



**basic education**  
 Department:  
 Basic Education  
 REPUBLIC OF SOUTH AFRICA

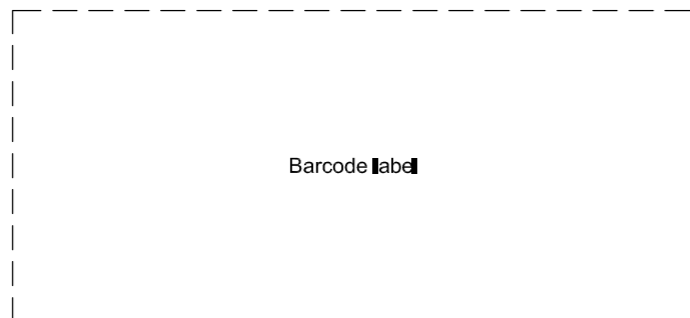
**SENIOR CERTIFICATE EXAMINATIONS/  
 NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**ENGINEERING GRAPHICS AND DESIGN P1**  
**2022**

**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			½	SIGN	MODERATED			½	SIGN	RE-MARKING			½	SIGN
1															
2															
3															
4															
<b>TOTAL</b>															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK	CHECKED BY
100	

<b>COMPLETE THE FOLLOWING:</b>
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER





**QUESTION 2: SOLID GEOMETRY**

**Given:**

- The front view and the top view of a right regular hexagonal pyramid resting with its base on an edge of a truncated right square prism. The prism is centrally pierced by a right equilateral triangular prismatic hole.
- An auxiliary view of the base of the hexagonal pyramid
- Both solids are cut by cutting plane D-D

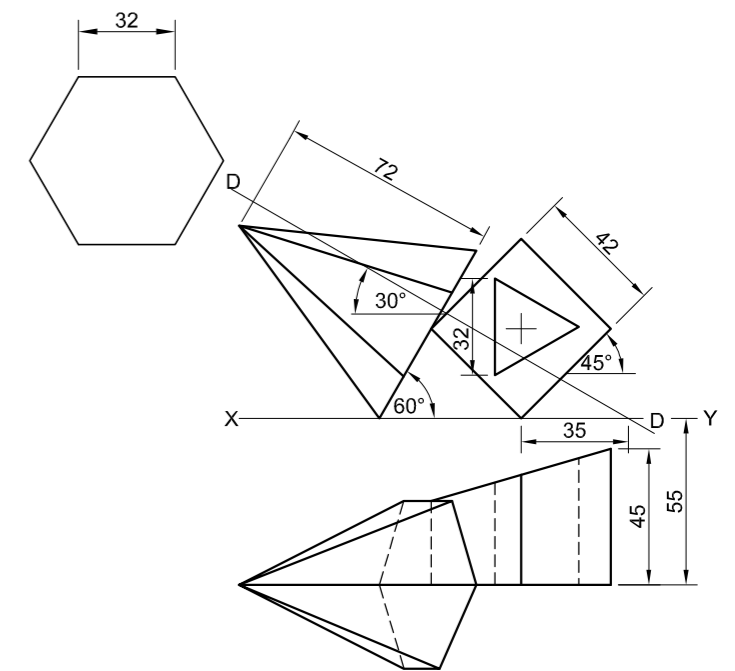
**Instructions:**

Draw, to scale 1 : 1, the following views of both solids:

- 2.1 The given front view
- 2.2 A sectional top view on cutting plane D-D
- 2.3 The left view
- 2.4 The true shape of the cut surface of the truncated prism

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

[40]



ASSESSMENT CRITERIA			
1	FRONT VIEW	7 1/2	
2	SECTIONAL TOP VIEW	14	
3	LEFT VIEW	12 1/2	
4	TRUE SHAPE	6	
PENALTIES (-)			
<b>TOTAL</b>		<b>40</b>	
EXAMINATION NUMBER			
EXAMINATION NUMBER			
			<b>3</b>



**QUESTION 3: PERSPECTIVE**

**Given:**

Three views of a dwelling and the information needed to draw a two-point perspective drawing

PP – Picture plane

HL – Horizon line

GL – Ground line

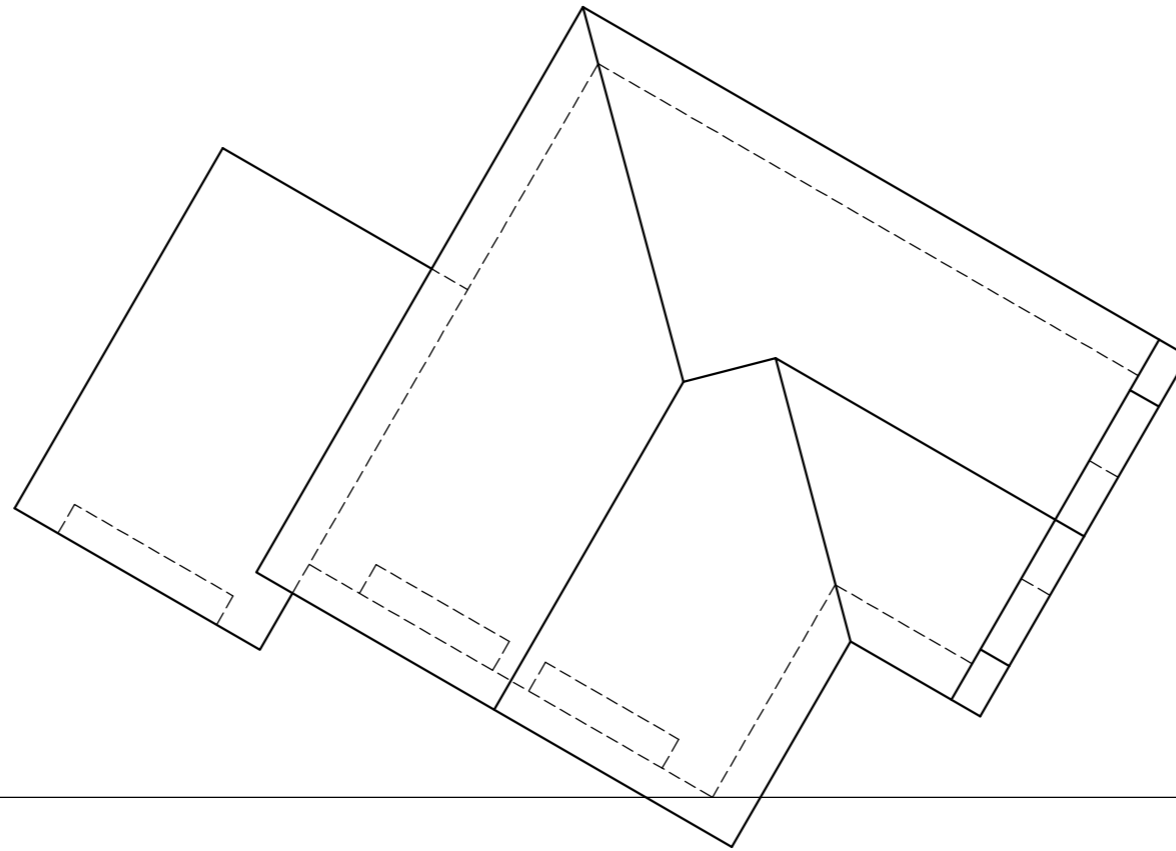
SP – Station point

**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 doors and windows.
- NO hidden detail or interior detail is required.

[38]



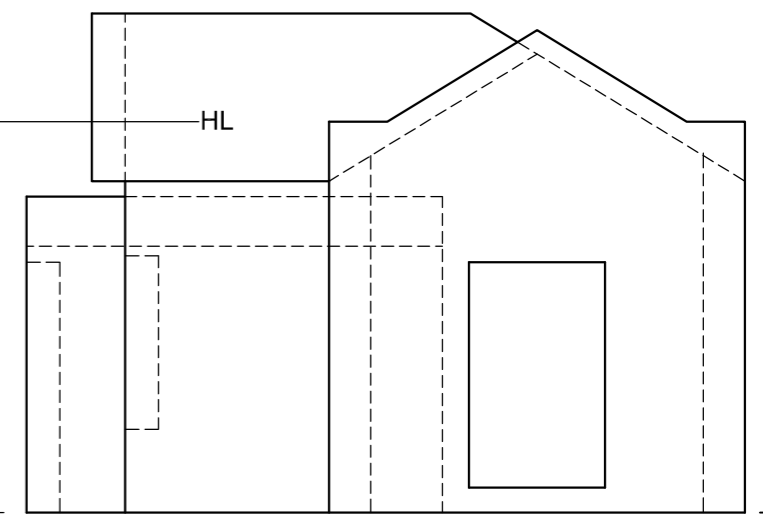
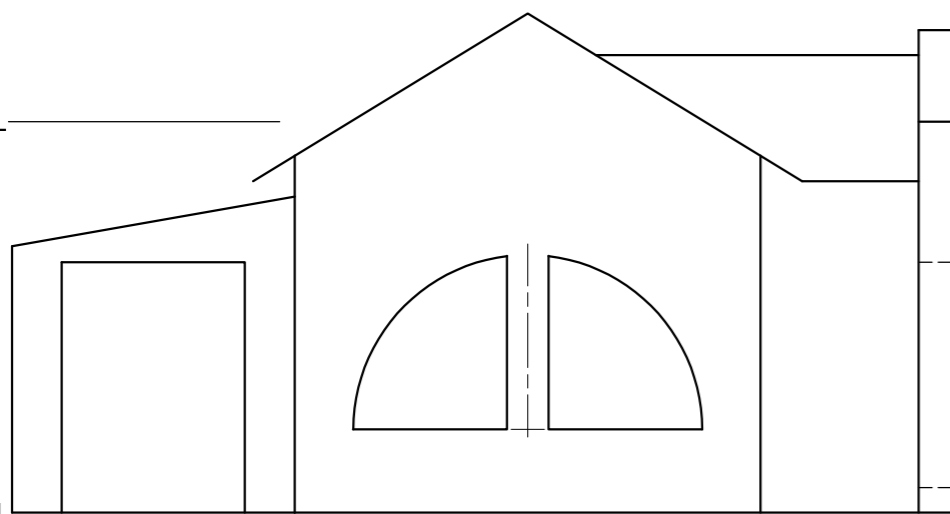
PP

HL

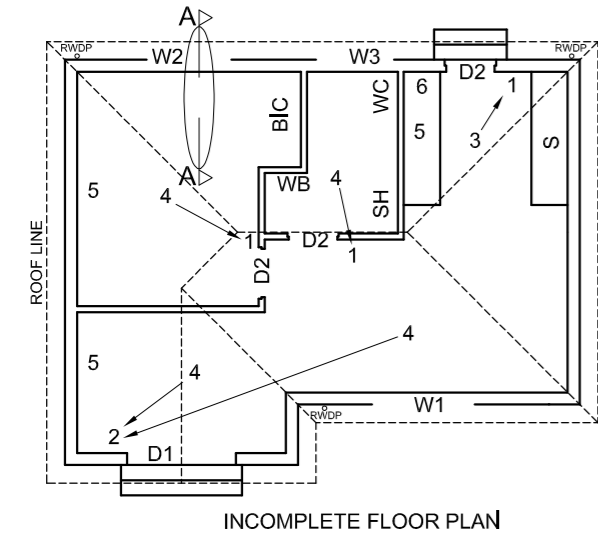
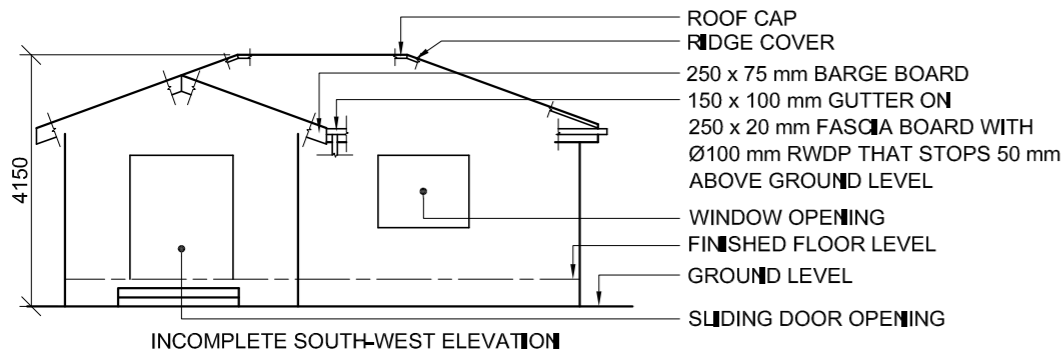
GL

SP

ASSESSMENT CRITERIA				
1	CONSTRUCTION	6		
2	WALLS	11 ½		
3	ROOF	5		
4	WINDOWS	10		
5	GARAGE	5 ½		
PENALTIES (-)				
<b>TOTAL</b>		<b>38</b>		

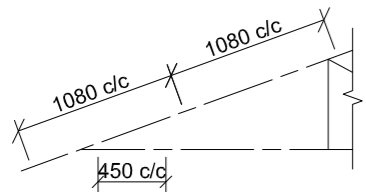


EXAMINATION NUMBER	
EXAMINATION NUMBER	4



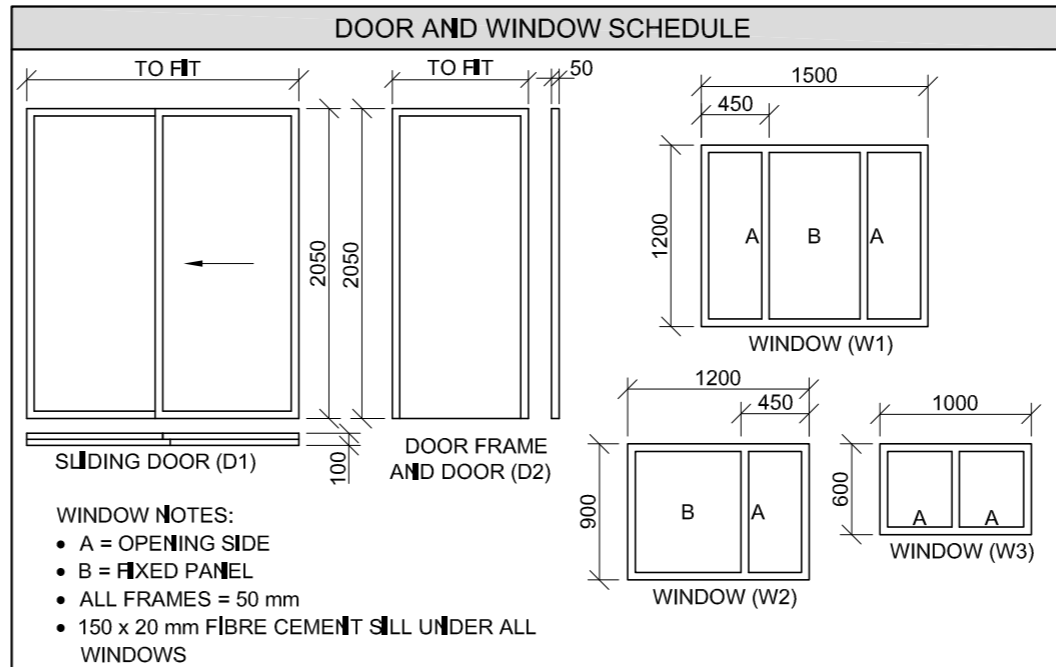
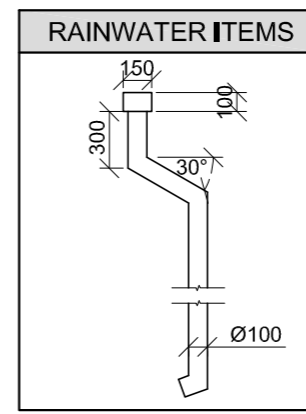
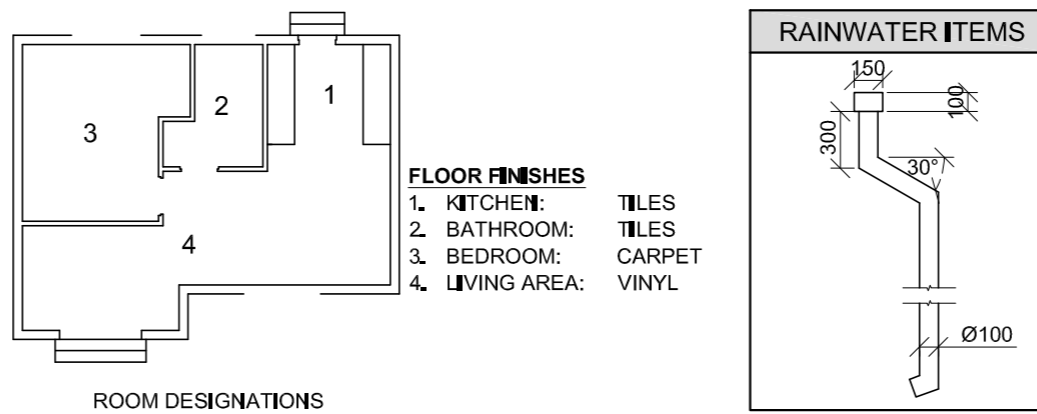
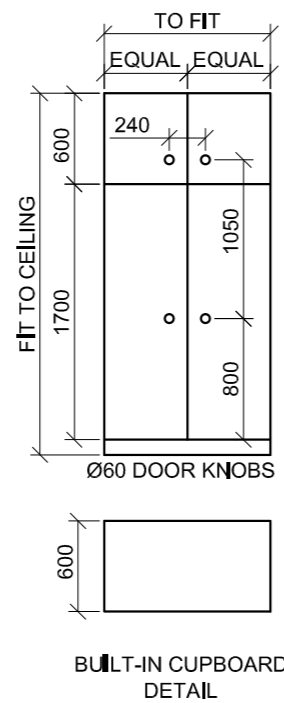
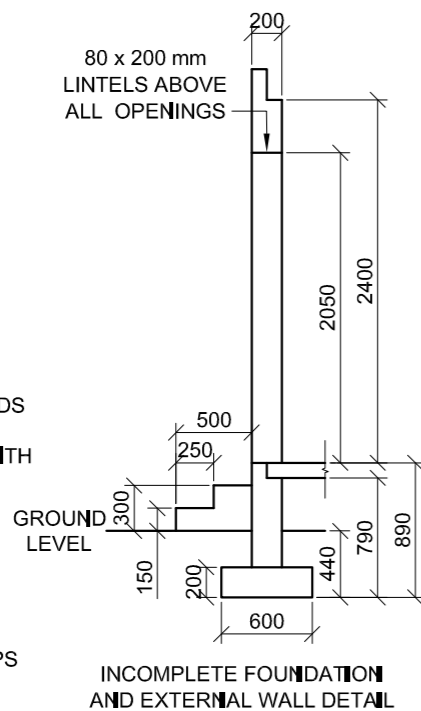
- FEATURES**  
 D1 SLIDING DOOR  
 D2 DOOR  
 W1 WINDOW  
 W2 WINDOW  
 W3 WINDOW
- FIXTURES**  
 WC TOILET  
 WB WASH BASIN  
 SH SHOWER  
 S SINK  
 B/C BUILT-IN CUPBOARD
- ELECTRICAL FITTINGS**  
 1. ONE-WAY SWITCH - SINGLE-POLE  
 2. ONE-WAY SWITCH - DOUBLE-POLE  
 3. FLUORESCENT LIGHT 1 x 40 W  
 4. CEILING LIGHT  
 5. SWITCHED SOCKET OUTLET  
 6. DISTRIBUTION BOARD

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

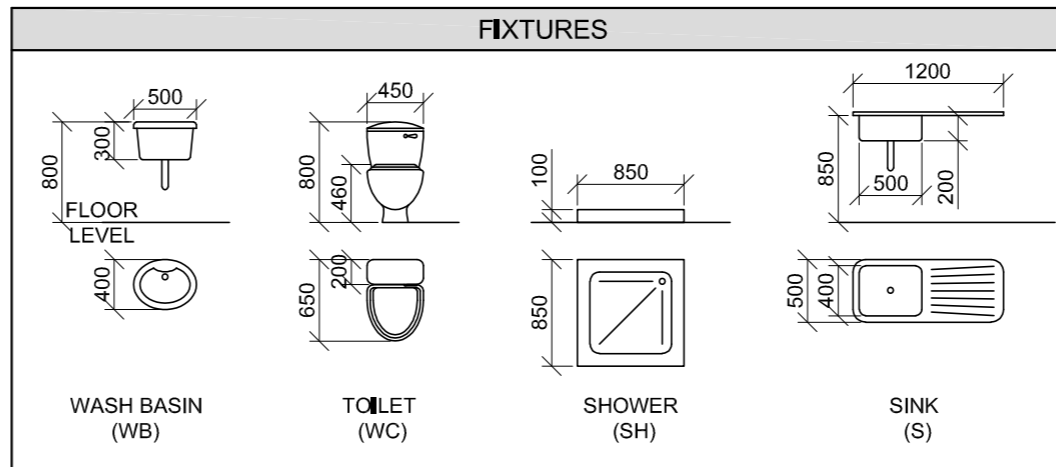


SCHEMATIC DIAGRAM OF A SECTION OF THE ROOF TRUSS AT CUTTING PLANE A-A

- ROOF NOTES:**  
 20° ROOF PITCH  
 114 x 40 mm ROOF TRUSSES ON 114 x 40 mm WALL PLATES  
 300 mm ROOF OVERHANG TO END OF ROOF TRUSS  
 30 mm CORRUGATED ROOF SHEET ON 75 x 50 mm PURLINS @ 1080 mm c/c  
 250 x 75 mm FIBRE CEMENT BARGE BOARDS ON GABLE ENDS  
 BARGE BOARDS END FLUSH WITH OUTSIDE EDGE OF GUTTERS  
 250 x 20 mm FASCIA BOARDS WITH 150 x 100 mm GUTTERS ON ALL SIDES  
 10 mm CEILING BOARD ON 40 x 40 mm BRANDING STRIPS @ 450 mm c/c



ROOF COMPONENTS		ELECTRICAL SYMBOLS	
	250 x 20 mm FASCIA BOARD		
	150 x 100 mm GUTTER		
	75 x 50 mm PURLINS		
	250 x 75 mm BARGE BOARD		
	ROOF CAP AND RIDGE COVER		



**QUESTION 4: CIVIL DRAWING**

**Given:**

- The incomplete south-west elevation of a new house, showing the walls, the window opening, the sliding door opening, the roof and labels
- The incomplete floor plan showing the walls, roof line, positions of the doors, windows and fixtures, as well as the electrical layout
- A schematic diagram of a section of a roof truss at cutting plane A-A and roof notes
- The incomplete foundation and external wall detail
- The built-in cupboard detail
- Room designations and floor finishes
- A table of rainwater items
- 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 a break line 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 numbers
- ALL hatching detail

**4.1.2 THE COMPLETE SOUTH-WEST ELEVATION**

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

- The outside walls, steps, window and sliding door detail
- ALL the roof detail, including the fascia board, barge boards, gutters and rainwater downpipe
- The finished floor level

4.2 Using the given foundation and break line 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.

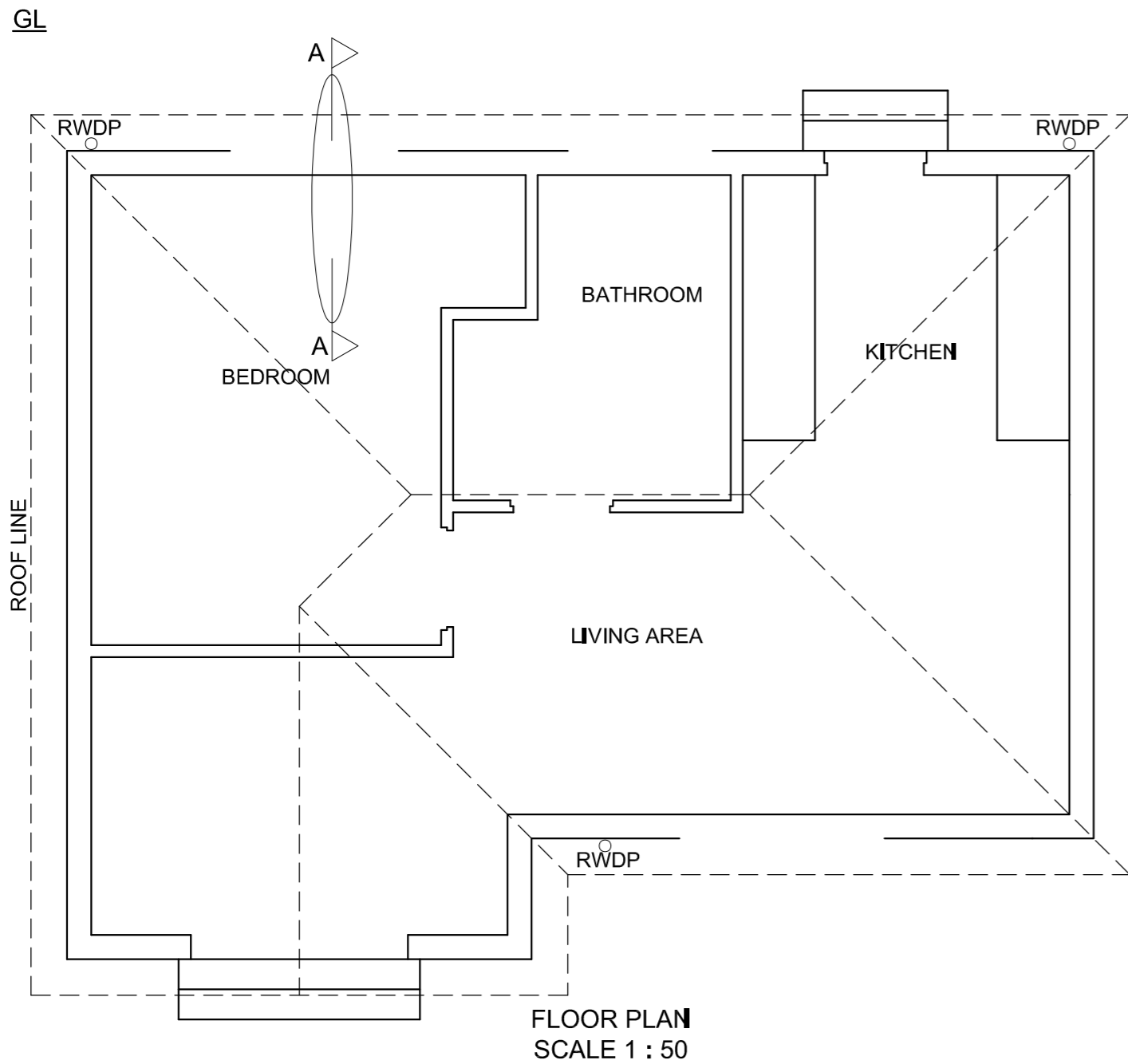
**Show the following features on the drawing:**

- The complete foundation, external wall and window detail
- The roof detail, including the fascia board, gutter and rainwater items
- The steps, roof, wall and built-in cupboard detail to the right of cutting plane A-A
- ALL hatching detail. ONLY the substructure may be hatched in neat freehand.

**Label the following:**

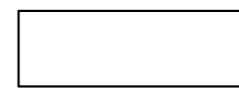
- The south-west elevation
- The floor finishes
- Ground level, finished floor level and damp-proof course (use the correct abbreviations and show them on ALL the relevant views)

**NOTE:**  
 ALL drawings must comply with the guidelines and graphical symbols as contained in the 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			
<b>TOTAL</b>		<b>TOTAL</b>	

ASSESSMENT CRITERIA				
FLOOR PLAN				
		POSSIBLE	OBTAINED	SIGN MODERATED
1	DOORS + WINDOWS	11		
2	FIXTURES	9		
3	ELECTRICAL	9 1/2		
4	HATCHING	3		
5	LABELS	2		
<b>SUBTOTAL</b>		<b>34 1/2</b>		
SOUTH-WEST ELEVATION				
1	ROOF + RWDP	9 1/2		
2	WALLS + STEP + FFL	4 1/2		
3	DOOR + WINDOW	8 1/2		
4	LABELS	1		
<b>SUBTOTAL</b>		<b>23 1/2</b>		
DETAILED SECTION				
1	ROOF DETAIL	13		
2	SLAB + WALL + WINDOW + STEP	11 1/2		
3	HATCHING	5 1/2		
4	BIC	2 1/2		
5	LABELS	1 1/2		
<b>SUBTOTAL</b>		<b>34</b>		
<b>TOTAL</b>		<b>92</b>		
PENALTIES (-)				
<b>GRAND TOTAL</b>				
EXAMINATION NUMBER				
EXAMINATION NUMBER				



SECTION A-A  
SCALE 1 : 20