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# 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

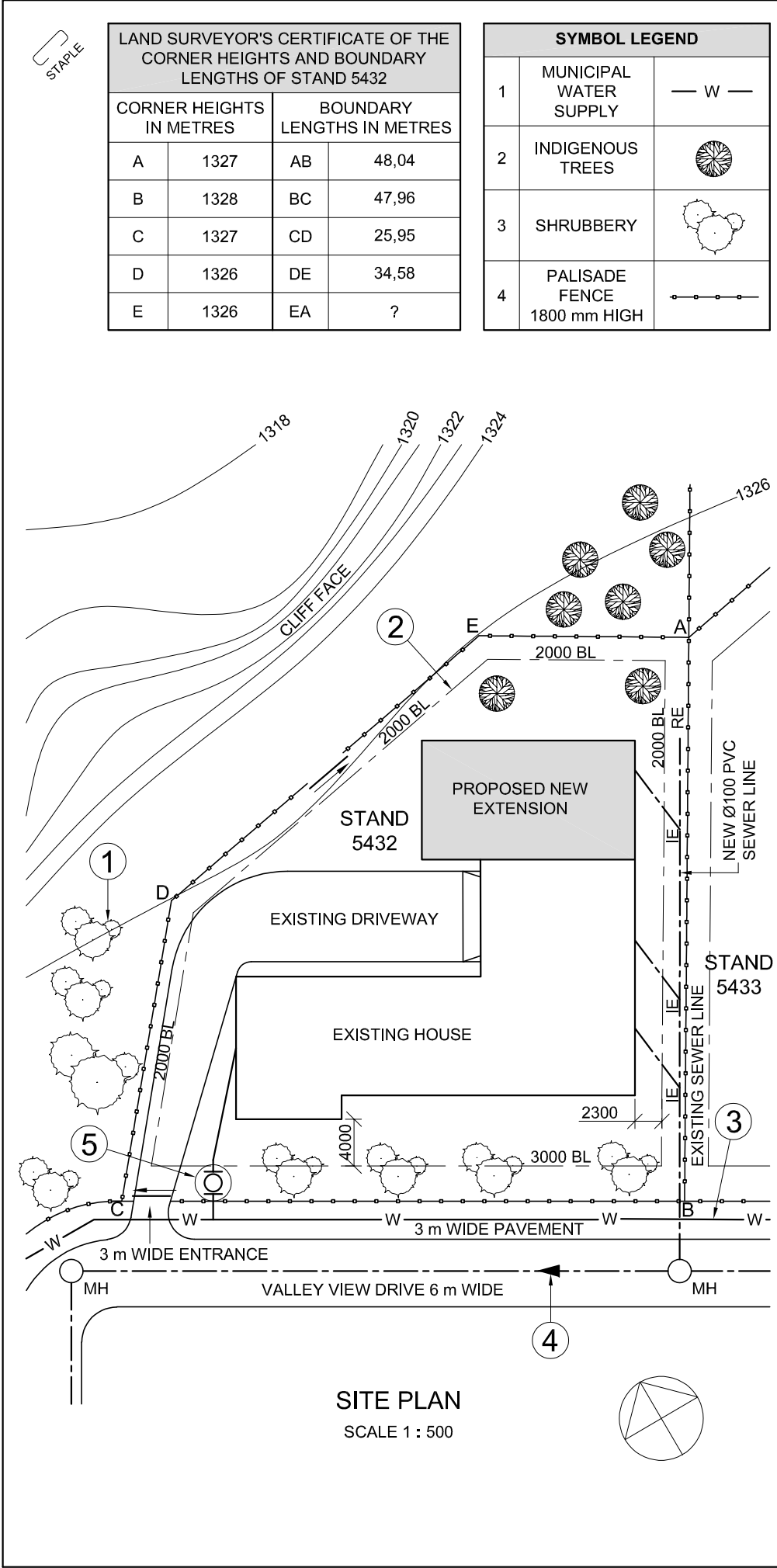
### INSTRUCTIONS AND INFORMATION

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.

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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



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.

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

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Please turn over



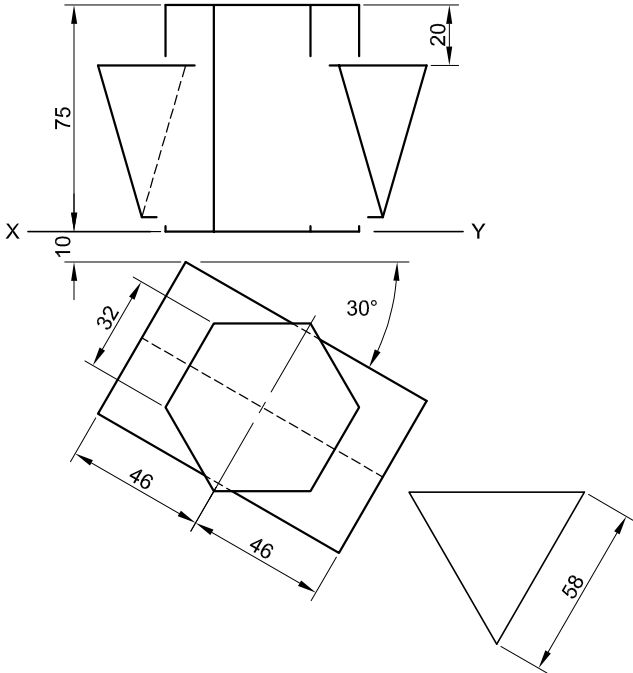
QUESTION 2: INTERPENETRATION

- 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

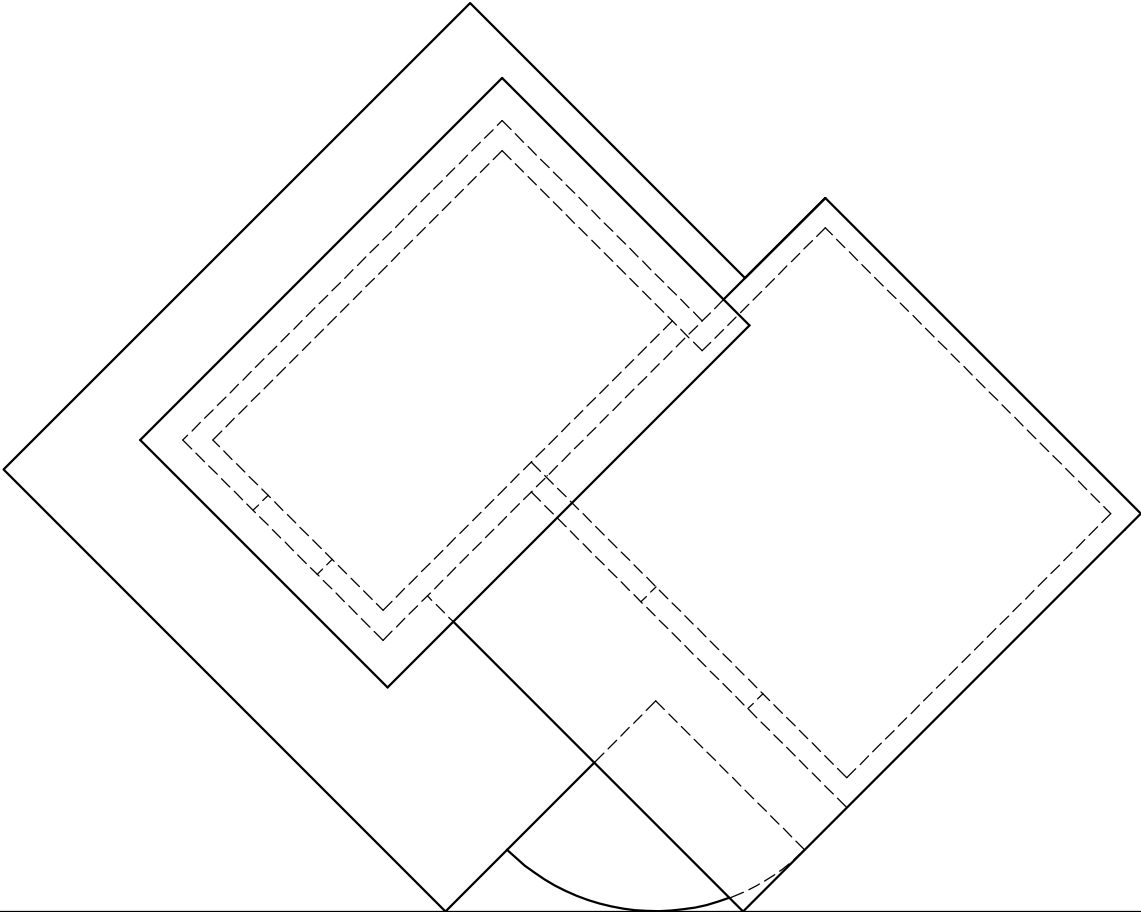
- Instructions:**
- Draw, to scale 1 : 1, the following views of the interpenetrating solids:
- 2.1 The given top view
- 2.2 The complete front view, clearly showing both curves of interpenetration
- 2.3 The complete right view, clearly showing both curves of interpenetration

- 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 <sup>1</sup> / <sub>2</sub>			
3	WINDOW + DOOR	6			
4	ROOF	9			
5	ARC	5 <sup>1</sup> / <sub>2</sub>			
PENALTIES (-)					
TOTAL		39			

PP

PP

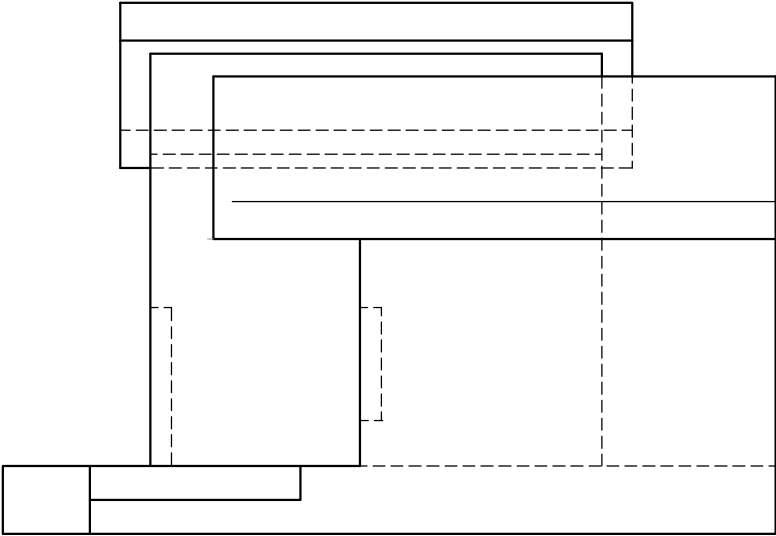
HL

GL

SP

HL

GL



EXAMINATION NUMBER

EXAMINATION NUMBER

4

ROOF CAP AND RIDGE CAP  
200 x 20 mm FASCIA BOARD  
200 x 75 mm BARGE BOARD  
10° LEAN-TO ROOF  
WINDOW OPENING  
THREE 150 x 150 mm WOODEN POSTS  
DOUBLE SWING DOOR OPENING  
150 x 50 mm WOODEN RAILING  
FINISHED FLOOR LEVEL  
GROUND LEVEL  
300 x 150 mm STEP

INCOMPLETE WEST ELEVATION

INCOMPLETE FLOOR PLAN

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

**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  
BRANDERING STRIPS @ 440 mm c/c

INCOMPLETE FOUNDATION, EXTERNAL WALL, VERANDA AND RAILING DETAIL

**DOOR AND WINDOW SCHEDULE**

TO FIT	TO FIT	1500
DOUBLE SWING DOOR AND FRAME (D1)	DOOR AND FRAME (D2)	750
		1200
		A B
		WINDOW (W1)
		1000
		500
		800
		A B
		WINDOW (W2)
		800
		A B
		WINDOW (W3)

**WINDOW NOTES:**  
• A = OPENING SIDE  
• B = FIXED PANEL  
• ALL FRAMES = 50 mm THICK  
• 150 x 150 x 20 mm CERAMIC TILE SILL UNDER ALL WINDOWS

**ROOF COMPONENTS**

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

**ELECTRICAL SYMBOLS**


**FIXTURES**

WASH-BASIN (WB)	TOILET (WC)	BATH (B)	SINK (S)

**ROOM DESIGNATIONS**

**FLOOR FINISHES**  
1. LIVING AREA - VINYL  
2. KITCHEN - TILES  
3. BATHROOM - TILES  
4. BEDROOM - CARPET  
5. VERANDA - TILES

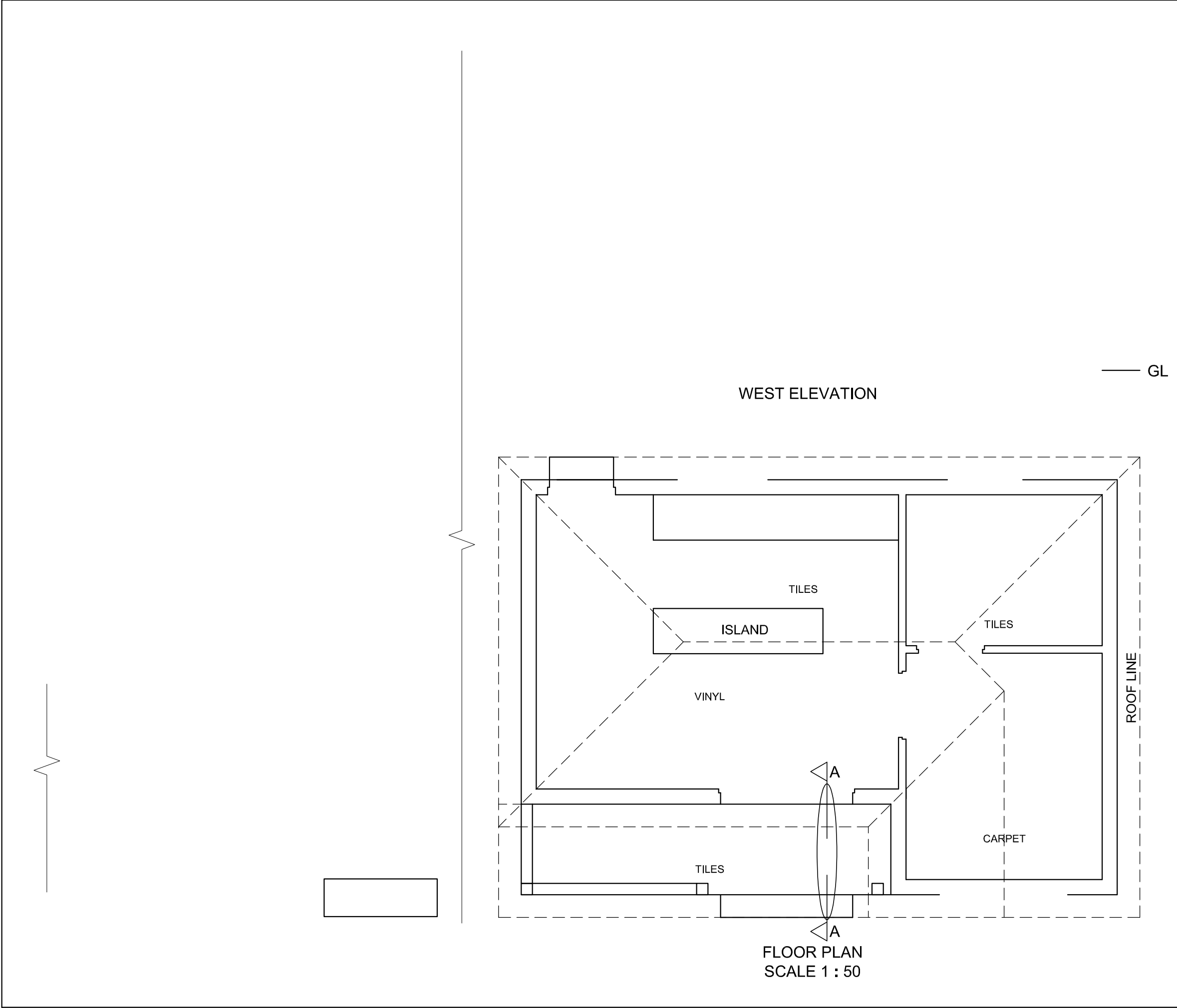
QUESTION 4: CIVIL DRAWING

- 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			
			INCORRECT SCALE(S) USED			
			NON-ALIGNMENT OF VIEWS			
			VIEW(S) ROTATED			
			SECTION VIEWED INCORRECTLY			
			INCORRECT LETTERING			
			NOT USING BREAK LINES			
			TOTAL			
			TOTAL			
ASSESSMENT CRITERIA						
FLOOR PLAN						
			POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	11				
2	FIXTURES	8 $\frac{1}{2}$				
3	ELECTRICAL	9 $\frac{1}{2}$				
4	HATCHING	4				
5	LABELS	2 $\frac{1}{2}$				
SUBTOTAL		35 $\frac{1}{2}$				
WEST ELEVATION						
1	ROOF + LEAN-TO	8 $\frac{1}{2}$				
2	WALLS + POSTS + VERANDA	5				
3	DOORS + WINDOW	6 $\frac{1}{2}$				
4	STEP + FFL + RAILING	4 $\frac{1}{2}$				
5	LABELS	$\frac{1}{2}$				
SUBTOTAL		25				
DETAILED SECTION						
1	ROOF DETAIL	15				
2	SLAB + WALL + STEPS + POST	10				
3	HATCHING	5 $\frac{1}{2}$				
4	RAILING	3				
5	LABELS	1				
SUBTOTAL		34 $\frac{1}{2}$				
TOTAL		95				
PENALTIES (-)						
GRAND TOTAL						
EXAMINATION NUMBER						
EXAMINATION NUMBER					6	