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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

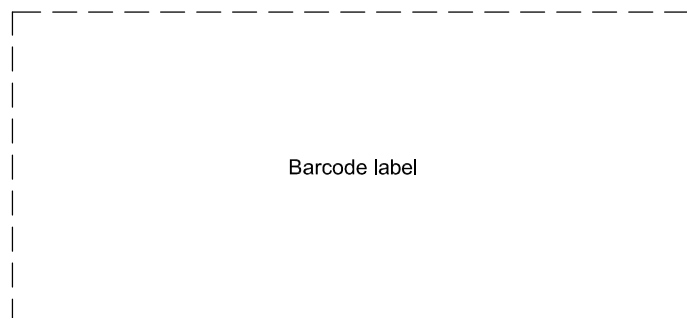
2022

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			$\frac{1}{2}$	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



LAND SURVEYOR'S CERTIFICATE OF THE CORNER HEIGHTS AND BOUNDARY LENGTHS OF STAND 108			
CORNER HEIGHTS IN METRES		BOUNDARY LENGTHS IN METRES	
A	21	AB	117,7
B	19	BC	13,7
C	18,8	CD	115,1
D	18,8	DE	8,3
E	?	EF	88,3
F	17,3	FG	39,7
G	17,7	GA	102,8

**SYMBOL LEGEND:**

1. PALM TREE 
2. EVERGREEN TREE 
3. BRICK PAVING 
4. INTERNAL FENCE 
5. 2 m HIGH BOUNDARY FENCE 
6. PARKING FOR DISABLED PEOPLE 

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:

20.1 NORTH POINT

20.2 TWO-WAY SWITCH

## 20.1 NORTH POINT

## 20.2 TWO-WAY SWITCH

1	2021-09-20	ADD PARKING FOR DISABLED PEOPLE

REVISION	DATE	DESCRIPTION
----------	------	-------------

MULLER ARCHITECTS  
63 ALLIANZ ROAD  
NEW GERMANY  
4001

www.cart.arch.co.za  
098 765 4321

PRINTED BY:  
CREATE PRINTERS  
(PTY) LTD

DATE OF PRINT:  
2021-09-30

DRAWING TITLE:

## SITE PLAN

PROJECT:

PROPOSED NEW HOSPITAL FOR  
DR W ZULU & PARTNERS ON  
STAND 108, 7 MUNCHEN STREET,  
SYRINGER, 4002

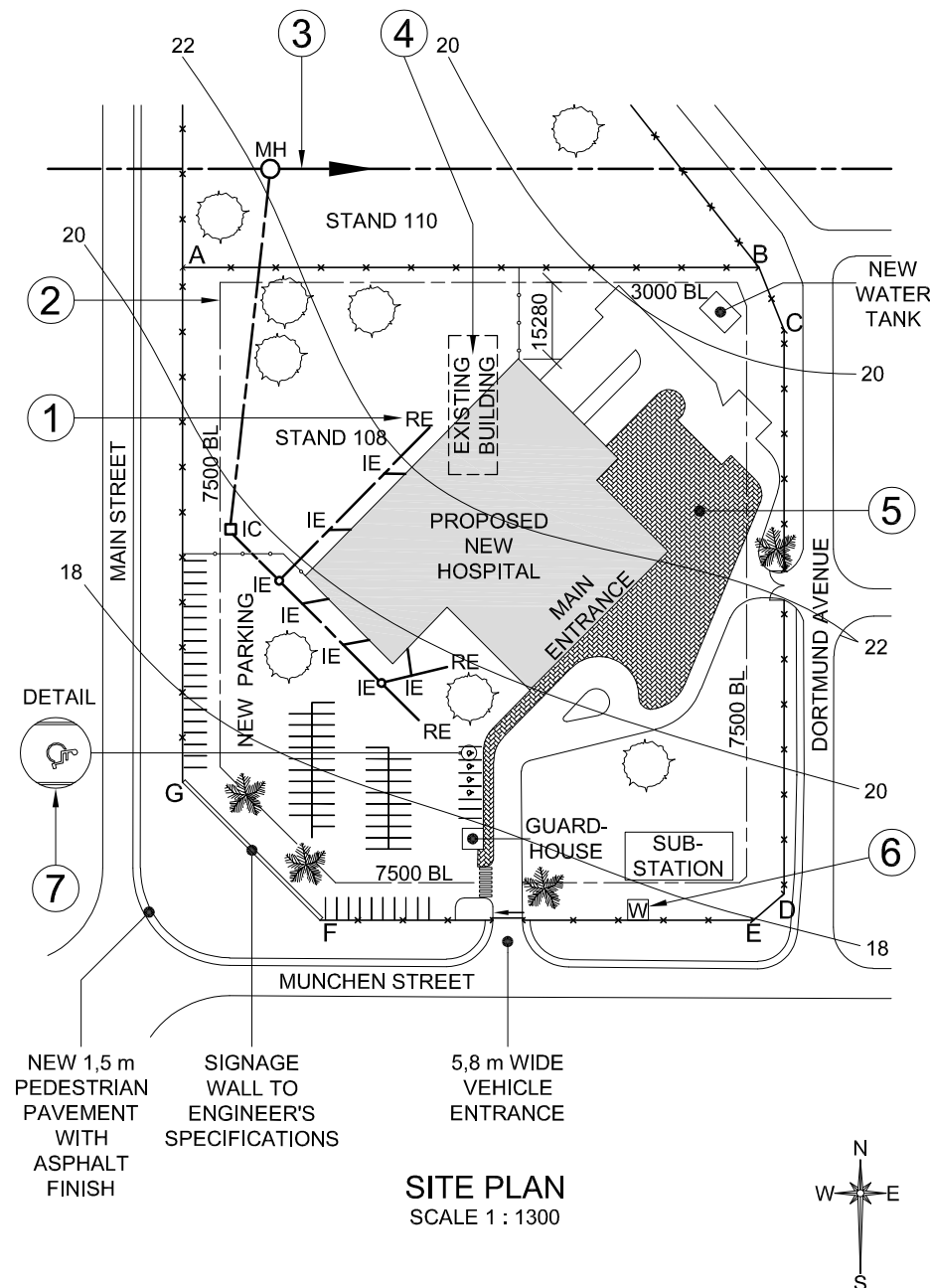
PROJECT NUMBER:  
CR 20200401 - 7

DRAWING NUMBER:  
001 - TU

DATE:	DRAWN:
2021-09-13	EINSTEIN

CHECKED:	SCALE:
PLATO	1 : 1300

REFERENCE CODE:  
884939



**QUESTION 1: ANALYTICAL (CIVIL)**

**Given:**

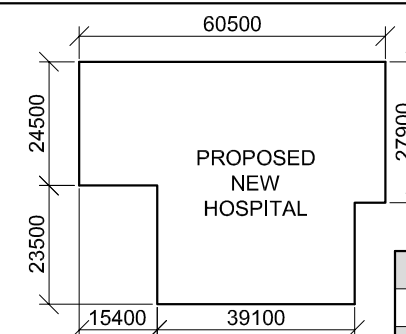
The site plan of a proposed new hospital, a title panel and a table of questions. The drawing has not been presented to the indicated scale.

**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 is the reference code of the drawing?		1	
2	What scale is indicated for the site plan?		1	
3	With reference to the title panel, what does CR 20200401 - 7 refer to?		1	
4	What architectural firm was responsible for the design of the new hospital?		1	
5	What does the arrow on the sliding gate into Munchen Street indicate?		1	
6	What does the abbreviation <i>RE</i> at 1 stand for?		1	
7	What is the height of the boundary fence in millimetres?		1	
8	Name the feature at 2.		1	
9	Name the feature at 3.		1	
10	What must happen to the existing building at 4?		1	
11	What finish is required at 5?		1	
12	Name the feature at 6.		1	
13	What does the symbol at 7 indicate?		1	
14	What is the shortest distance from the proposed new hospital building to boundary line AB in metres?		2	
15	What colour is used to represent new wood on sectional elevations and floor plans?		1	
16	What is the height of corner E in metres?		2	
17	Which elevation of the proposed new hospital entrance faces Dortmund Avenue?		2	
18	In the space below (ANSWER 18), determine the perimeter of STAND 108 in metres.		3	
19	In the space below (ANSWER 19), determine the total area of the proposed new hospital building in square metres.		3	
20	In the space provided in the title panel (ANSWER 20), draw, in neat freehand, the <i>SANS 10143</i> graphical symbol for a: (20.1) NORTH POINT and (20.2) TWO-WAY SWITCH.		4	
TOTAL			30	

ANSWER 18  
Show ALL calculations.



ANSWER 19  
Show ALL calculations.

EXAMINATION NUMBER	
EXAMINATION NUMBER	2

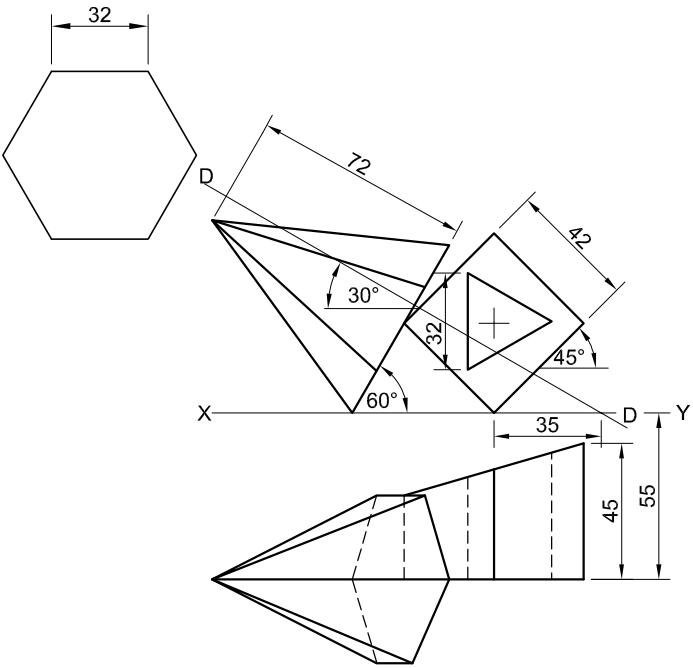


QUESTION 2: SOLID GEOMETRY

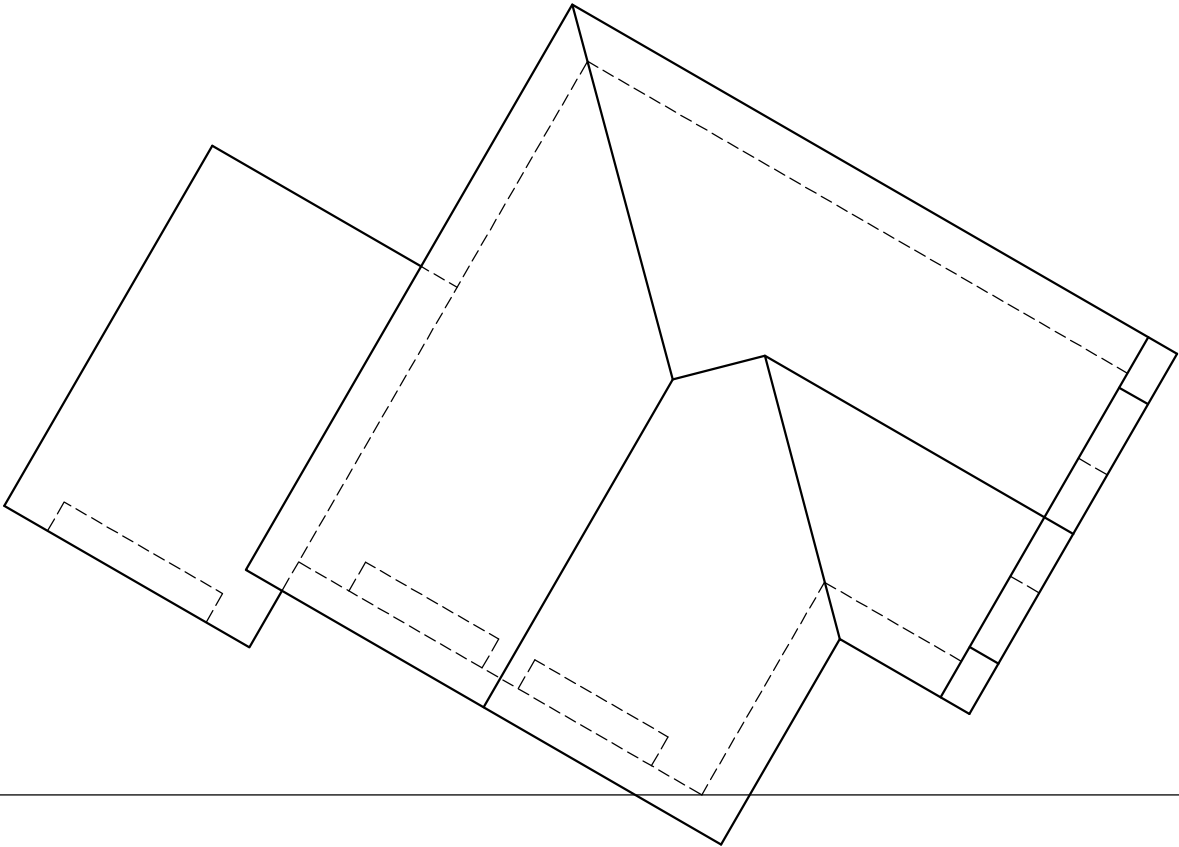
- Given:**
- The front view and the top view of a right regular hexagonal pyramid resting with its base on an edge of a truncated right square prism. The prism is centrally pierced by a right equilateral triangular prismatic hole.
  - An auxiliary view of the base of the hexagonal pyramid
  - Both solids 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 (-)					
TOTAL		40			
EXAMINATION NUMBER					
EXAMINATION NUMBER					3



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]

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

PP

HL

GL

SP

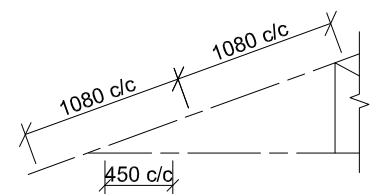
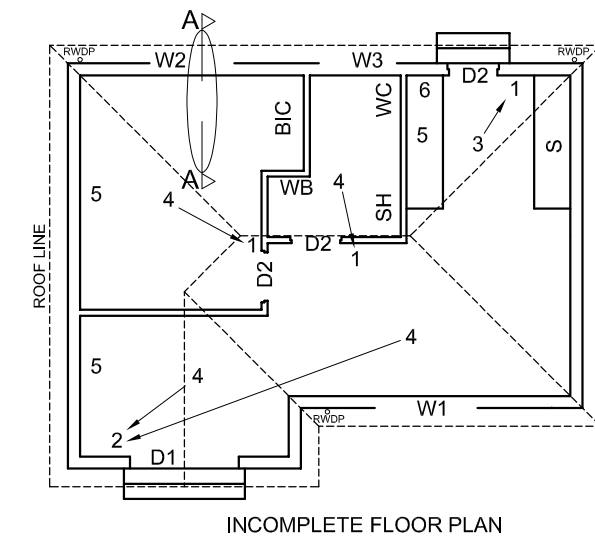
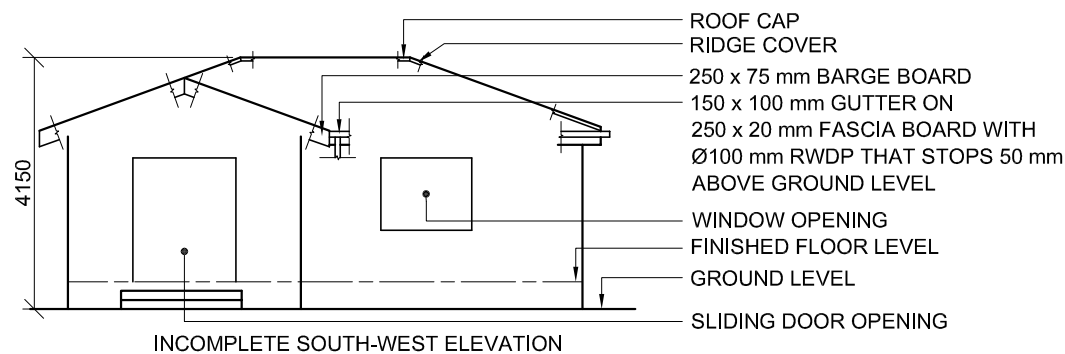
HL



EXAMINATION NUMBER

EXAMINATION NUMBER

4



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

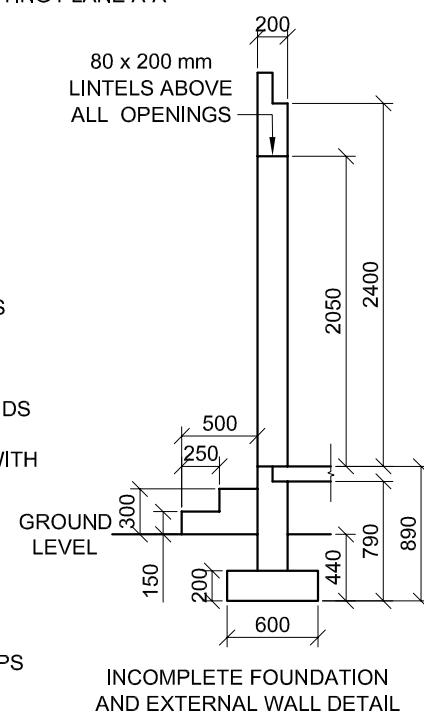
30 mm CORRUGATED ROOF  
SHEET ON 75 x 50 mm PURLINS  
@ 1080 mm c/c

250 x 75 mm FIBRE CEMENT  
BARGE BOARDS ON GABLE ENDS

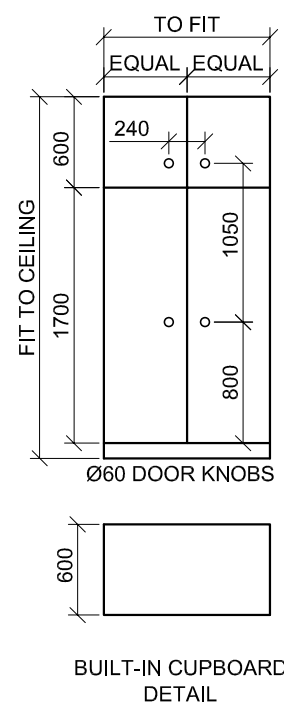
BARGE BOARDS END FLUSH WITH  
OUTSIDE EDGE OF GUTTERS

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

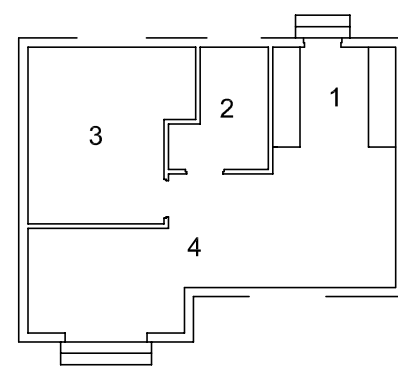
10 mm CEILING BOARD ON  
40 x 40 mm BRANDING STRIPS  
@ 450 mm c/c



### INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL



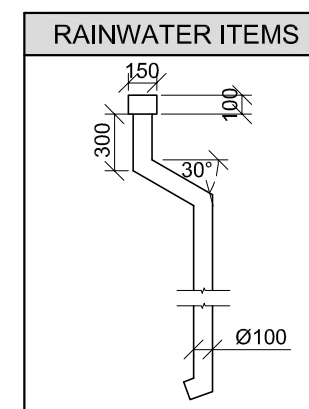
### BUILT-IN CUPBOARD DETAIL



ROOM DESIGNATIONS

## FLOOR FINISHES

- |                 |        |
|-----------------|--------|
| 1. KITCHEN:     | TILES  |
| 2. BATHROOM:    | TILES  |
| 3. BEDROOM:     | CARPET |
| 4. LIVING AREA: | VINYL  |



## RAINWATER ITEMS

#### 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 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 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
- 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:**

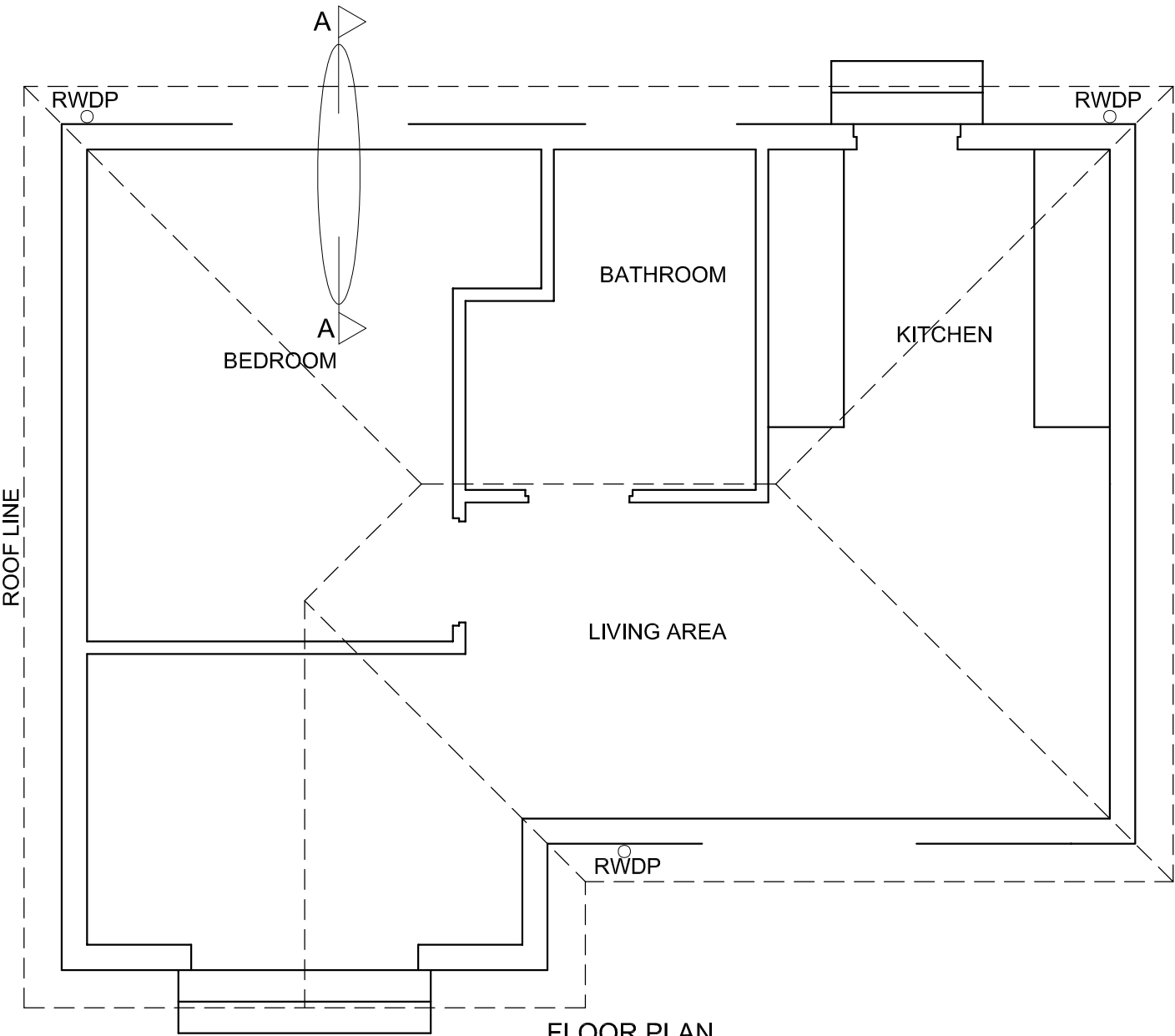
- The south-west elevation
- The floor finishes
- Ground level, finished floor level and damp-proof course (use the correct abbreviations and show them on ALL the relevant views)

**NOTE:**

ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the *SANS 10143*. [92]



GL



FLOOR PLAN  
SCALE 1 : 50



SECTION A-A  
SCALE 1 : 20



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	

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			
SUBTOTAL		34 1/2			
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			
SUBTOTAL		23 1/2			
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			
SUBTOTAL		34			
TOTAL		92			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6