

STAPLE



basic education
 Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
 SENIOR CERTIFICATE**

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P1
FEBRUARY/MARCH 2016

MARKS: 100
TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

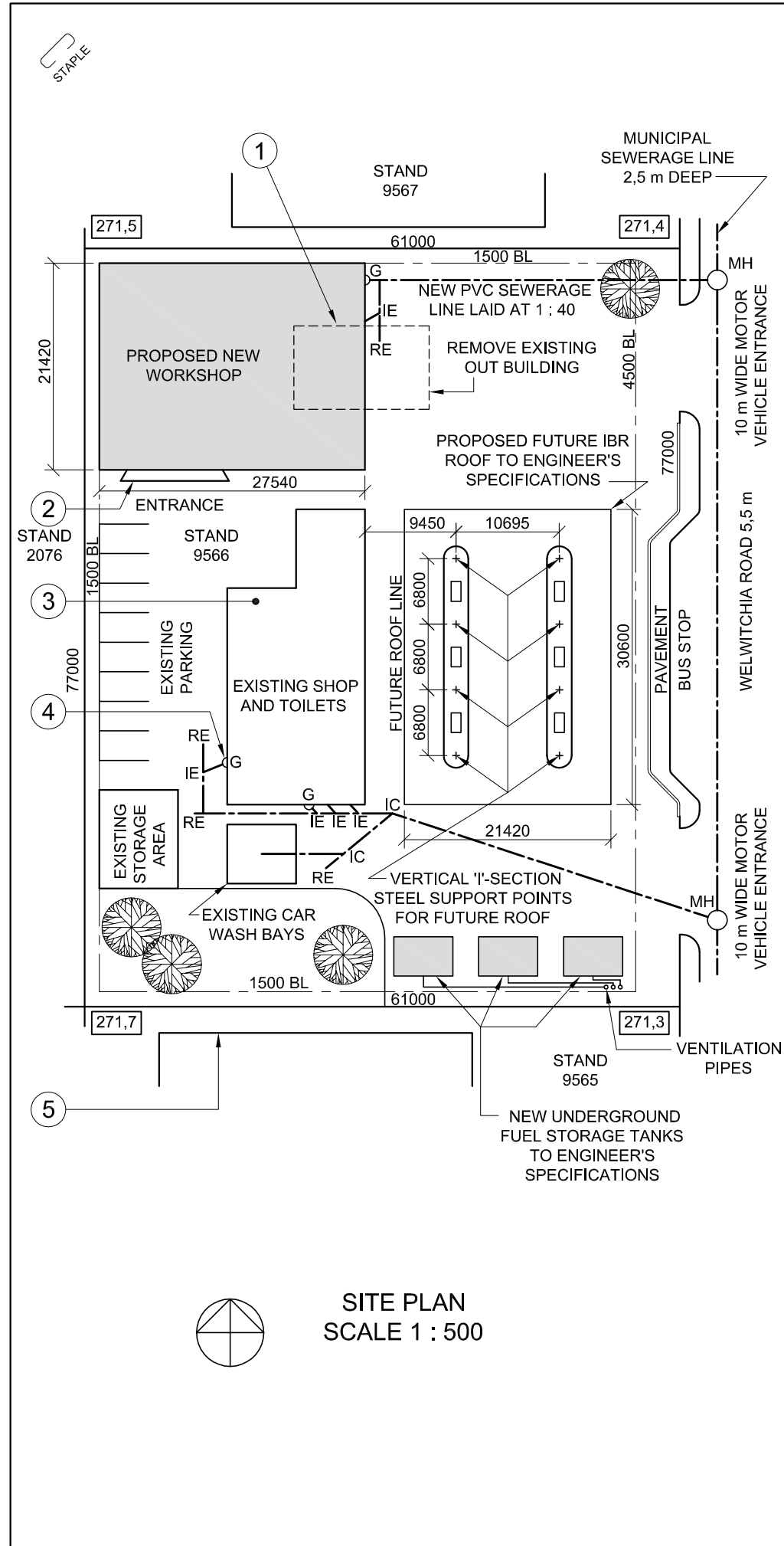
1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in first-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be completed using instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL 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. Proper planning 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			$\frac{1}{2}$	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



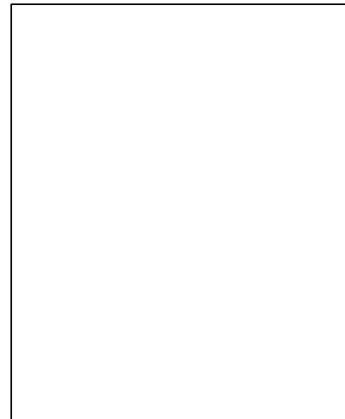


NOTE:
Contractors must verify all dimensions and levels on site before commencing work. Architects to be notified immediately of any discrepancies.

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	2015-08-30	Move vent pipes
2	2015-08-18	Replace fuel tanks
1	2015-08-06	Include new roof support points

DIGITAL DRAWING
ARCHITECTS
17 SAFFRON DRIVE
GLENASHLEY
☎ 031 5836092

PRINTED BY
TIMELESS PRINTERS

DATE OF PRINT
2015-10-17

DRAWING TITLE
SITE PLAN

PROJECT
PROPOSED NEW WORKSHOP,
UNDERGROUND FUEL STORAGE TANKS
AND FUTURE ROOF FOR SA PETROLEUM
ON STAND 9566, WELWITCHIA ROAD

PROJECT NUMBER SSA/FS/-2015	DRAWING NUMBER TH 15-05-R4K/J		
DATE 2015-09-04	DRAWN TOM	CHECKED HARRY	SCALE 1 : 500

REFERENCE CODE
1QP1-2015



QUESTION 1: ANALYTICAL (CIVIL)

Given:

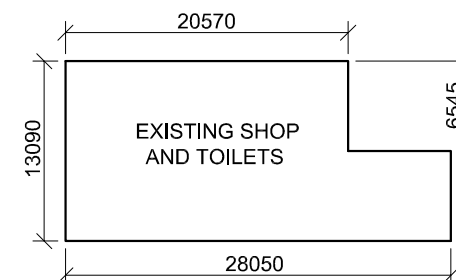
The site plan of an existing service station with a proposed new workshop, underground fuel storage tanks and future roof, a title panel and a table of questions. The drawing has not been prepared to the indicated scale.

Instructions:

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

QUESTIONS		ANSWERS	
1	How many signatures are required?	1	
2	What is the architectural firm's telephone number?	1	
3	What was the second revision?	1	
4	What is the width of Welwitchia Road in millimetres?	1	
5	What type of roof cover is proposed for the future roof?	1	
6	How many trees are shown?	1	
7	How many new underground fuel storage tanks are shown?	1	
8	What does the broken line at 1 indicate?	1	
9	Name the feature at 2.	1	
10	In what colour should new steel be indicated on a drawing?	1	
11	In what colour should the feature at 3 be shown?	1	
12	Name the feature at 4.	1	
13	Name the feature at 5.	1	
14	Which side of the existing shop and toilets faces Welwitchia Road?	2	
15	Give a reason why graphical symbols are used in drawings.	2	
16	What determines the size of a graphical symbol on a drawing?	1	
17	What is the height of the lowest corner of the stand in metres?	2	
18	In the space below, determine the perimeter of the existing shop and toilets in metres.	3	
19	In the space below, determine the total area of the existing shop and toilets in square metres.	3	
20	In the space provided in the title panel, draw, in neat freehand, the front view and top view of the SANS 10143 graphical symbol for a SINGLE WALL-MOUNTED URINAL.	4	
TOTAL		30	

ANSWER 18
Show ALL calculations.



ANSWER 19
Show ALL calculations.

EXAMINATION NUMBER	
EXAMINATION NUMBER	2



QUESTION 2: SOLID GEOMETRY

Given:

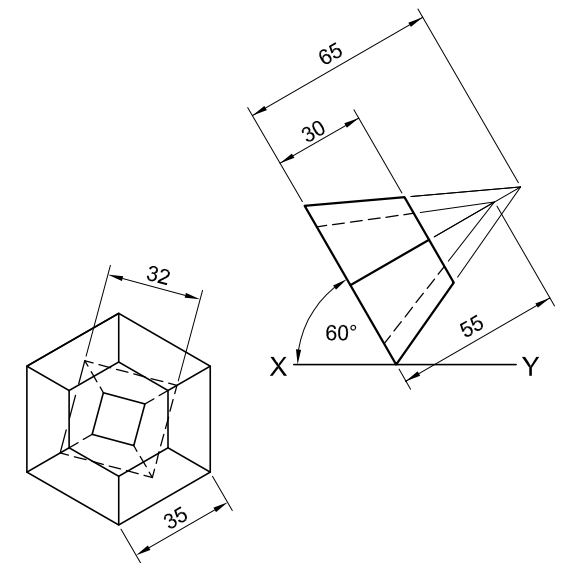
The front view and an auxiliary view of a truncated right regular hexagonal pyramid with a centrally placed right square pyramidal hole.

Instructions:

Draw, to scale 1 : 1, the following views of the solid:

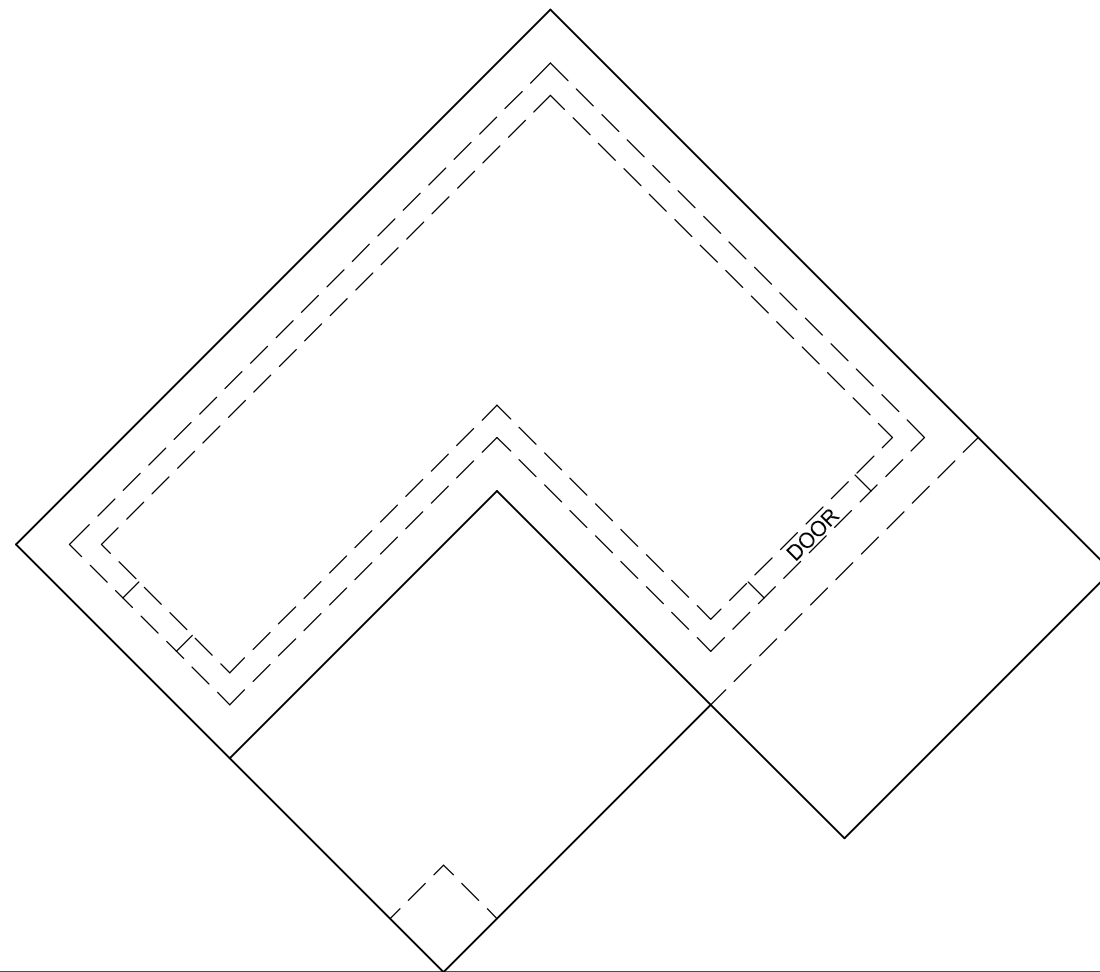
- 2.1 The given front view
- 2.2 The top view
- 2.3 The left view

- Show ALL hidden detail.
- Show ALL necessary construction. **[40]**



ASSESSMENT CRITERIA				
1	FRONT AND AUX. VIEW	7½		
2	TOP VIEW	15		
3	LEFT VIEW	17½		
PENALTIES (-)				
TOTAL		40		
EXAMINATION NUMBER				
EXAMINATION NUMBER				3





PP

QUESTION 3: PERSPECTIVE

Given:

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

PP – Picture plane

HL – Horizon line

GL – Ground line

SP – Station point

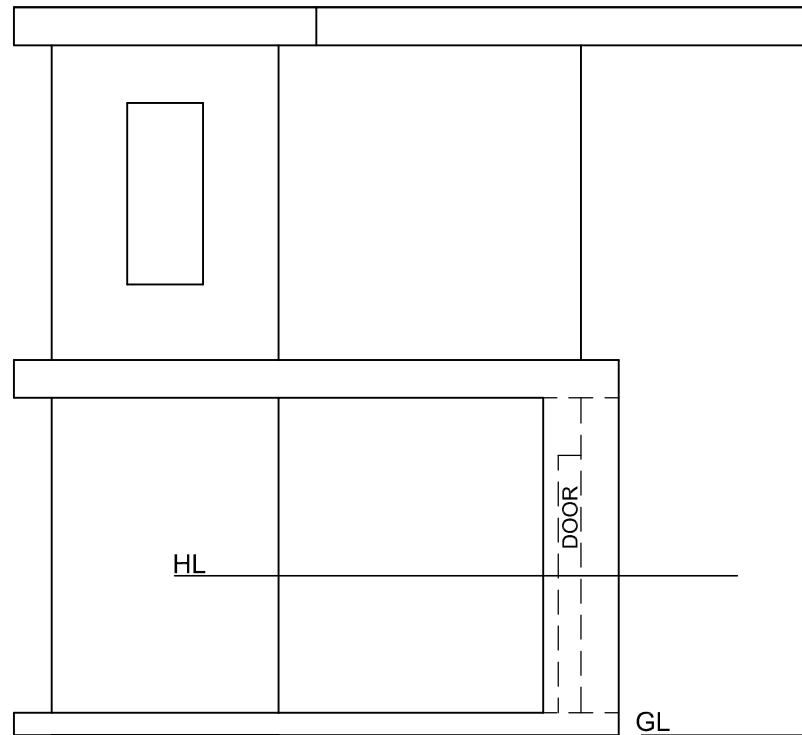
Instructions:

Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL necessary construction.
- NO hidden detail is required. [39]

ASSESSMENT CRITERIA

1	CONSTRUCTION + VPs	5		
2	FLOOR	4		
3	GROUND FLOOR	12		
4	FIRST FLOOR	12		
5	WINDOW + DOOR	6		
PENALTIES (-)				
TOTAL		39		

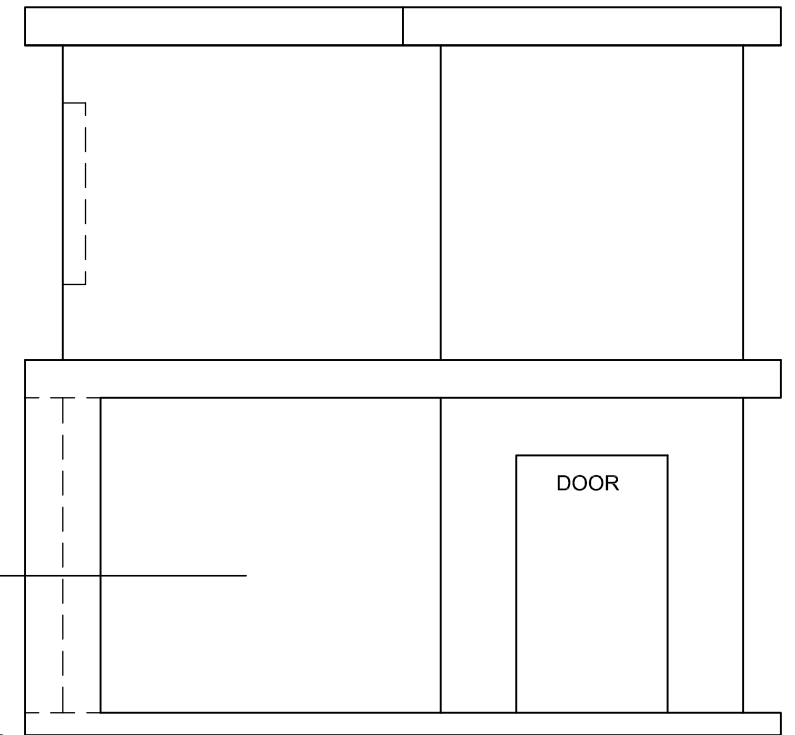


HL

DOOR

GL

SP



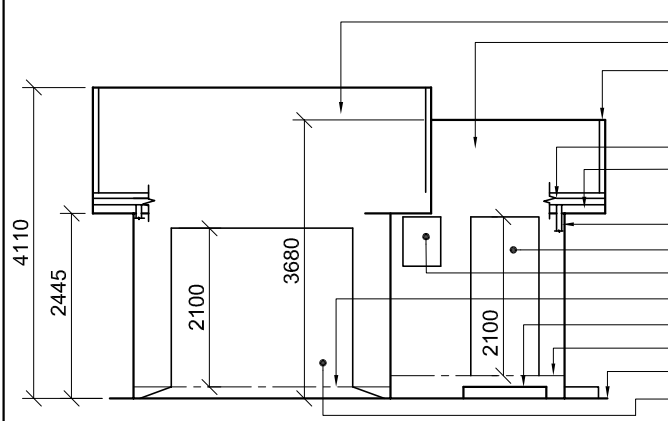
DOOR

EXAMINATION NUMBER

EXAMINATION NUMBER

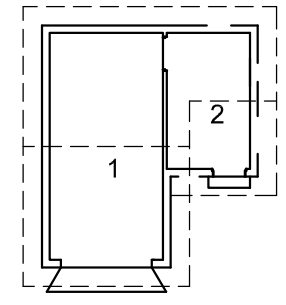
4





INCOMPLETE SOUTH-EAST ELEVATION

- ROOF 1
- ROOF 2
- 300 x 100 mm BARGE BOARD ON ALL GABLED ENDS
- 150 x 100 mm GUTTER
- 200 x 20 mm FASCIA BOARD
- Ø70 mm RWDP
- DOOR OPENING
- WINDOW OPENING
- FINISHED FLOOR LEVEL (GARAGE)
- 150 mm HIGH STEP
- FINISHED FLOOR LEVEL (WASHROOM)
- GROUND LEVEL
- GARAGE DOOR OPENING



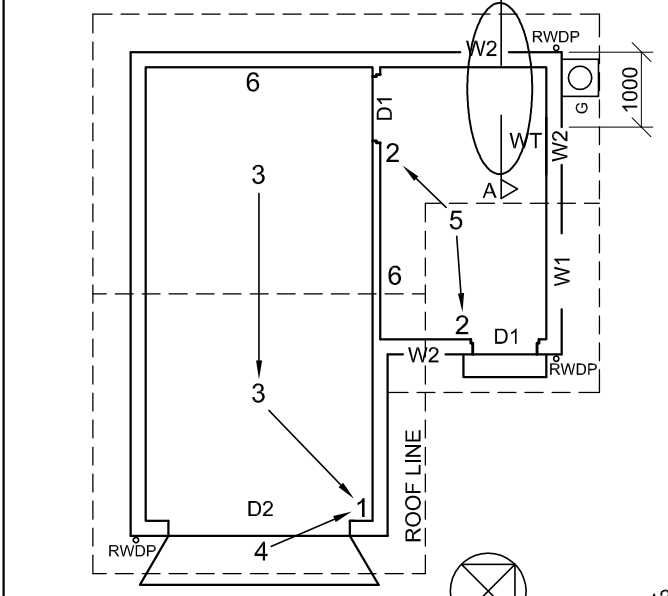
ROOM DESIGNATIONS

- FLOOR FINISHES**
 1 GARAGE: GRANO
 2 WASHROOM: TILE

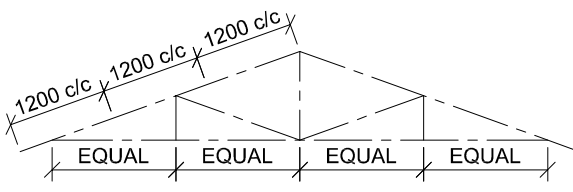
- FEATURES**
 D1 DOOR
 D2 GARAGE DOOR
 W1 WINDOW
 W2 WINDOW

- FIXTURE**
 WT WASHTUB
- ELECTRICAL FITTINGS**
 1. ONE-WAY SWITCH - DOUBLE-POLE
 2. TWO-WAY SWITCH
 3. FLUORESCENT LIGHT 2 x 40 W
 4. WALL-MOUNTED LIGHT
 5. CEILING LIGHT
 6. SWITCHED SOCKET OUTLET

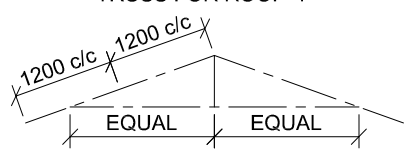
NOTE:
 THE ARROW SHOWS THE LIGHT CONNECTION TO THE SWITCH.



INCOMPLETE FLOOR PLAN



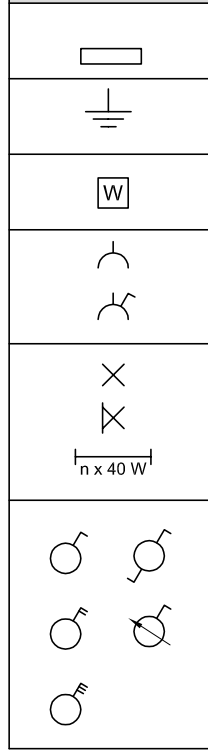
SCHEMATIC DIAGRAM OF A TRUSS FOR ROOF '1'



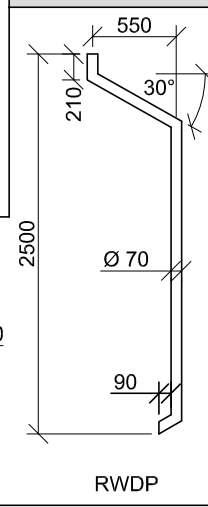
SCHEMATIC DIAGRAM OF A TRUSS FOR ROOF '2'

- ROOF NOTES:**
 ROOF PITCH 20°
- 200 x 20 mm FASCIA BOARD ON ALL SIDES AND 300 x 20 mm BARGE BOARD ON THE GABLED ENDS
- ROOF COVER 15 mm FIBRE CEMENT SHEETING ON 75 x 50 mm PURLINS SPACED ACCORDING TO SCHEMATIC DIAGRAMS
- 114 x 38 mm ROOF TRUSS ON 114 x 38 mm WALL PLATES
- 9 mm CEILING BOARD ON 38 x 38 mm BRANDING STRIPS @ 400 mm c/c
- 100 x 150 mm GUTTER ON ALL SIDES

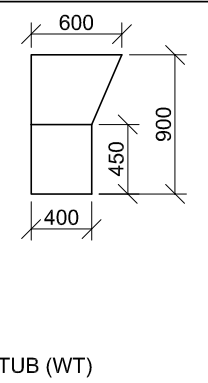
ELECTRICAL SYMBOLS



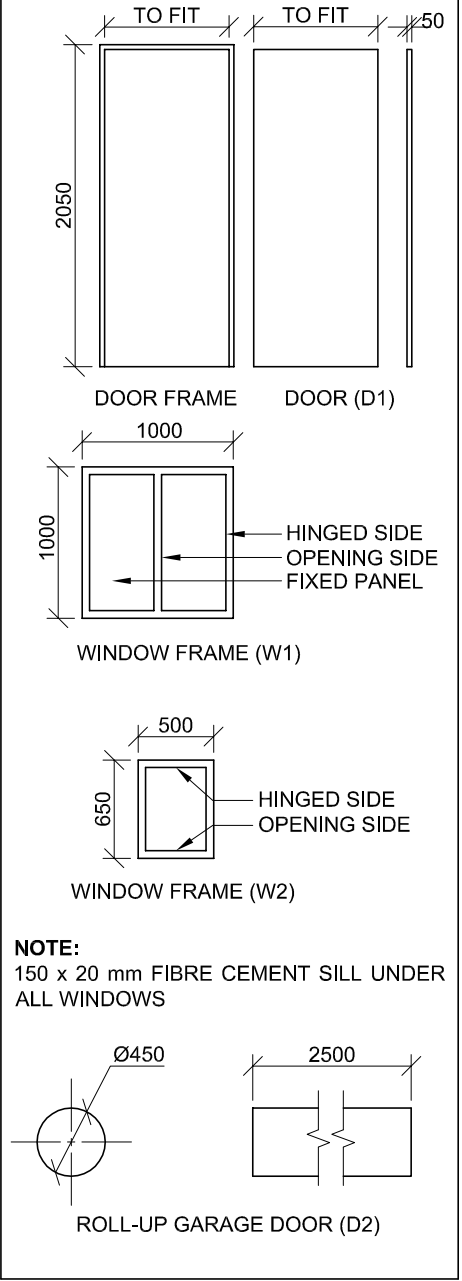
RAINWATER ITEMS



FIXTURE

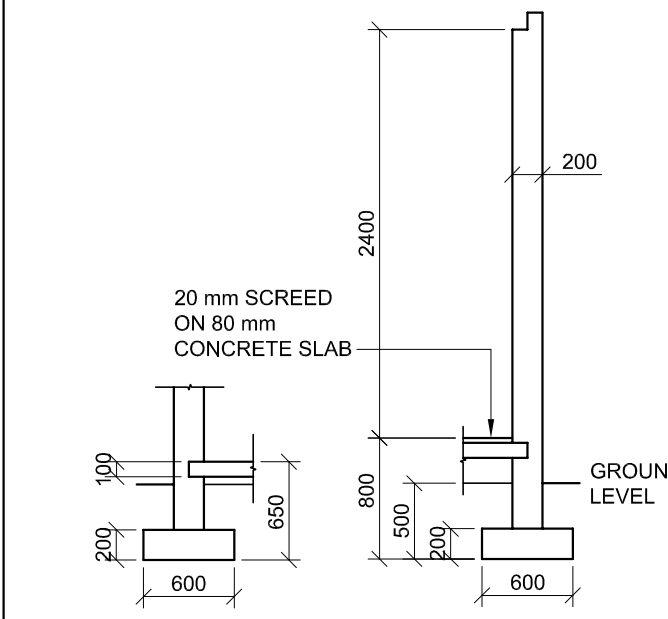


DOOR AND WINDOW SCHEDULE



ROOF COMPONENTS

	ROOF CAP
	WALL PLATE
	75 x 50 mm PURLIN
	150 x 100 mm GUTTER
	300 x 100 mm FIBRE CEMENT BARGE BOARD
	200 x 20 mm FASCIA BOARD



INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL OF THE GARAGE

INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL OF THE WASHROOM

QUESTION 4: CIVIL DRAWING

- Given:**
- The incomplete south-east elevation of a **new garage and washroom** showing the walls, the garage door opening, the door and window openings, the roof and notes
 - The incomplete floor plan showing the walls, position of the doors, windows, fixture and the electrical layout
 - The incomplete foundation and external wall detail of the garage and of the washroom
 - Room designations and floor finishes
 - Schematic diagrams of the TWO types of roof trusses and roof notes
 - A table of electrical symbols
 - A table of rainwater items
 - A table of the fixture
 - A door and window schedule
 - A table of roof components
 - The incomplete floor plan of the **new garage and washroom**, drawn to scale 1 : 50, 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 garage and washroom**:
- 4.1.1 **THE COMPLETE FLOOR PLAN**
Add the following features to the drawing:
- ALL doors and windows
 - The fixture as indicated by the abbreviation
 - ALL electrical fittings as indicated by numbers
 - ALL hatching detail
- 4.1.2 **THE COMPLETE SOUTH-EAST ELEVATION**
Show the following features on the drawing:
- The outside walls, door and window detail
 - The roof detail, including the fascia boards, barge boards, gutters, rainwater down-pipe and gully
 - The finished floor level
- 4.2 In the space provided, 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, with a DOUBLE lintel
 - The roof detail, including the fascia board and gutter
 - ALL features and fixtures to the right of the section
 - ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

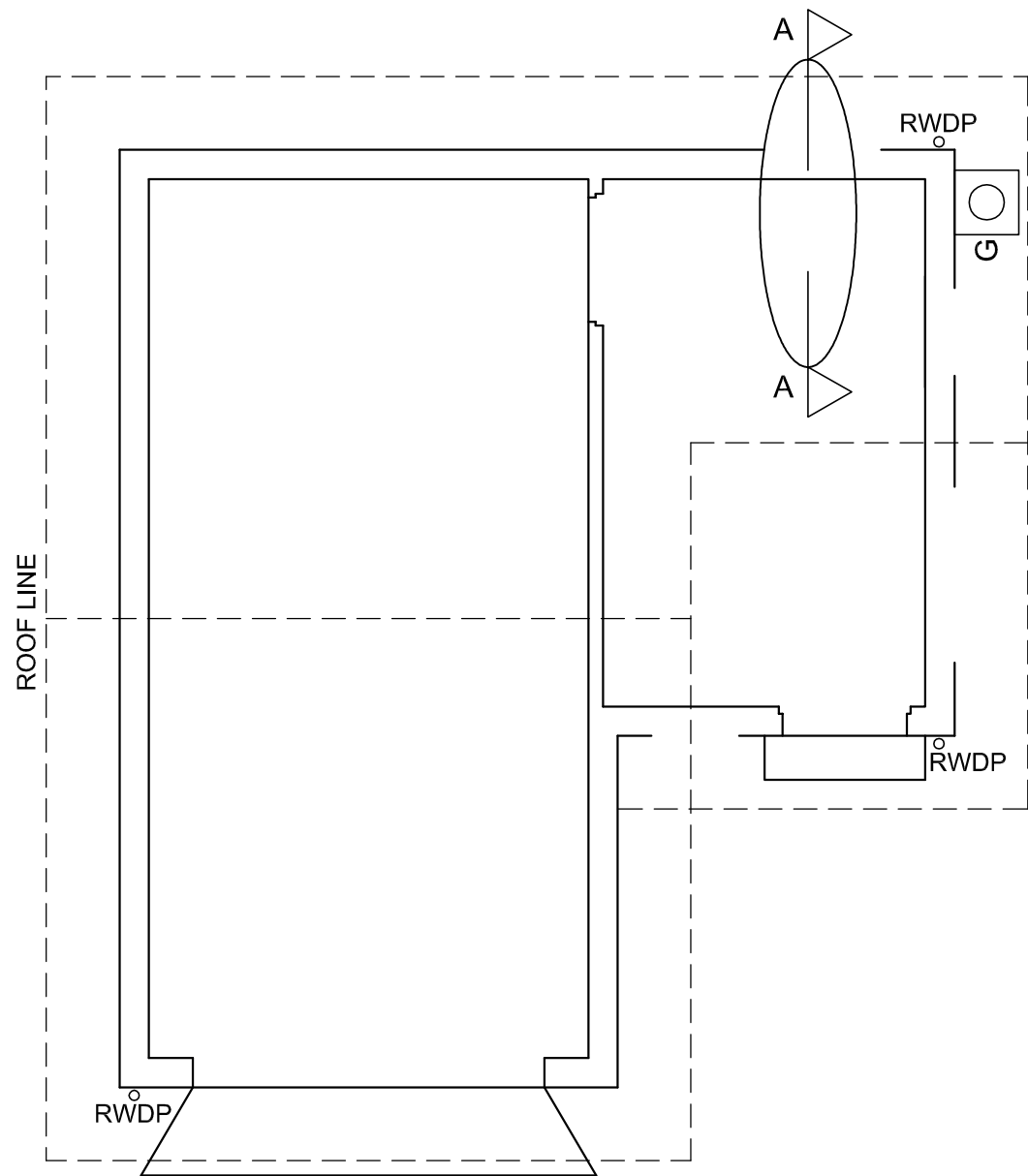
Label the following:

- The south-east elevation
- The room designations and floor finishes
- Using the correct abbreviations, label the following features in the correct view: ground level, finished floor level and damp-proof course.

NOTE:

- Planning is essential.
- ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the SANS 10143.





FLOOR PLAN
SCALE 1 : 50

DETAILED SECTION ON A-A
SCALE 1 : 20

FOR OFFICIAL USE ONLY		
INCORRECT SCALE(S)		
NON-ALIGNMENT OF VIEWS		
VIEW(S) ROTATED		
SECTION VIEWED INCORRECTLY		
INCORRECT LETTERING		
TOTAL PENALTIES (-)		

MARK ALLOCATION FOR SECTION OF ROOF (4.2 No 1)												
A	B	C	D	E	F	G	H	I	J	K	L	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATE
1	DOORS + WINDOWS	12			
2	ELECTRICAL	8			
3	FIXTURE	2			
4	HATCHING	4			
5	LABELS	2			
SUBTOTAL		28			
SOUTH-EAST ELEVATION					
1	ROOF + RWDP	9			
2	WALLS + FFL + GULLEY + STEP + RAMP	6½			
3	DOOR + WINDOW	7½			
4	LABELS	2			
SUBTOTAL		25			
DETAILED SECTION					
1	ROOF DETAIL + RWDP	16			
2	FOUNDATION + WALL + SLAB + LINE BREAK	9			
3	WINDOW + WT	8			
4	HATCHING	4			
5	LABELS	1			
SUBTOTAL		38			
TOTAL		91			
TOTAL PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER				6	

