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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

2019

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				1/2	SIGN	MODERATED				1/2
1											
2											
3											
4											
TOTAL											
	2	0	0				2	0	0		

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:

CENTRE NUMBER

CENTRE NUMBER

EXAMINATION NUMBER

EXAMINATION NUMBER

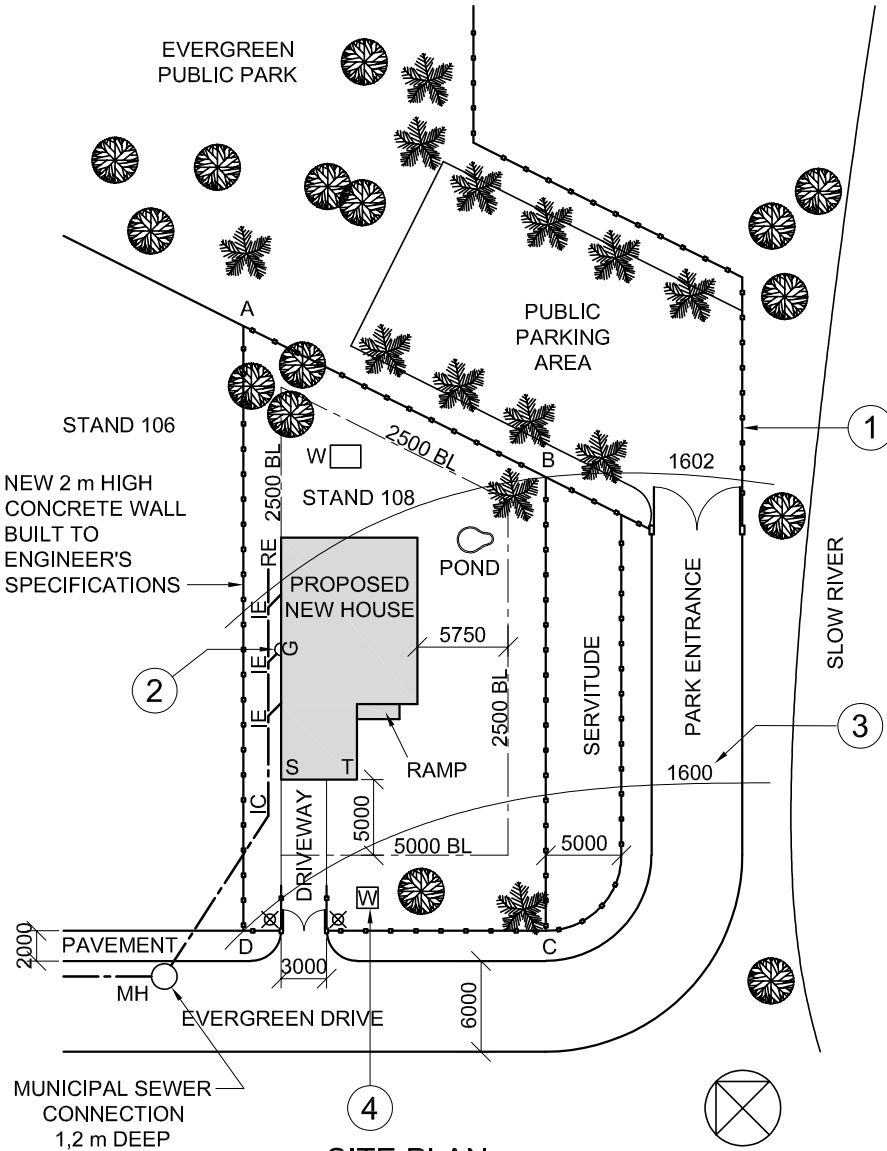


LAND SURVEYOR'S CERTIFICATE OF STAND 108, SURVEYED ON 2017-08-31	
BOUNDARY LENGTHS IN METRES	CORNER HEIGHTS IN METRES
AB = 22,36	A = 1603
BC = 30	B = 1602
CD = 20	C = 1598
DA = 40	D = 1600

- GENERAL NOTES:
- NEW DRIVEWAY LAID ON WELL-COMPACTED HARDCORE WITH A 80 mm ASPHALT FINISH
  - SLOW RIVER IS A NON-PERENNIAL RIVER (DOES NOT FLOW THE ENTIRE YEAR)

SYMBOL LEGEND:

- 2,5 m HIGH LAMP POSTS
- PALM TREES
- DECIDUOUS TREES
- CONCRETE WALL



SITE PLAN  
SCALE 1 : 500

NOTE:  
Contractors must verify all dimensions and levels on site before commencing work. Architects to be notified immediately of any discrepancies.

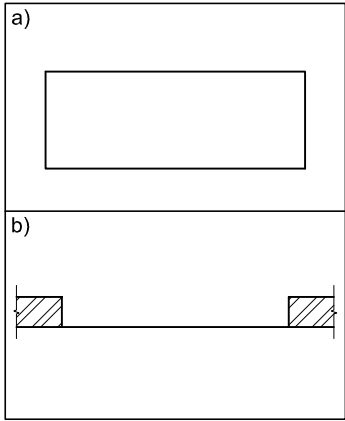
ARCHITECT'S SIGNATURE .....

CLIENT'S SIGNATURE .....

ANSWER 20

In the space below, complete, in neat freehand and according to the SANS 10143:

- a) The plan view of the ramp, with a gradient of 1 : 10 and the lowest point on the right
- b) The plan view of a sliding door between the given walls



2	2018/05/13	MOVE LAMP POSTS
1	2018/01/18	ADD NEW BOUNDARY WALLS
REVISION	DATE	DESCRIPTION

BAYERN  
ARCHITECTS  
108 MUNICH DRIVE  
NEW GERMANY  
☎ 031 108 1080

PRINTED BY:  
EXPRESS PRINT

DATE OF PRINT:  
2018-08-25

DRAWING TITLE:

SITE PLAN

PROJECT:

PROPOSED NEW HOUSE FOR  
THOMAS ZONDO ON STAND 108,  
EVERGREEN DRIVE, REEDSVILLE, 2080

PROJECT NUMBER: YG/-2018		DRAWING NUMBER: CE 1-01-DV	
DATE: 2018-01-13	DRAWN: DIANNE	CHECKED: VANESSA	SCALE: 1 : 500
REFERENCE CODE: X5-2018			



QUESTION 1: ANALYTICAL (CIVIL)

Given:

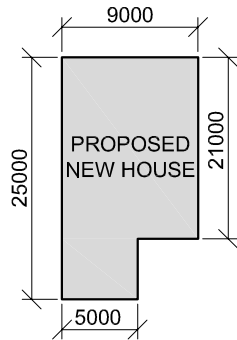
The site plan of a proposed new house, a title panel and a table of questions. The drawing has not been prepared to the indicated scale.

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	Who checked the drawing?	1		
2	What is the stand number of the proposed new house?	1		
3	What is the project number?	1		
4	How wide is Evergreen Drive in metres?	1		
5	How deep is the municipal sewerage connection in metres?	1		
6	How many inspection eyes are on the drawing?	1		
7	How many deciduous trees are on STAND 108?	1		
8	How high are the lamp posts in millimetres?	1		
9	In what colour could proposed new work be indicated on a site plan?	1		
10	What does the abbreviation /C stand for?	1		
11	Other than trees, what other natural feature is shown on the site plan?	1		
12	Name the feature at 1.	1		
13	Name the feature at 2.	1		
14	What does the number at 3 indicate?	1		
15	Name the feature at 4.	1		
16	What is the shortest distance from wall ST on the proposed new house to Evergreen Drive in metres?	1		
17	Which elevation of the proposed new house faces the entrance to the property?	2		
18	In the space below (ANSWER 18), determine the perimeter of the proposed new house in metres.	3		
19	In the space below (ANSWER 19), determine the total area of STAND 108 in square metres.	3		
20	In the space in the title panel (ANSWER 20), complete, in neat freehand and according to the SANS 10143: a) The plan view of the ramp, with a gradient of 1 : 10 and the lowest point on the right b) The plan view of the sliding door between the given walls	6		
TOTAL		30		

ANSWER 18  
Show ALL calculations.



ANSWER 19  
Show ALL calculations.

EXAMINATION NUMBER	
EXAMINATION NUMBER	2



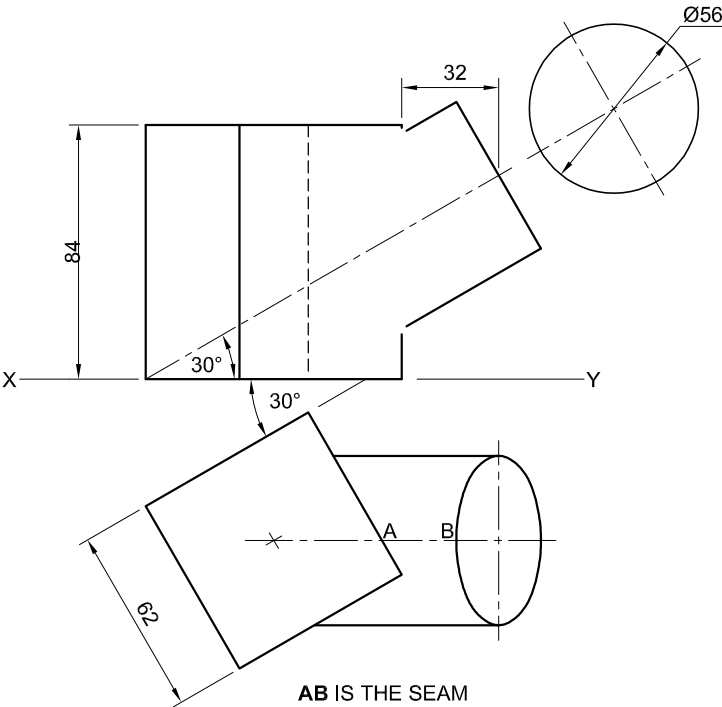
QUESTION 2: INTERPENETRATION AND DEVELOPMENT

- Given:**
- The incomplete front view and the top view of a hollow right square prism with a right cylindrical branch pipe. The axes of both pipes lie in a common vertical plane.
  - An auxiliary view of the branch pipe

- Instructions:**
- Draw, to scale 1 : 1, the following views of the TWO pipes:
- 2.1 The given top view
  - 2.2 The complete front view, clearly showing the curve of interpenetration
  - 2.3 The development of the cylindrical branch pipe. Make **AB** the seam.

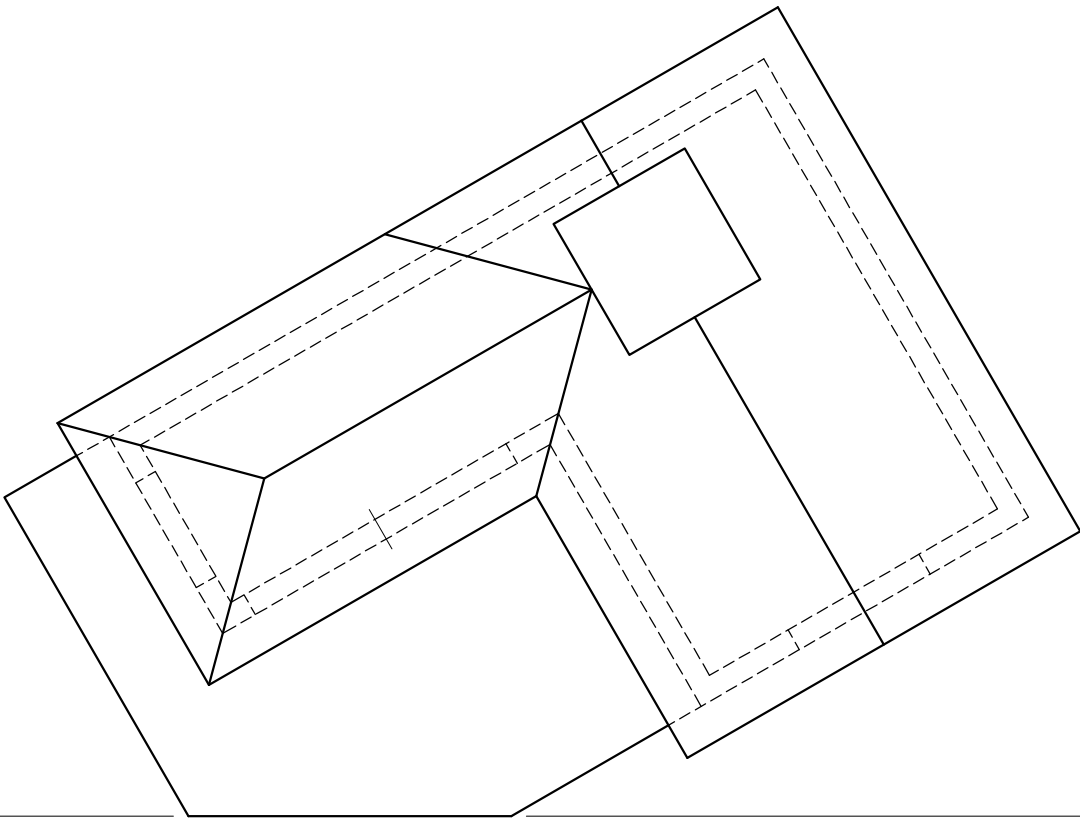
- Planning is essential.
- Show ALL hidden detail.
- Show ALL construction.

[37]



ASSESSMENT CRITERIA				
1	TOP VIEW	10 1/2		
2	FRONT VIEW + CIRCLE DIVISION	6 1/2		
3	CURVE OF INTERPENETRATION	9		
4	DEVELOPMENT	11		
PENALTIES (-)				
TOTAL		37		
EXAMINATION NUMBER				
EXAMINATION NUMBER				3

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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

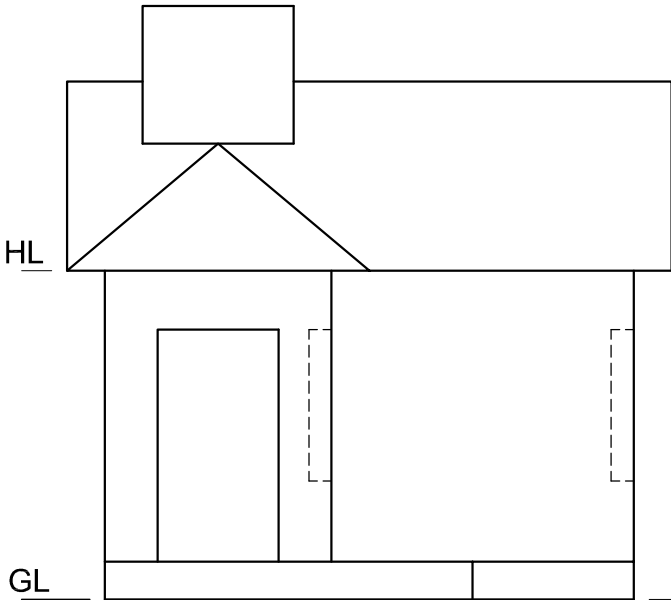
**Instructions:**  
Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL construction.
- NO interior detail is required.
- NO hidden detail is required.

[38]

ASSESSMENT CRITERIA					
1	CONSTRUCTION	6			
2	FLOOR AND WALLS	10			
3	DOOR AND WINDOWS	13 ½			
4	ROOF	8 ½			
PENALTIES (-)					
TOTAL		38			

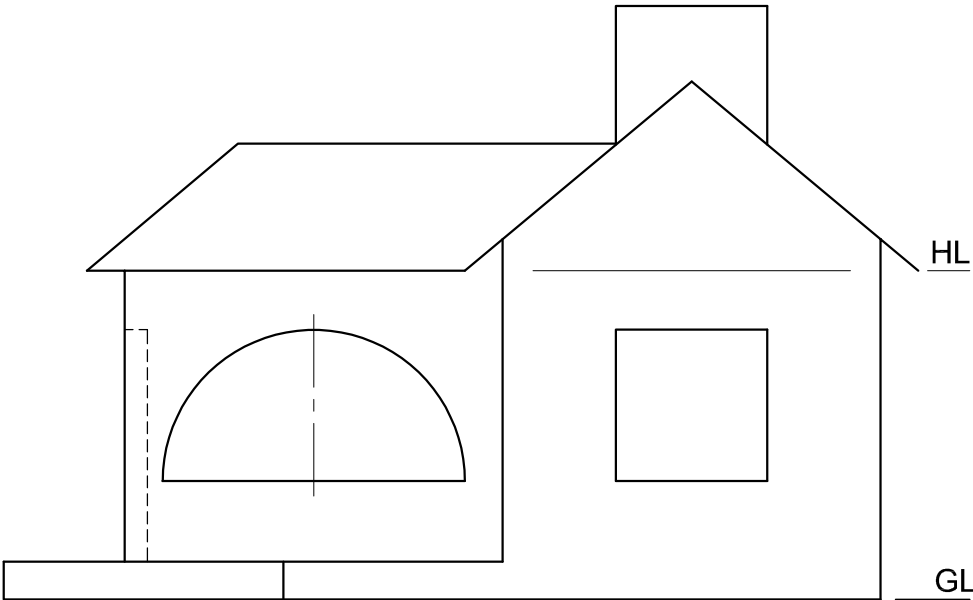
PP



HL

GL

SP



HL

GL



EXAMINATION NUMBER	
EXAMINATION NUMBER	
4	

300 x 75 x 10 mm BARGE BOARD

140 x 100 mm GUTTER ON A  
300 x 20 mm FASCIA BOARD

Ø100 mm RWDP

DOOR OPENING  
1000 x 300 x 150 mm  
CONCRETE STEPS

FINISHED FLOOR LEVEL  
GROUND LEVEL

400 x 400 x 150 GULLY

INCOMPLETE WEST ELEVATION

INCOMPLETE FLOOR PLAN

**FEATURES**

**D** DOOR

**W1 TO W3** WINDOWS

**FIXTURES**

**WC** TOILET

**WB** WASHBASIN

**SH** SHOWER

**S** SINK

**ELECTRICAL FITTINGS**

1. ONE-WAY SWITCH - SINGLE-POLE

2. ONE-WAY SWITCH - DOUBLE-POLE

3. FLUORESCENT LIGHT 2 x 40 W

4. CEILING LIGHT

5. SWITCHED SOCKET OUTLET

6. DISTRIBUTION BOARD

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

**ROOM DESIGNATIONS**

1 BATHROOM: TILE

2 LIVING ROOM: CARPET

3 KITCHEN: TILE

**FLOOR FINISHES**

**ROOF NOTES:**

30° ROOF PITCH

114 x 38 mm ROOF TRUSS ON 114 x 38 mm WALL PLATES

240 mm ROOF OVERHANG TO END OF ROOF TRUSS

30 mm CORRUGATED ROOF SHEETING ON 75 x 50 mm PURLINS @ 1000 mm c/c

300 x 75 x 10 mm BARGE BOARD ON GABLE ENDS, 20 mm PAST THE GUTTER

300 x 20 mm FASCIA BOARD WITH 140 x 100 mm GUTTERS ON ALL SIDES

9 mm CEILING BOARD ON 38 x 38 mm BRANDING STRIPS @ 400 mm c/c

SCHEMATIC DIAGRAM OF A ROOF TRUSS FOR ROOF 'A'

SCHEMATIC DIAGRAM OF A ROOF TRUSS FOR ROOF 'B'

INCOMPLETE WALL AND FOUNDATION DETAIL OF AN EXTERNAL AND AN INTERNAL WALL

**ELECTRICAL SYMBOLS**

**RAIN WATER ITEMS**

**DOOR AND WINDOW SCHEDULE**

TO FIT	600
2100	1850
DOOR FRAME AND DOOR (D)	WINDOW (W1)

**DOOR NOTE:**  
75 x 100 mm LINTELS ABOVE THE DOORS

600	1150
700	575
WINDOW (W2)	WINDOW (W3)

**WINDOW NOTES:**

- A = OPENING SIDE
- B = HINGED SIDE
- C = FIXED PANEL
- 150 x 20 mm FIBRE CEMENT SILL UNDER ALL WINDOWS

ROOF COMPONENTS	
	ROOF CAP
	114 x 38 mm WALL PLATE
	140 x 100 mm GUTTER

**FIXTURES**

	900	1900		450	450		400	300		750	400	500
FLOOR LEVEL												
SHOWER (SH)												
SINK (S)												
WASHBASIN (WB)												
TOILET (WC)												

QUESTION 4: CIVIL DRAWING

Given:

- The incomplete west elevation of a **new house** showing the walls, the door and window openings, the roof and notes
- The incomplete floor plan showing the walls, positions of the doors, windows, fixtures and the electrical layout
- Roof notes and a schematic diagram of roof truss 'A' and roof truss 'B'
- Room designations and floor finishes
- The incomplete wall and foundation detail of an external and an internal wall
- A table of electrical symbols
- A table of rain water items
- A door and window schedule
- A table of roof components
- A table of fixtures
- The incomplete floor plan of the **new house**, drawn to scale 1 : 50 and the incomplete foundation of a 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, draw, in first-angle orthographic projection and 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
- The 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, gullies, steps and door detail
- The roof detail, including the barge boards, fascia board, gutter and rainwater down-pipes
- The finished floor level

4.2 Using the incomplete foundation 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 wall and foundation detail of both walls
- The door detail
- The roof detail, including the fascia board, barge board and gutter
- The shower, toilet and the window above the ellipse
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:

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

NOTE:

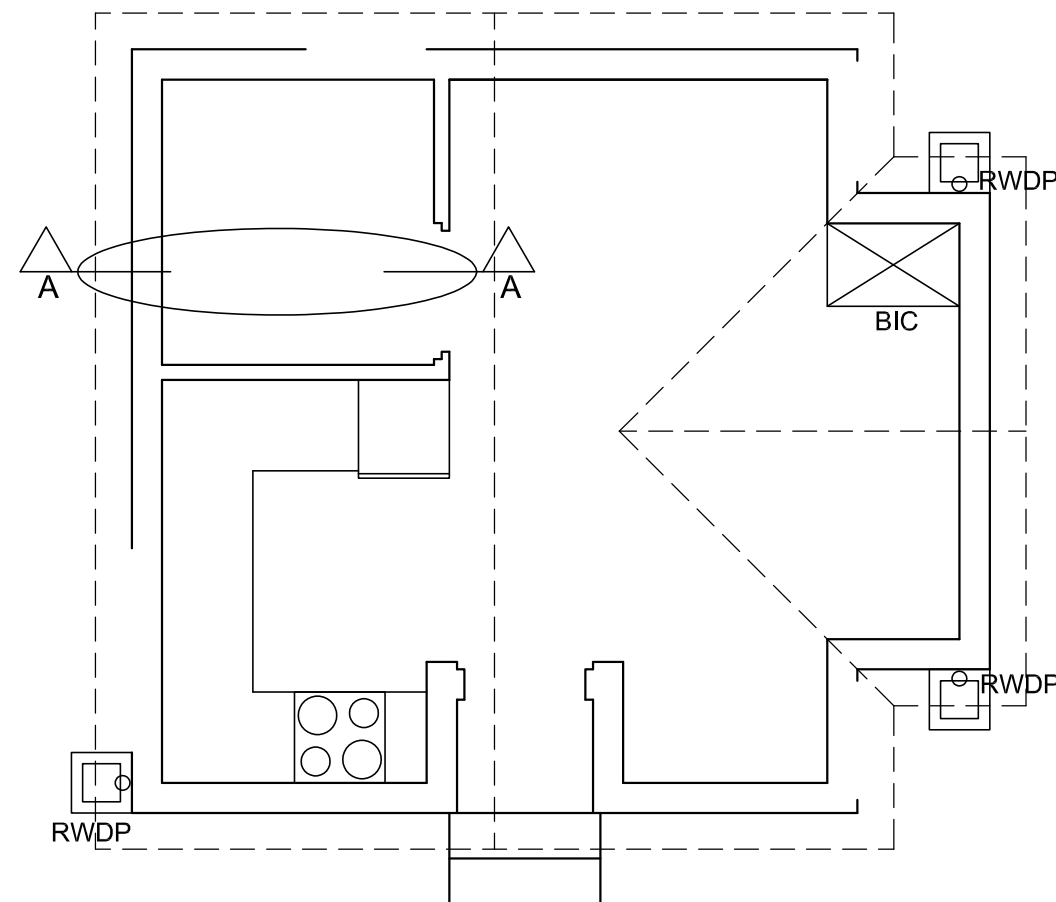
ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the **SANS 10143**. [95]

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BASIC EDUCATION

Please turn over

5



DETAILED SECTION A-A  
SCALE 1 : 20

FLOOR PLAN  
SCALE 1 : 50

1. MARK ALLOCATION FOR ROOF SECTION		FOR OFFICIAL USE ONLY	
A (1)		INCORRECT SCALE(S) USED	
B (1)		NON-ALIGNMENT OF VIEWS	
C (2)		VIEW(S) ROTATED	
D (5)		SECTION VIEWED INCORRECTLY	
E (2)		INCORRECT LETTERING	
F (1)			
G (1)			
H (1)			
I (1)			
<b>TOTAL</b>		<b>TOTAL</b>	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	10			
2	ELECTRICAL	6			
3	FIXTURES	8			
4	HATCHING	3			
5	LABELS	3			
SUBTOTAL		30			
WEST ELEVATION					
1	ROOF + RWDP	10			
2	WALLS + FFL	6 $\frac{1}{2}$			
3	DOOR + WINDOW	2			
4	LABELS	1 $\frac{1}{2}$			
SUBTOTAL		20			
DETAILED SECTION					
1	ROOF DETAIL	15			
2	FOUNDATION + WALL + DOOR	14 $\frac{1}{2}$			
3	WC + SHOWER + WINDOW	7			
4	HATCHING	7 $\frac{1}{2}$			
5	LABELS	1			
SUBTOTAL		45			
TOTAL		95			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
					6