mm CORRUGATED ROOF SHEET ON 80 x 50 mm PURLINS @ 1000 mm c/c
200 x 20 mm FASCIA BOARDS ON ALL SIDES
200 x 75 mm BARGE BOARDS ON GABLED ENDS 250 mm PAST FASCIA BOARDS
10 mm CEILING BOARDS ON 40 x 40 mm BRANDING STRIPS @ 440 mm c/c



ROOF COMPONENTS		ELECTRICAL SYMBOLS	
	200 x 20 mm FASCIA BOARD		
	80 x 50 mm PURLINS		
	200 x 75 mm BARGE BOARD		
	ROOF CAP AND RIDGE CAP		



QUESTION 4: CIVIL DRAWING

Given:

- The incomplete west elevation of a **new house**, showing the walls, step, the double swing door and window openings, the roof, labels, veranda and railing
- The incomplete floor plan showing the walls, steps, veranda, positions of the doors, windows and fixtures, and the electrical layout
- An incomplete schematic diagram of a roof truss at cutting plane A-A and roof notes
- The incomplete foundation, external wall, veranda and railing detail
- A door and window schedule
- A table of roof components
- A table of electrical symbols
- A table of fixtures
- Room designations and floor finishes
- Incomplete lean-to roof detail
- 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 position of the 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 WEST ELEVATION

Show the following features on the drawing:

- The outside walls, step, window and double swing door detail (in the closed position)
- The roof detail, including the fascia board and barge boards
- The veranda, railing, posts and lean-to roof detail
- The finished floor level

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

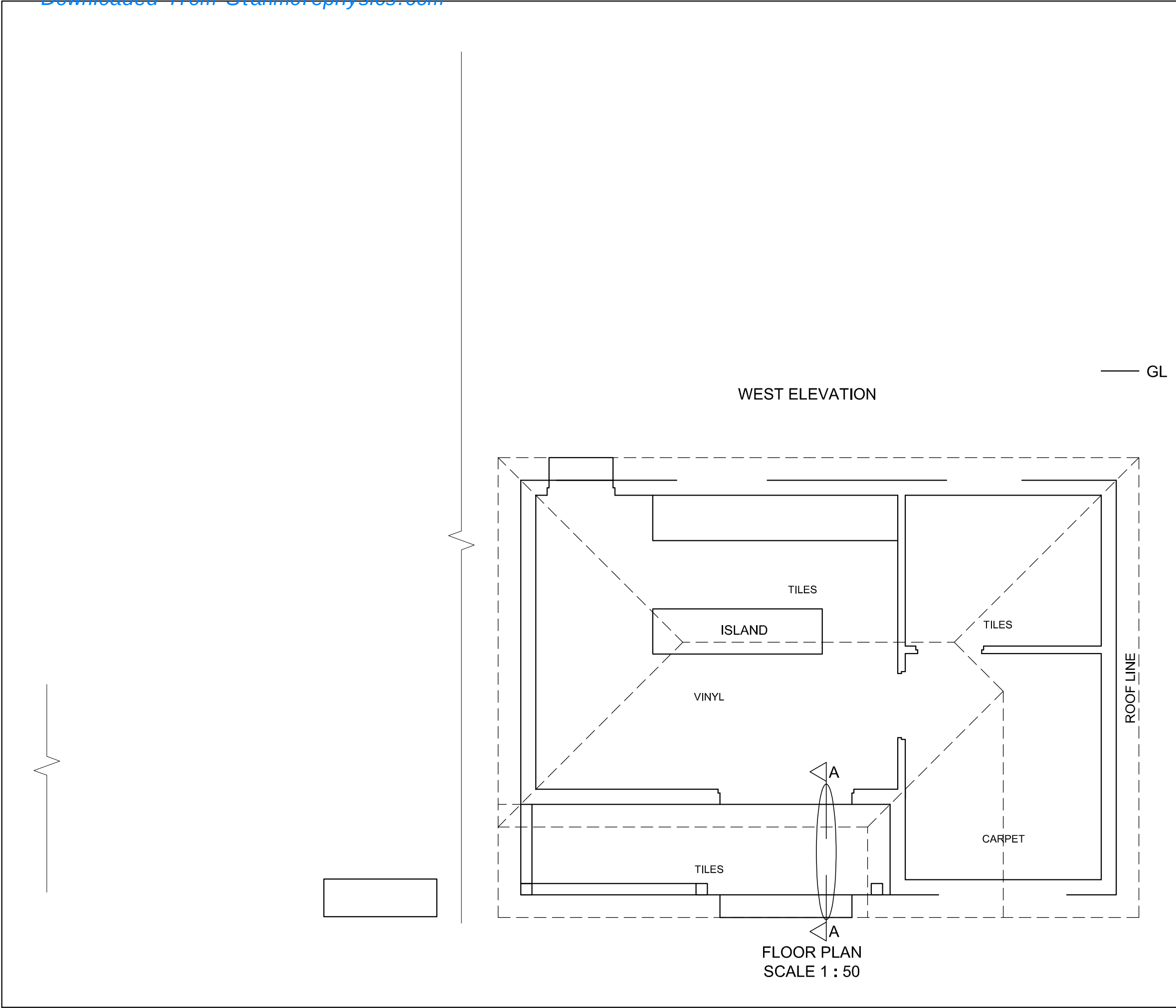
Show the following features on the drawing:

- The complete foundation, external wall and door detail
- The roof detail, including the fascia board
- The veranda and lean-to roof detail
- The post and railing, as well as the fascia board to the left (north) of cutting plane A-A
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:

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

NOTE: ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the **SANS 10143**. [95]



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		NOT USING BREAK LINES			
G					
H					
J					
TOTAL				TOTAL	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	11			
2	FIXTURES	8 1/2			
3	ELECTRICAL	9 1/2			
4	HATCHING	4			
5	LABELS	2 1/2			
SUBTOTAL		35 1/2			
WEST ELEVATION					
1	ROOF + LEAN-TO	8 1/2			
2	WALLS + POSTS + VERANDA	5			
3	DOORS + WINDOW	6 1/2			
4	STEP + FFL + RAILING	4 1/2			
5	LABELS	1/2			
SUBTOTAL		25			
DETAILED SECTION					
1	ROOF DETAIL	15			
2	SLAB + WALL + STEPS + POST	10			
3	HATCHING	5 1/2			
4	RAILING	3			
5	LABELS	1			
SUBTOTAL		34 1/2			
TOTAL		95			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6



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ENGINEERING GRAPHICS AND DESIGN P1

MAY/JUNE 2024

MARKING GUIDELINES

MARKS: 100

These marking guidelines consist of 8 pages.

ANSWERS		
1	CHECKED	1
2	1 : 500	1
3	08/05/2023	1
4	CONTRACTORS	1
5	6	1
6	2	1
7	INSPECTION EYE	1
8	<u>CLIFF</u> FACE	1
9	SHRUBBERY	1
10	BUILDING LINE	1
11	MUNICIPAL <u>WATER SUPPLY</u>	1
12	1,8	1
13	100	1
14	<u>DIRECTION</u> OF <u>FLOW</u>	1
15	WATER METER	1
16	10	2
17	GREEN	1
18	SSW / SOUTH SOUTH WEST / SOUTH WEST / SW	2
19	See below	3
20		3
21		4
TOTAL		30

ANSWER 19

Show ALL calculations.

APPLYING CORRECT FORMULA ✓

$$S = P - (S + S + S + S)$$

$$= 173,56 - (48,04 + 47,96 + 25,95 + 34,58)$$

$$= 17,03 \quad \checkmark \quad \checkmark$$

ANSWER 20

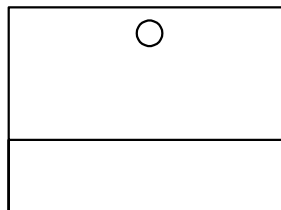
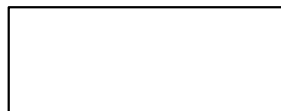
Show ALL calculations.

APPLYING CORRECT FORMULA ✓

$$A = (L \times B) + (L \times B) + \dots$$

$$= (30 \times 13) + (5 \times 10) + (21 \times 10,5) + (9 \times 2)$$

$$= 678,5 \text{ m}^2 \quad \checkmark \quad \checkmark$$

ANSWER 21

FREEHAND

1

RECTANGLE

✓ 1

TOP
RECTANGLE

✓ 1

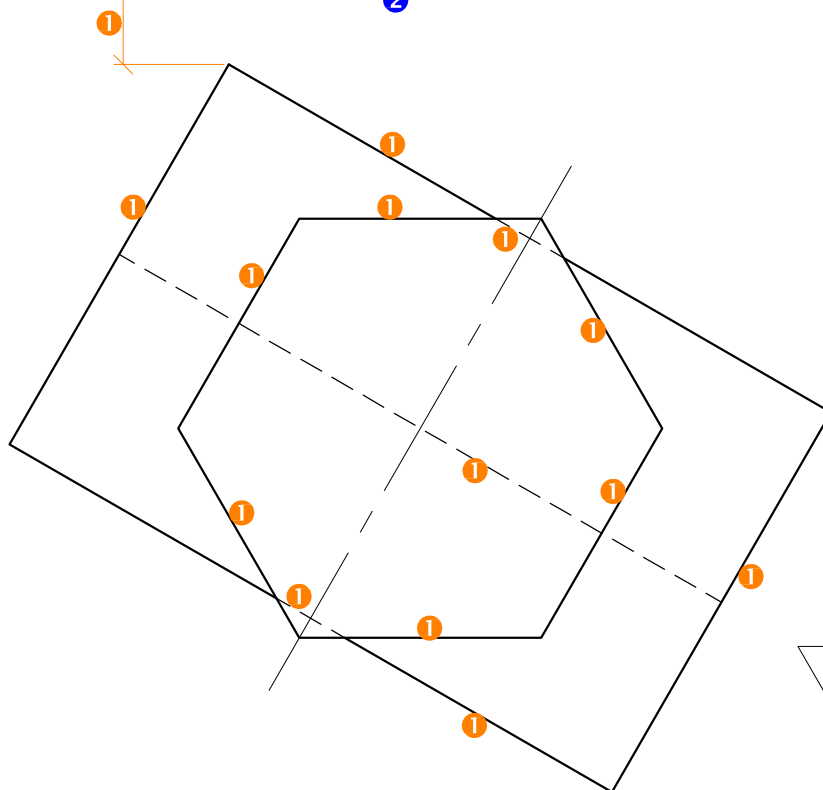
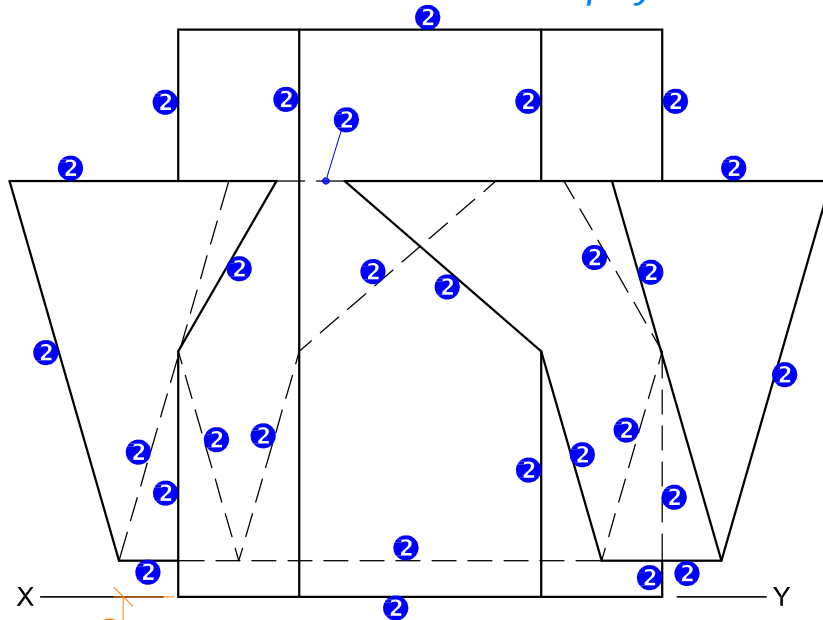
BOTTOM
RECTANGLE

✓ 1

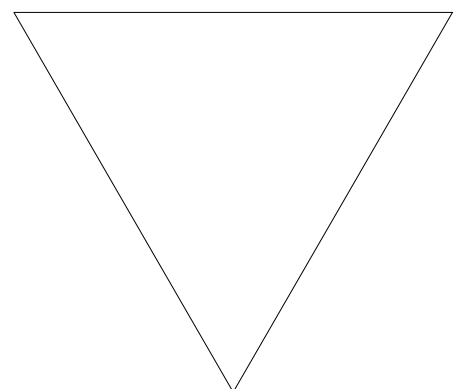
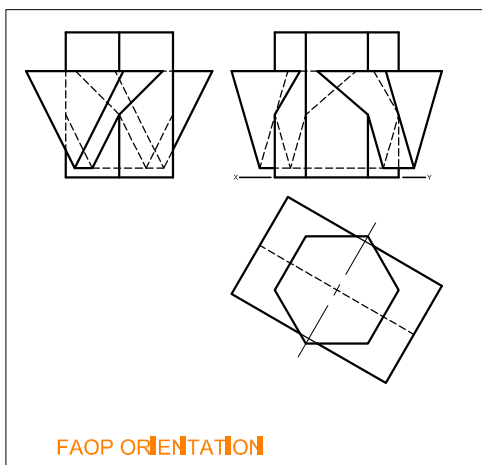
CIRCLE

1

PAPER 1 QUESTION 1
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES

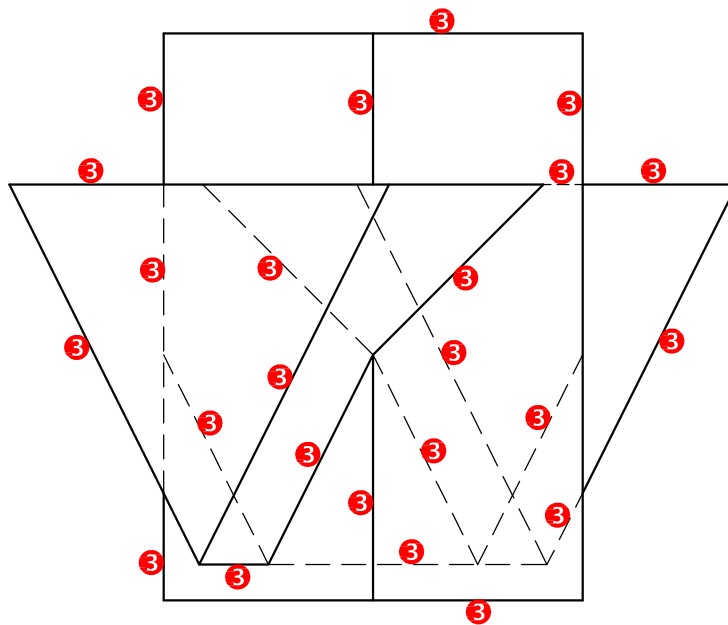
**1. CONSTRUCTION**

30° ANGLE	1
SHAPE OF HEXAGON	1
SHAPE OF TRIANGLE	1
TOTAL	3



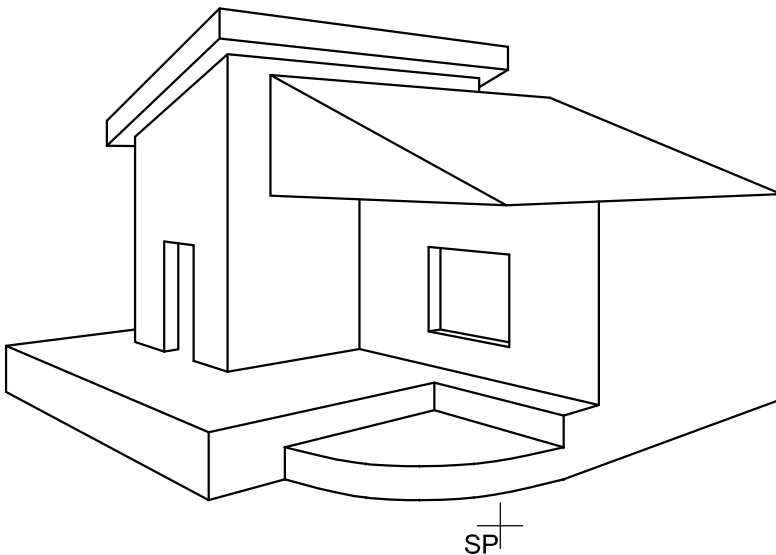
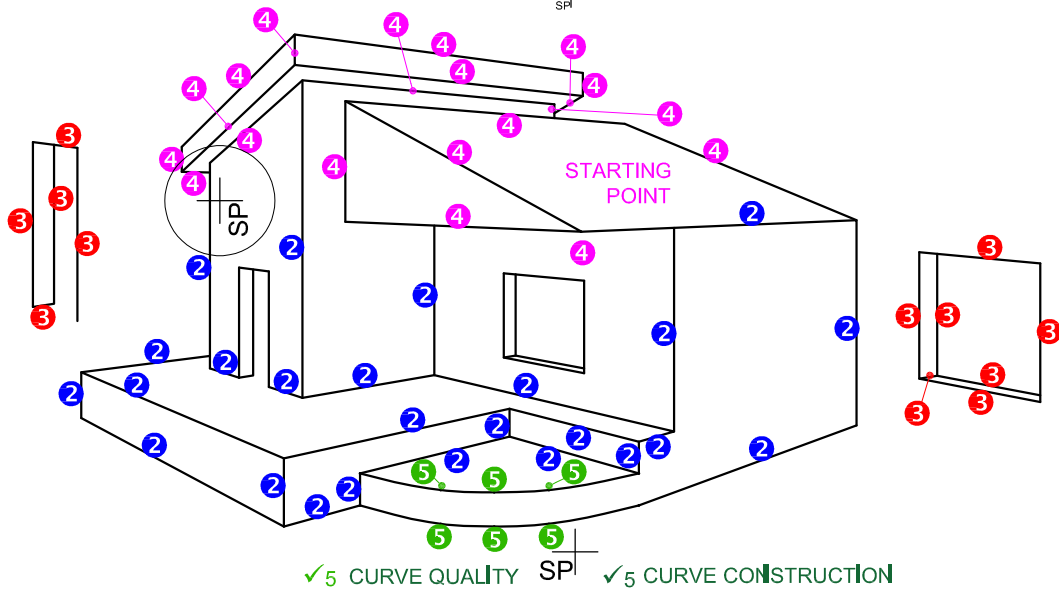
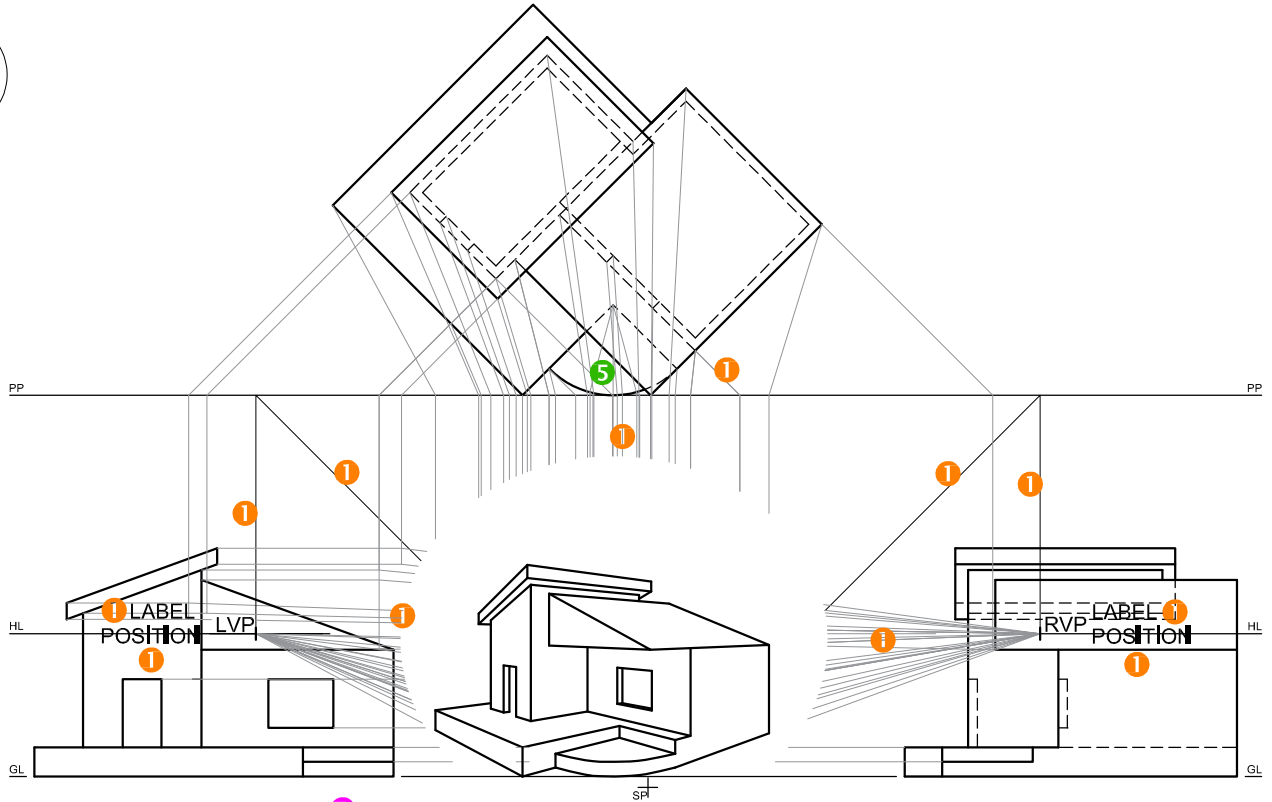
ASSESSMENT CRITERIA		
1	TOP VIEW	10
2	FRONT VIEW	14
TOTAL		24

PAPER 1 QUESTION 2
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES



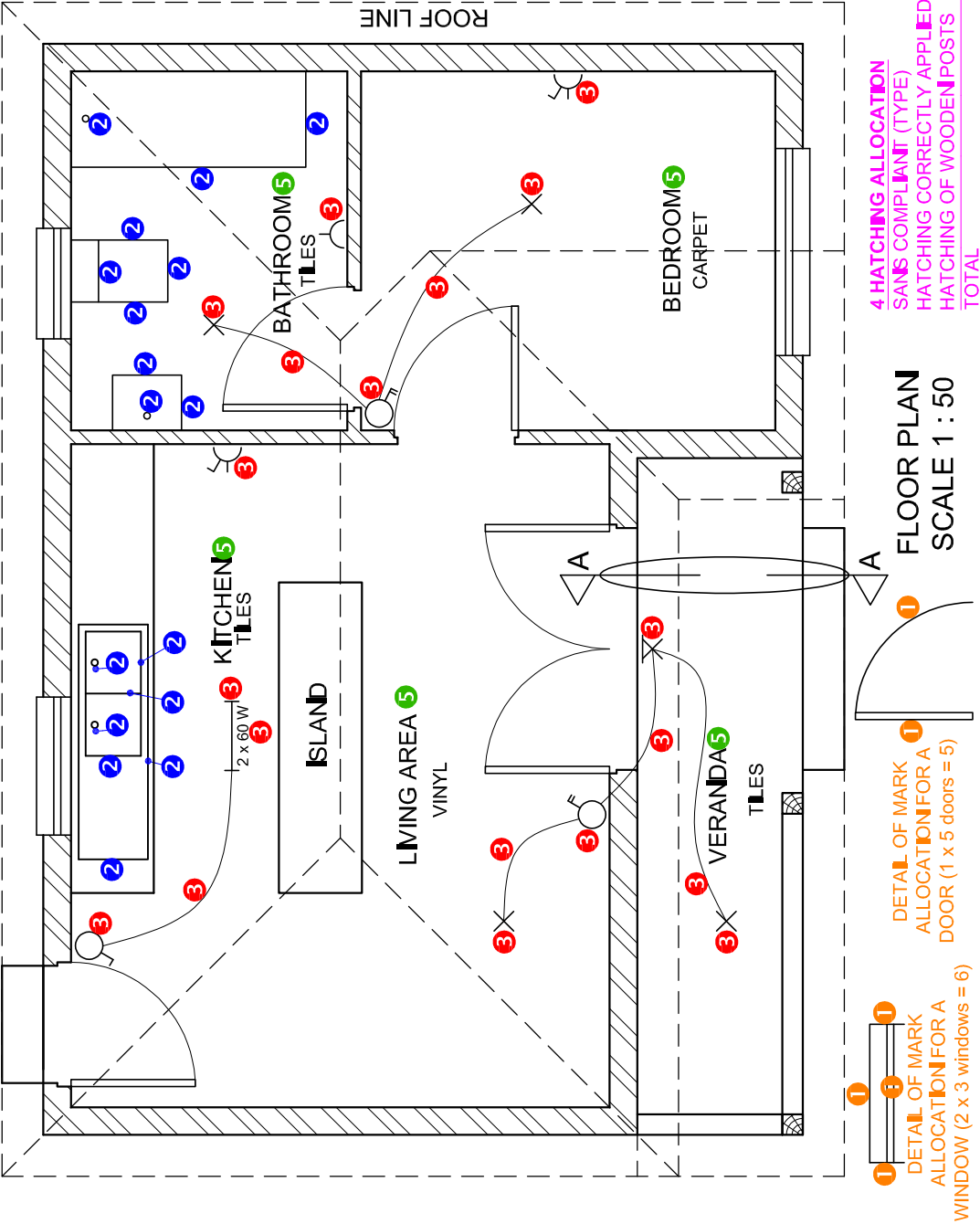
ASSESSMENT CRITERIA		
3	RIGHT VIEW	12
TOTAL		12

PAPER 1 QUESTION 2
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES



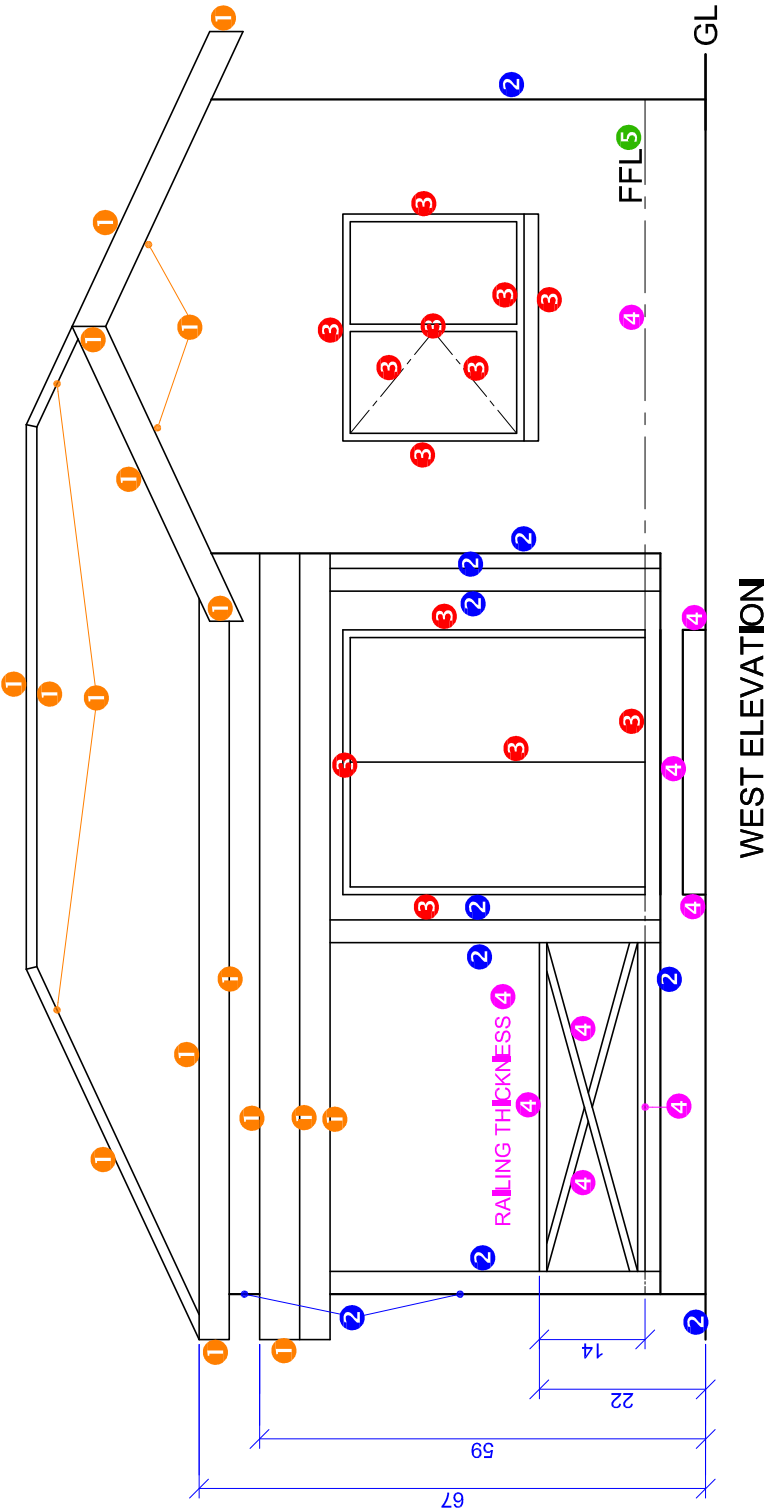
ASSESSMENT CRITERIA		
1	CONSTRUCTION	6
2	WALL + BASE + STAIRS	12 $\frac{1}{2}$
3	WINDOW + DOOR	6
4	ROOF	9
5	ARC	5 $\frac{1}{2}$
TOTAL		39

PAPER 1 QUESTION 3
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES



ASSESSMENT CRITERIA	
FLOOR PLAN	
1	DOORS + WINDOWS 11
2	FEATURES 8 1/2
3	ELECTRICAL 9 1/2
4	HATCHING 4
5	LABELS 2 1/2
SUBTOTAL 35 1/2	

PAPER 1 QUESTION 4
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES

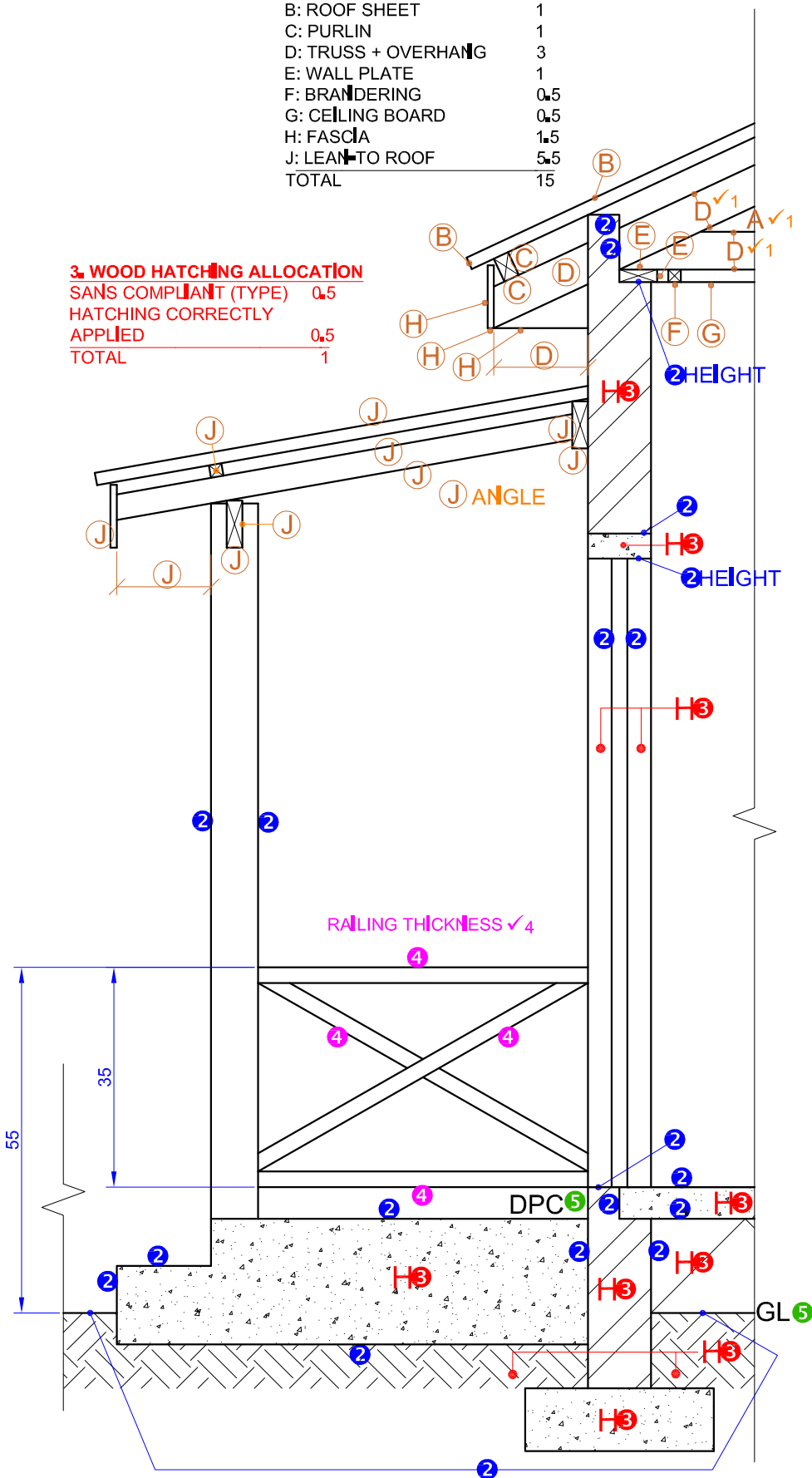


ASSESSMENT CRITERIA	
WEST ELEVATION	
1	ROOF + LEANING WALL + POSTS + VERANDA
2	DOORS + WINDOW
3	STEPS + FFL + RAILING
4	LABELS
SUBTOTAL	
25	

PAPER 1 QUESTION 4
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES

1. MARK ALLOCATION FOR ROOF	
A: ROOF ANGLE	1
B: ROOF SHEET	1
C: PURLIN	1
D: TRUSS + OVERHANG	3
E: WALL PLATE	1
F: BRANDING	0.5
G: CEILING BOARD	0.5
H: FASCIA	1.5
J: LEAN TO ROOF	5.5
TOTAL	15

3. WOOD HATCHING ALLOCATION	
SANS COMPLIANT (TYPE)	0.5
HATCHING CORRECTLY APPLIED	0.5
TOTAL	1



ASSESSMENT CRITERIA		
DETAILED SECTION		
1	ROOF DETAIL	15
2	SLAB + WALL + STEPS + B/L	10
3	HATCHING	5 $\frac{1}{2}$
4	RAILING	3
5	LABELS	1
SUBTOTAL		34 $\frac{1}{2}$

PAPER 1 QUESTION 4
GRADE 12
DBE MAY/JUNE 2024
MARKING GUIDELINES