

STAPLE



# basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

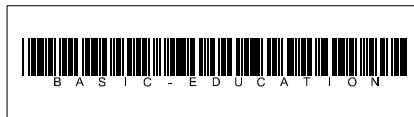
**ENGINEERING GRAPHICS AND DESIGN P1**  
**NOVEMBER 2019**

**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	SIGN	RE-MARKING			1/2	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



LAND SURVEYOR'S CERTIFICATE OF THE CORNER HEIGHTS AND BOUNDARY LENGTHS OF STAND 2045, SURVEYED ON 2018-09-17

CORNER HEIGHTS IN METRES	BOUNDARY LENGTHS IN METRES
A = 876,0	AB = 16,06
B = 876,1	BC = 7,05
C = 876,0	CD = 23,36
D = 876,3	DE = 26,41
E = 876,3	EF = 18,07
F = 876,4	FG = 53,16
G = 876,4	GA = 47,69

**SYMBOL LEGEND:**

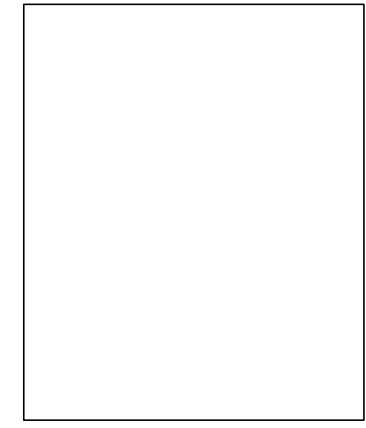
1. DECIDUOUS TREES	
2. SHRUBBERY	
4. GRAVEL PATHWAY	
3. FRENCH DRAIN	

**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 front view and top view of the *SANS 10143* graphical symbol for a SINGLE WALL-MOUNTED URINAL.



REVISION	DATE	DESCRIPTION
3	2018-12-20	ADD SWING GATES
2	2018-11-18	ADD SEWER LINES
1	2018-11-17	REMOVE DECIDUOUS TREE

CREATIVE ARCHITECTS  
777 BEREA ROAD DURBAN  
www.c-arch.co.za  
031 334 9762

PRINTED BY: KRYPTON (PTY) LTD  
DATE OF PRINT: 2018-12-28

DRAWING TITLE:  
**SITE PLAN**

PROJECT:  
PROPOSED CLUBHOUSE, DECK AND POOL FOR LOIS CHALET ON STAND 2045, 4 COMIC STREET, DURBAN, 4091

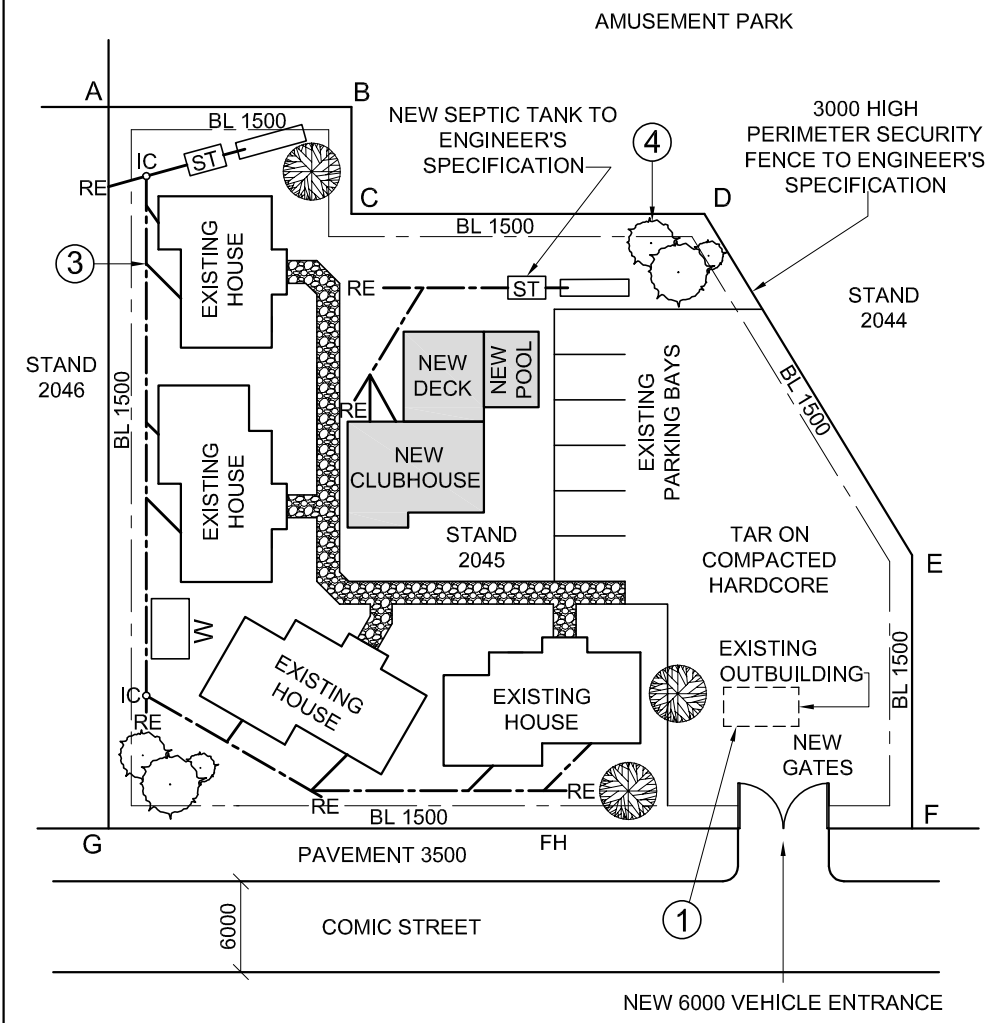
PROJECT NUMBER: FLY-2018	DRAWING NUMBER: 1818		
DATE: 2018-11-18	DRAWN: CLARK	CHECKED: KENT	SCALE: 1 : 500
REFERENCE CODE: SMAN-2018			

**QUESTION 1: ANALYTICAL (CIVIL)**

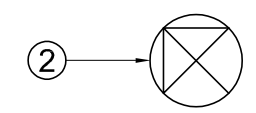
**Given:**  
The site plan of an existing housing development with a proposed new club facility, a title panel and a table of questions. The drawing has not been prepared to the indicated scale.

**Instructions:**  
Complete the table below by neatly answering the questions, which refer to the accompanying drawing, title panel and civil content. **[30]**

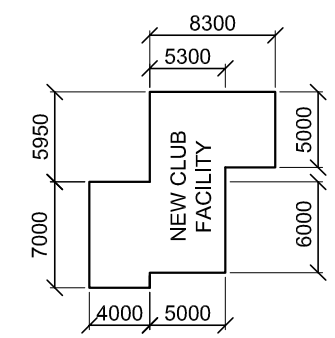
QUESTIONS		ANSWERS	
1	Who prepared the drawing?	1	
2	What is the drawing number?	1	
3	What company printed the drawing?	1	
4	On what date was the last revision made?	1	
5	What must the contractors do before commencing with any work?	1	
6	What is the finish on the pathway?	1	
7	How wide is the new entrance to STAND 2045 in metres?	1	
8	What is the STAND number of the amusement park?	1	
9	What colour is used to represent new sewer lines on a drainage plan?	1	
10	What does the abbreviation <i>BIC</i> stand for?	1	
11	What does the broken line at 1 indicate?	1	
12	What does the symbol at 2 indicate?	1	
13	What is the abbreviation of the component that you will find at the junction at 3?	1	
14	Name the feature at 4.	1	
15	What are the final TWO components of the sewerage system?	2	
16	Which elevation of the clubhouse faces Comic street?	1	
17	What features make up the new club facility?	3	
18	In the space below (ANSWER 18), determine the total length of the perimeter of STAND 2045 in metres.	3	
19	In the space below (ANSWER 19), determine the total area of the new club facility in square metres.	3	
20	In the space in the title panel (ANSWER 20), draw, in neat freehand, the front view and top view of the <i>SANS 10143</i> graphical symbol for a SINGLE WALL-MOUNTED URINAL.	4	
<b>TOTAL</b>		<b>30</b>	



**SITE PLAN**  
SCALE 1 : 500



**ANSWER 18**  
Show ALL calculations.



**ANSWER 19**  
Show ALL calculations.

EXAMINATION NUMBER	
EXAMINATION NUMBER	<b>2</b>





**QUESTION 2: INTERPENETRATION AND DEVELOPMENT**

**Given:**

- The top view and incomplete front view of a right regular hexagonal prism that has been shaped to fit over an equilateral triangular prism. The axes of both solids lie in a common vertical plane.
- An auxiliary view of the triangular prism

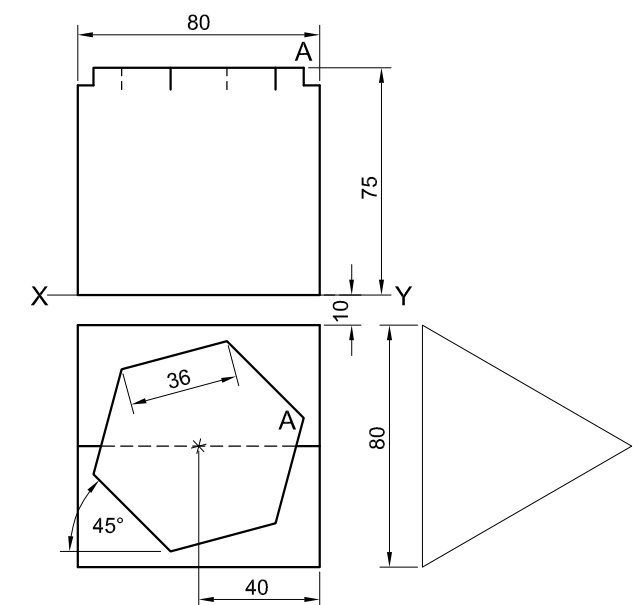
**Instructions:**

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

- 2.1 The given top view
- 2.2 The right view
- 2.3 The complete front view, clearly showing the curve of interpenetration
- 2.4 The development of the surface of the hexagonal prism. Make edge 'A' the seam.

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

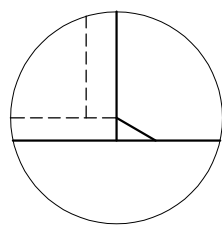
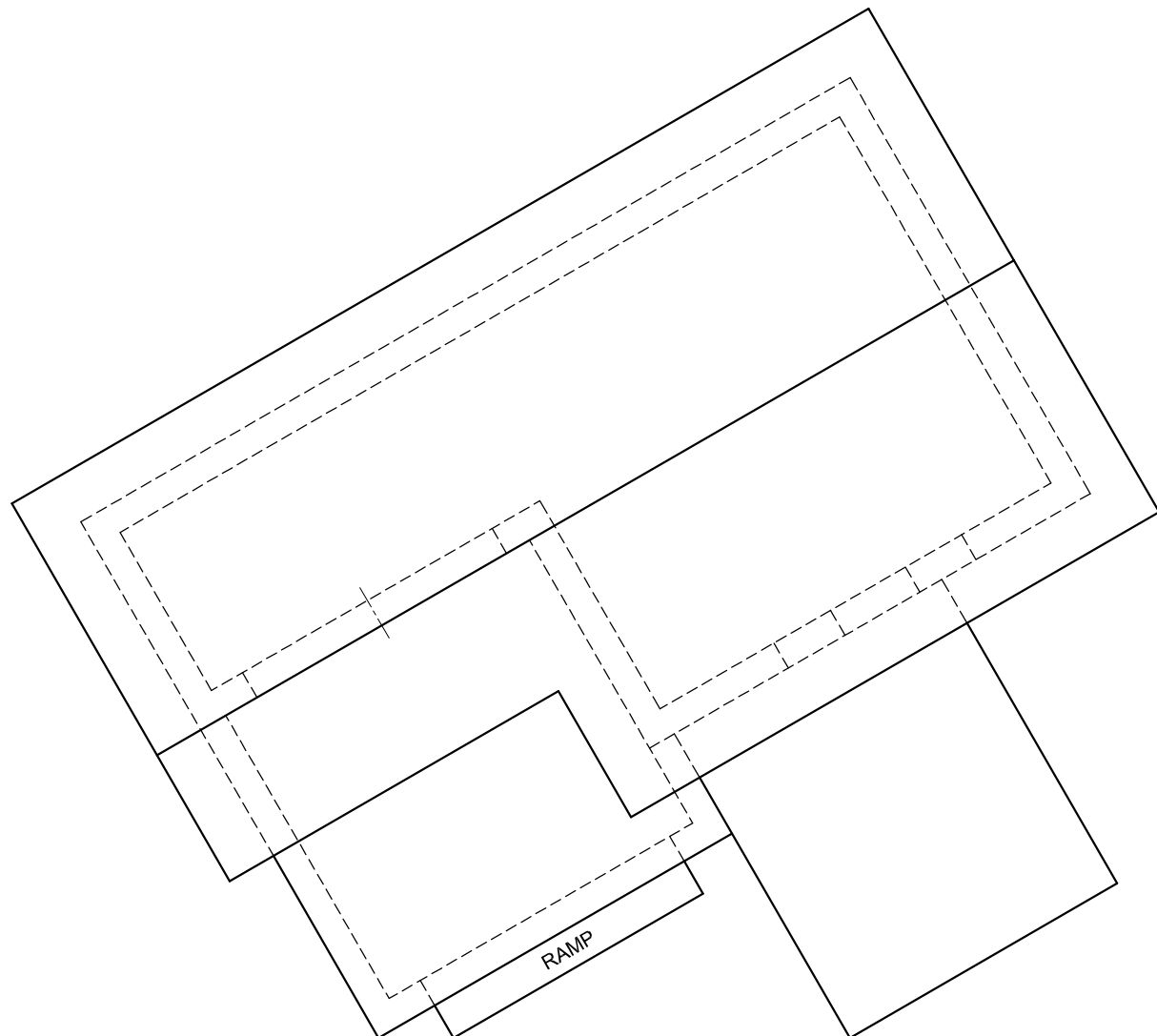
[37]



EDGE 'A' IS THE SEAM

ASSESSMENT CRITERIA				
1	TOP VIEW	7 1/2		
2	RIGHT VIEW	5		
3	FRONT VIEW	13		
4	DEVELOPMENT	11 1/2		
PENALTIES (-)				
<b>TOTAL</b>		<b>37</b>		
EXAMINATION NUMBER				
EXAMINATION NUMBER				
				<b>3</b>





DETAIL OF RAMP

PP

**QUESTION 3: PERSPECTIVE**

**Given:**

Two views of a house with a pitched roof, the detail of the ramp 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.

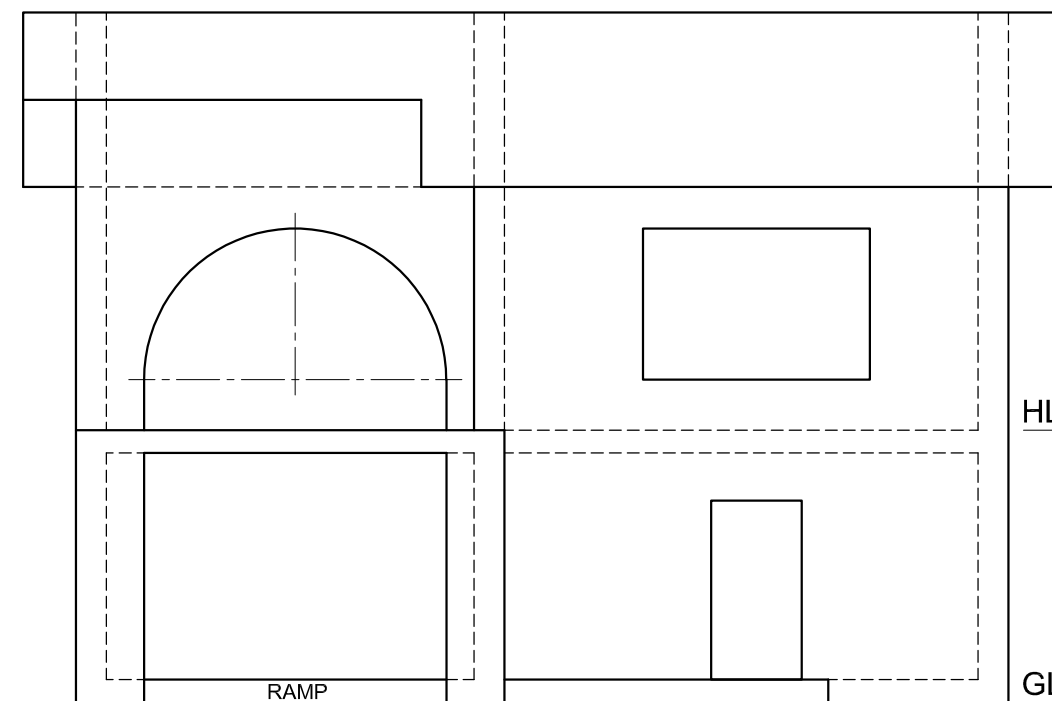
[39]

ASSESSMENT CRITERIA				
1	CONSTRUCTION	6		
2	WALLS	13		
3	DOORS + WINDOWS	8 1/2		
4	ROOF	4 1/2		
5	ARCS	7		
PENALTIES (-)				
<b>TOTAL</b>		<b>39</b>		

HL

GL

SP

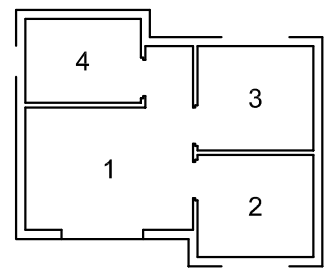
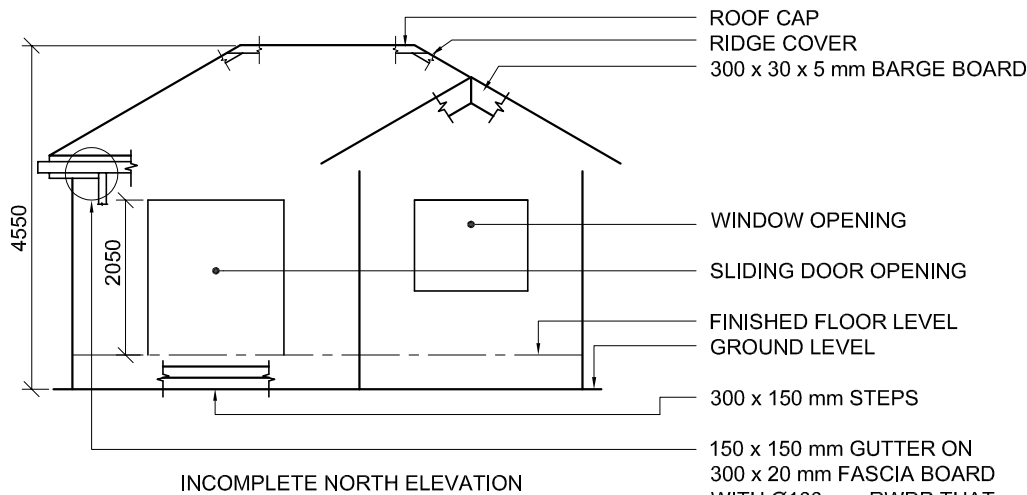


EXAMINATION NUMBER

EXAMINATION NUMBER

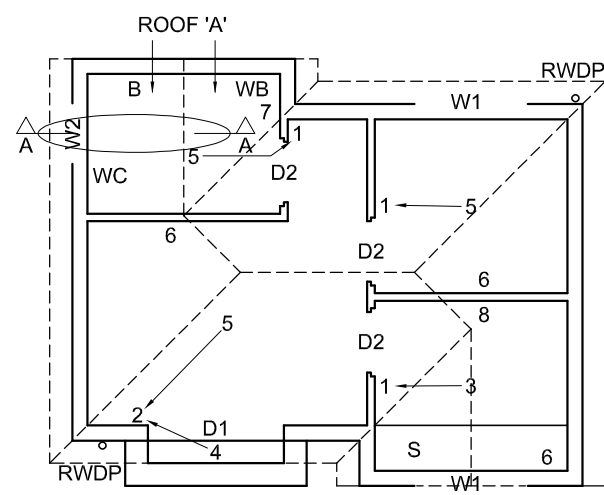
4



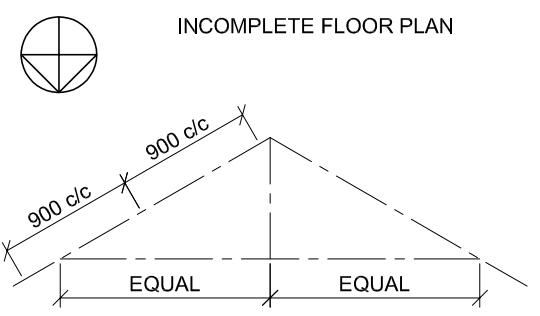


ROOM DESIGNATIONS

- FLOOR FINISHES**
- 1. LOUNGE: CARPET
  - 2. KITCHEN: TILES
  - 3. BEDROOM: CARPET
  - 4. BATHROOM: TILES



INCOMPLETE FLOOR PLAN



SCHEMATIC DIAGRAM OF A ROOF TRUSS FOR ROOF 'A'

- ROOF NOTES:**
- 30° ROOF PITCH
  - 115 x 40 mm ROOF TRUSSES ON 115 x 40 mm WALL PLATES
  - 300 mm ROOF OVERHANG TO END OF ROOF TRUSS
  - 20 mm FIBRE CEMENT ROOF SHEETING ON 75 x 50 mm PURLINS @ 900 mm c/c
  - 300 x 20 mm FASCIA BOARD WITH 150 x 150 mm GUTTERS ON ALL SIDES
  - 300 x 30 x 5 mm BARGE BOARDS ON GABLE ENDS, 40 mm PAST THE GUTTERS
  - 8 mm CEILING BOARD ON 40 x 40 mm BRANDING STRIPS @ 600 mm c/c

**FEATURES**

- D1 + D2 DOORS
- W1 + W2 WINDOWS

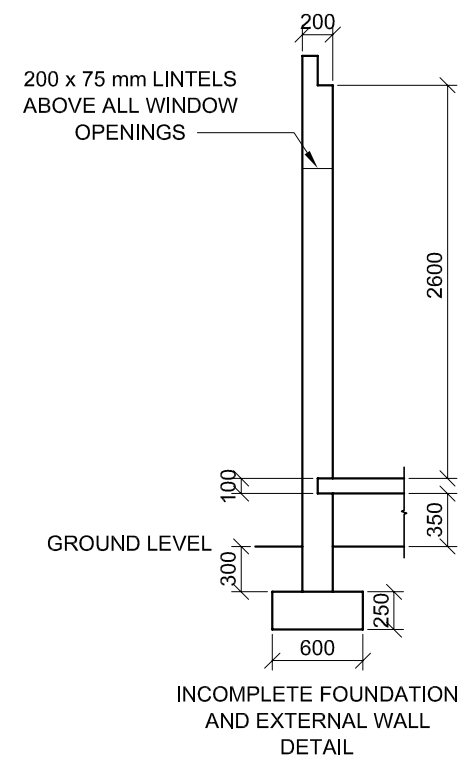
**FIXTURES**

- 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 3 x 40 W
- 4. WALL-MOUNTED LIGHT
- 5. CEILING LIGHT
- 6. SWITCHED SOCKET OUTLET
- 7. SOCKET OUTLET
- 8. DISTRIBUTION BOARD

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



INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL

**WINDOW AND DOOR SCHEDULE**

WINDOW (W1)

SLIDING DOOR (D1)

WINDOW (W2)

DOOR (D2)

**WINDOW NOTES:**

- A = OPENING SIDE
- B = HINGED SIDE
- C = FIXED PANEL
- ALL FRAMES 50 mm THICK
- 180 x 20 mm SILL TILE UNDER ALL WINDOWS

**DOOR NOTE:**

- ALL FRAMES 50 mm THICK

**FIXTURES**

TOILET (WC)

WASH BASIN (WB)

BATH (B)

SINK (S)

**ELECTRICAL SYMBOLS**


**ROOF COMPONENTS**

	ROOF CAP AND RIDGE COVER
	150 x 150 mm GUTTER
	300 x 20 mm FASCIA BOARD
	300 x 30 x 5 mm BARGE BOARD

**QUESTION 4: CIVIL DRAWING**

**Given:**

- The incomplete north elevation of a **new self-contained flatlet**, showing the walls, the sliding door and window openings, the roof and labels
- The incomplete floor plan showing the walls, steps, position of the doors, windows, fixtures and the electrical layout
- A schematic diagram of a roof truss for roof 'A' and roof notes
- Room designations and floor finishes
- The incomplete foundation and external wall detail
- A window and door schedule
- A table of fixtures
- A table of electrical symbols
- A table of roof components
- The incomplete floor plan of the **new self-contained flatlet**, drawn to scale 1 : 50, and the incomplete foundation and 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, draw, in first-angle orthographic projection and to scale 1 : 50, the following views of the **new self-contained flatlet**:

**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 NORTH ELEVATION**

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

- The outside walls, steps, window and door detail
- The roof detail, including the barge boards, fascia board, gutter and rainwater down-pipe
- 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 complete foundation and external wall detail
- The window detail
- The roof detail, including the fascia board, gutter and barge board
- The bath
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

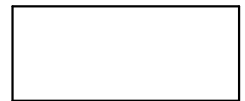
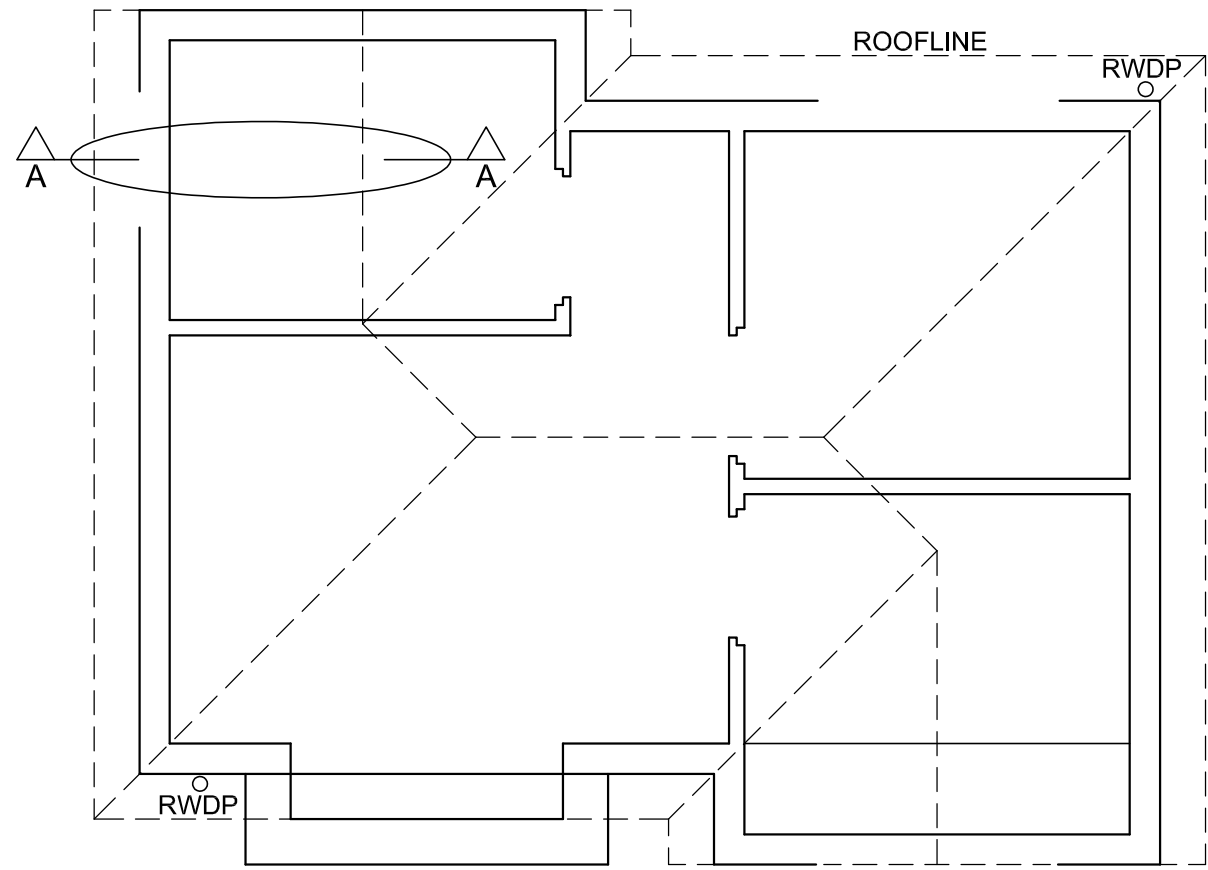
**Label the following:**

- The north 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**. [94]





DETAILED SECTION A-A  
SCALE 1 : 20

FLOOR PLAN  
SCALE 1 : 50

MARK ALLOCATION FOR SECTION OF ROOF		FOR OFFICIAL USE ONLY	
A (2)		INCORRECT SCALE(S) USED	
B (1)		NON-ALIGNMENT OF VIEWS	
C (1)		VIEW(S) ROTATED	
D (2)		SECTION VIEWED INCORRECTLY	
E (6)		INCORRECT LETTERING	
F (2)			
G (1)			
H (1)			
I (1)			
<b>TOTAL</b>		<b>TOTAL</b>	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	11			
2	FIXTURES	7			
3	ELECTRICAL	10			
4	HATCHING	3			
5	LABELS	4			
<b>SUBTOTAL</b>		<b>35</b>			
NORTH ELEVATION					
1	ROOF + RWDP	10 1/2			
2	WALLS + STEP + FFL	6			
3	DOOR + WINDOW	7			
4	LABELS	1 1/2			
<b>SUBTOTAL</b>		<b>25</b>			
DETAILED SECTION					
1	ROOF DETAIL	16			
2	FOUNDATION + WALL + WINDOW	10			
3	BATH	1			
4	HATCHING	5 1/2			
5	LABELS	1 1/2			
<b>SUBTOTAL</b>		<b>34</b>			
<b>TOTAL</b>		<b>94</b>			
PENALTIES (-)					
<b>GRAND TOTAL</b>					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
					<b>6</b>

