



# basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**ENGINEERING GRAPHICS AND DESIGN P1**  
**NOVEMBER 2017**

**MARKS: 200**

**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 completed 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. 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	

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



CORNER HEIGHTS AND BOUNDARY LENGTHS IN METRES			
A	137,38	AB	143,56
B	134,67	BC	223,91
C	133,5	CD	143,89
D	136	DA	223,87

- SYMBOL LEGEND:**
- 25 m HIGH LAMP POSTS SPACED MAXIMUM 50 m c/c
  - EXISTING PALM TREES
  - NEW DECIDUOUS TREES



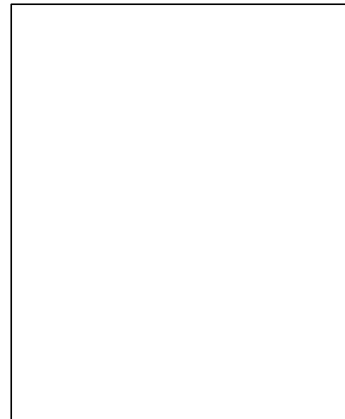
**NOTE:**  
Contractors must verify all dimensions and levels on site before commencing work. Architects to be notified immediately of any discrepancies.

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 WASHTUB.



REVISION	DATE	DESCRIPTION
2	2017-01-09	Security lighting
1	2017-01-07	New staff parking

**3D STUDIO ARCHITECTS**  
1024 FOREST DRIVE  
ISIPINGO  
☎ 031 555 2792

PRINTED BY: FAST PRINT  
DATE OF PRINT: 2017-01-28

DRAWING TITLE: **SITE PLAN**

PROJECT: PROPOSED NEW LOGISTICS CENTRE AND GUARD HOUSE FOR RAGE INDUSTRIES ON PLOT 7392, RIVER HORSE INDUSTRIAL PARK, 28 WILDEBEEST DRIVE, ISIPINGO

PROJECT NUMBER SSA/FS/-2015	DRAWING NUMBER LF 5-10-BPK/N		
DATE 2017-01-05	DRAWN NM	CHECKED LUKE	SCALE 1 : 1500

REFERENCE CODE: V1V1-2017



**QUESTION 1: ANALYTICAL (CIVIL)**

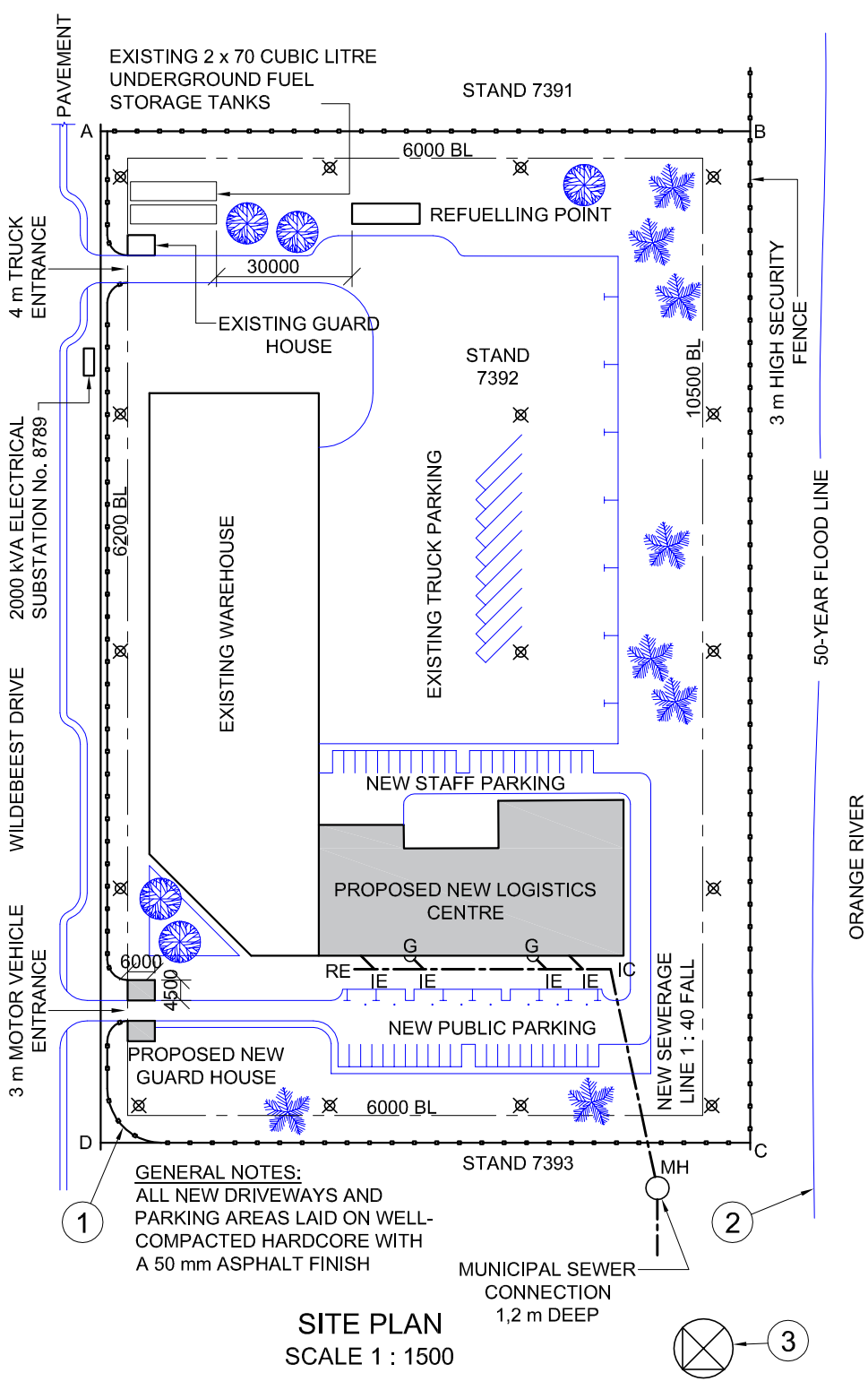
**Given:**

The site plan of an existing warehouse with a proposed new logistics centre and guard 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 and title panel. **[30]**

QUESTIONS		ANSWERS	
1	Who checked the drawing?	1	
2	What is the number of the stand?	1	
3	What is the number of the electrical substation?	1	
4	How far is the refuelling point from the fuel tanks in metres?	1	
5	How deep is the municipal sewerage connection?	1	
6	How many gullies are shown?	1	
7	What does the abbreviation IE stand for?	1	
8	How many palm trees are shown?	1	
9	What is the maximum permitted distance between the lamp posts in metres?	1	
10	What is the combined capacity of the underground fuel tanks in cubic litres?	2	
11	Besides the trees, what other natural feature is indicated?	1	
12	What does the line at 1 indicate?	1	
13	What does the line at 2 indicate?	1	
14	Name the feature at 3.	1	
15	In what colour must a new sewerage line be indicated on a drainage plan?	1	
16	Which elevation of the proposed new logistics centre faces the new staff parking?	2	
17	What is the distance between the boundary line and the building line on the north eastern side of the stand in metres?	2	
18	In the space below (ANSWER 18), determine the perimeter of the stand in metres.	3	
19	In the space below (ANSWER 19), determine the total area of the proposed new logistics centre 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 SANS 10143 graphical symbol for a WASHTUB.	4	
<b>TOTAL</b>		<b>30</b>	

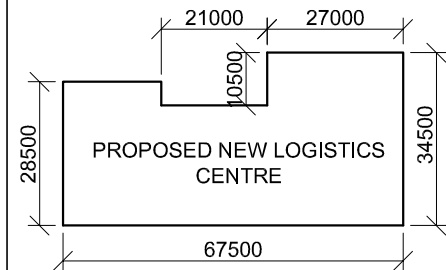


**GENERAL NOTES:**  
ALL NEW DRIVEWAYS AND PARKING AREAS LAID ON WELL-COMPACTED HARDWARE WITH A 50 mm ASPHALT FINISH

**SITE PLAN**  
SCALE 1 : 1500

MUNICIPAL SEWER CONNECTION  
1,2 m DEEP

**ANSWER 18**  
Show ALL calculations.



**ANSWER 19**  
Show ALL calculations.

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



**QUESTION 2: SOLID GEOMETRY**

**Given:**

- The front view and the top view of a right regular hexagonal prism with a right regular hexagonal pyramidal hole
- Cutting plane A-A

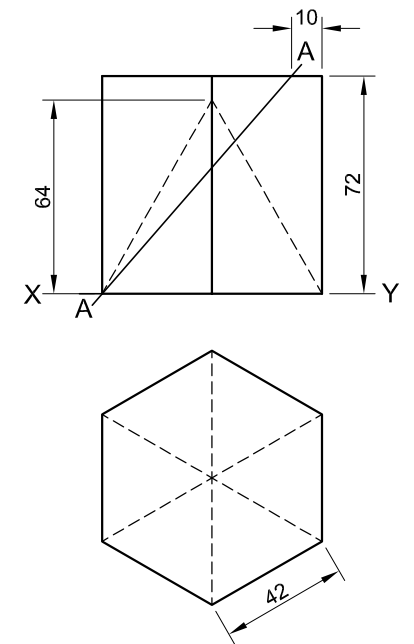
**Instructions:**

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

- 2.1 The given front view
- 2.2 A sectional top view
- 2.3 A sectional left view
- 2.4 The true shape of the cut surface

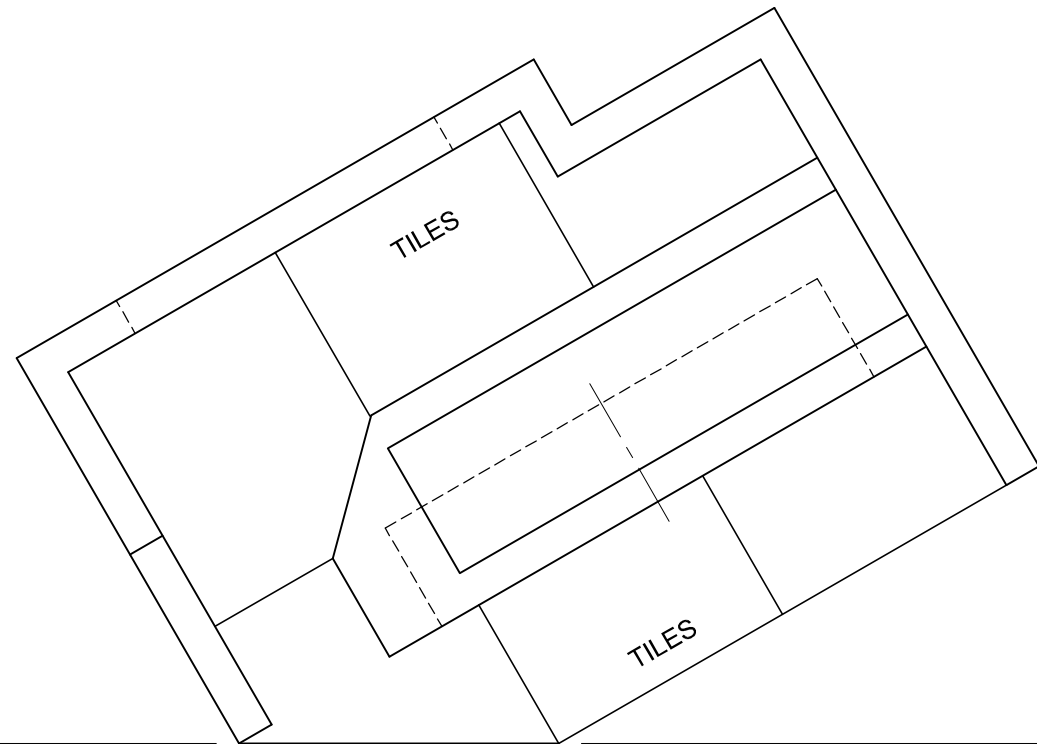
- Show ALL hidden detail.
- Show ALL construction.

**[35]**



ASSESSMENT CRITERIA			
1	FRONT VIEW	4	
2	SECTIONAL TOP VIEW	9½	
3	SECTIONAL LEFT VIEW	10½	
4	TRUE SHAPE	6	
5	HATCHING	5	
PENALTIES (-)			
<b>TOTAL</b>		<b>35</b>	
EXAMINATION NUMBER			
EXAMINATION NUMBER			
			<b>3</b>





**QUESTION 3: PERSPECTIVE**

**Given:**

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

PP – Picture plane

HL – Horizon line

GL – Ground line

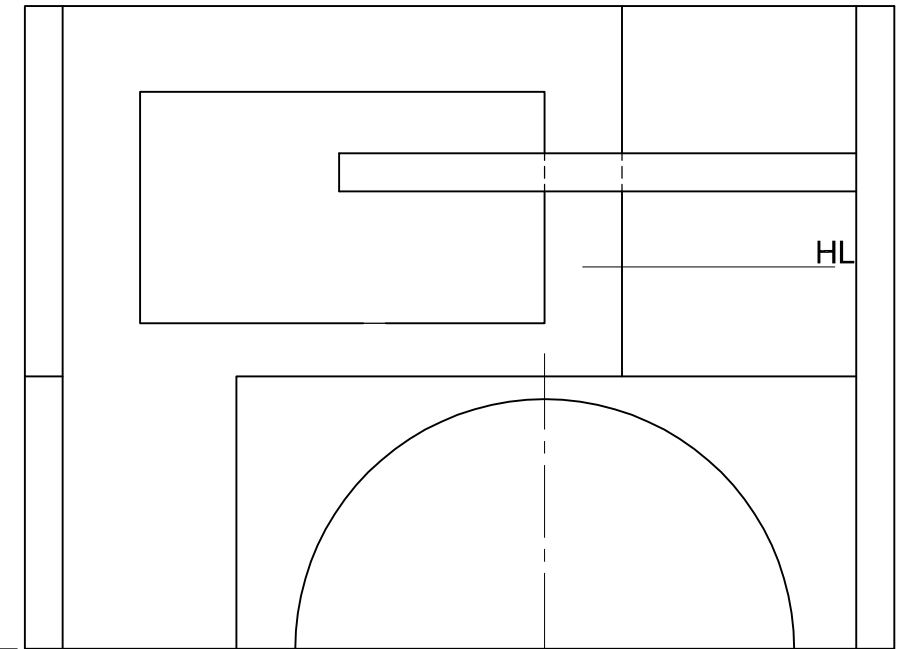
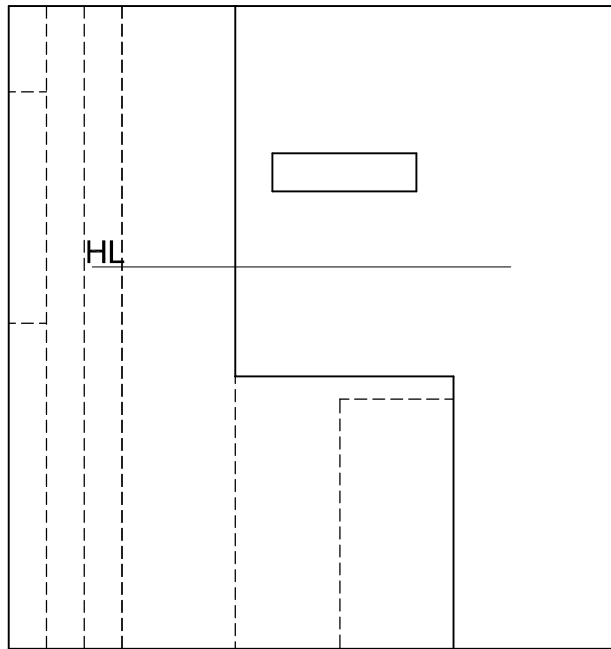
SP – Station point

**Instructions:**

Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL construction.
- NO hidden detail is required. **[40]**

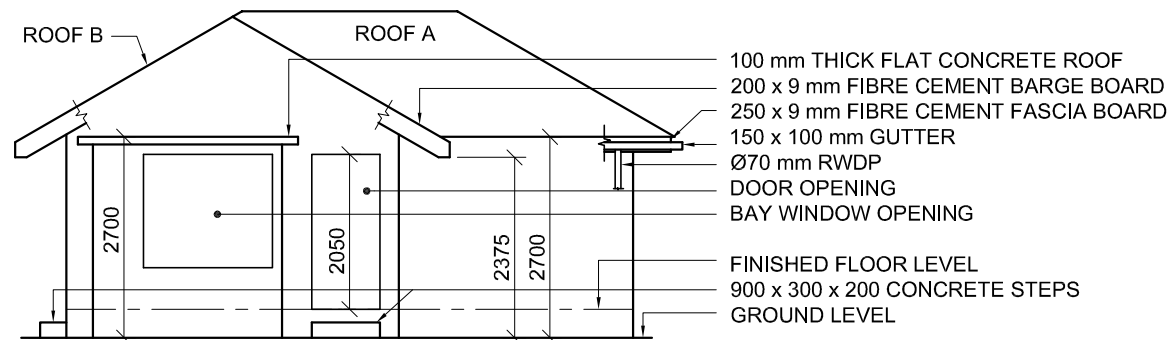
PP



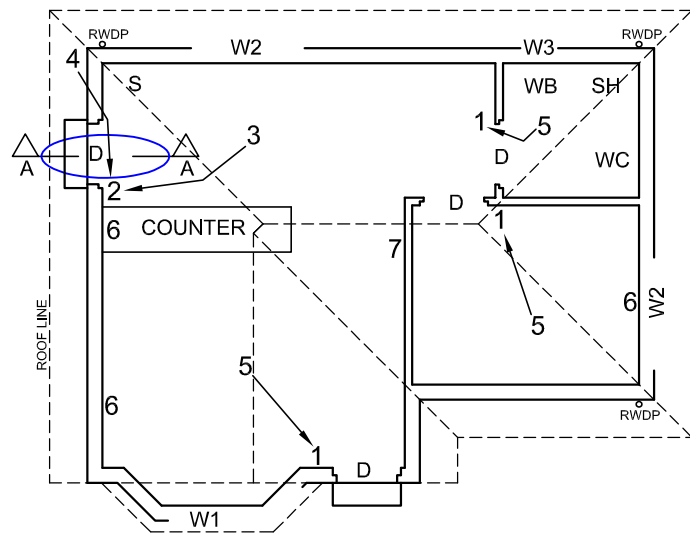
ASSESSMENT CRITERIA			
1	CONSTRUCTION	6	
2	WALLS AND WINDOW	17½	
3	SERVING AREA	11	
4	SEMICIRCLE	5½	
PENALTIES (-)			
<b>TOTAL</b>		<b>40</b>	

EXAMINATION NUMBER	
EXAMINATION NUMBER	4





INCOMPLETE WEST ELEVATION



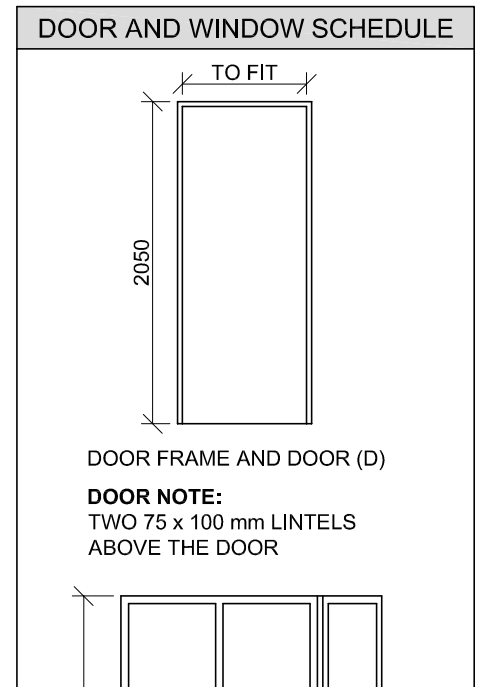
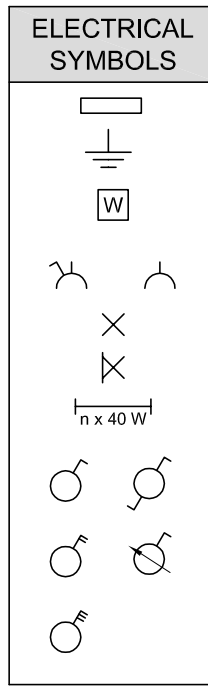
INCOMPLETE FLOOR PLAN

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

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



**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
- A schematic diagram of a roof truss and roof notes
- Room designations and floor finishes
- The incomplete foundation and external wall detail
- A table of roof components
- A table of electrical symbols
- A door and window schedule
- A table of fixtures
- The incomplete floor plan of the **new house**, drawn to scale 1 : 50, and the incomplete foundation of 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 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, door and window detail
- The roof detail, including the barge boards, fascia boards, gutters 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 foundation and external wall detail
- The door detail
- The roof detail, including the fascia board and gutter
- The sink
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

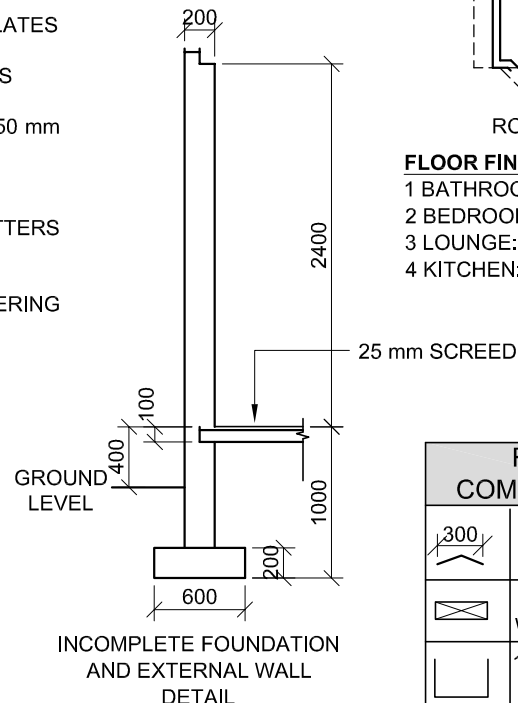
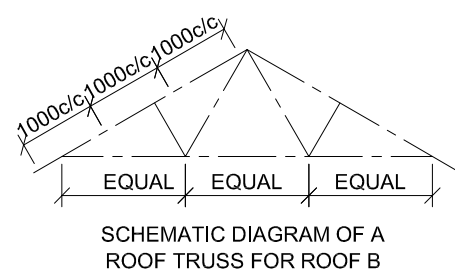
**Label the following:**

- 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:**

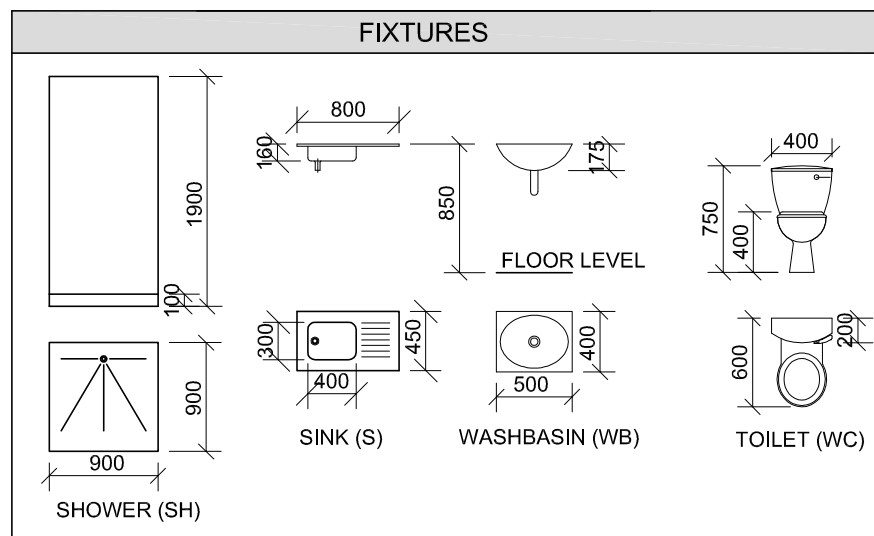
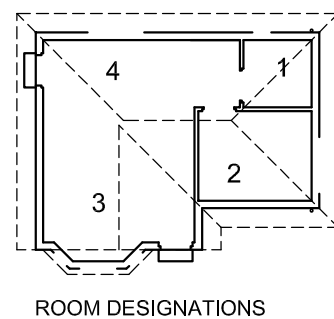
ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the **SANS 10143**. [95]

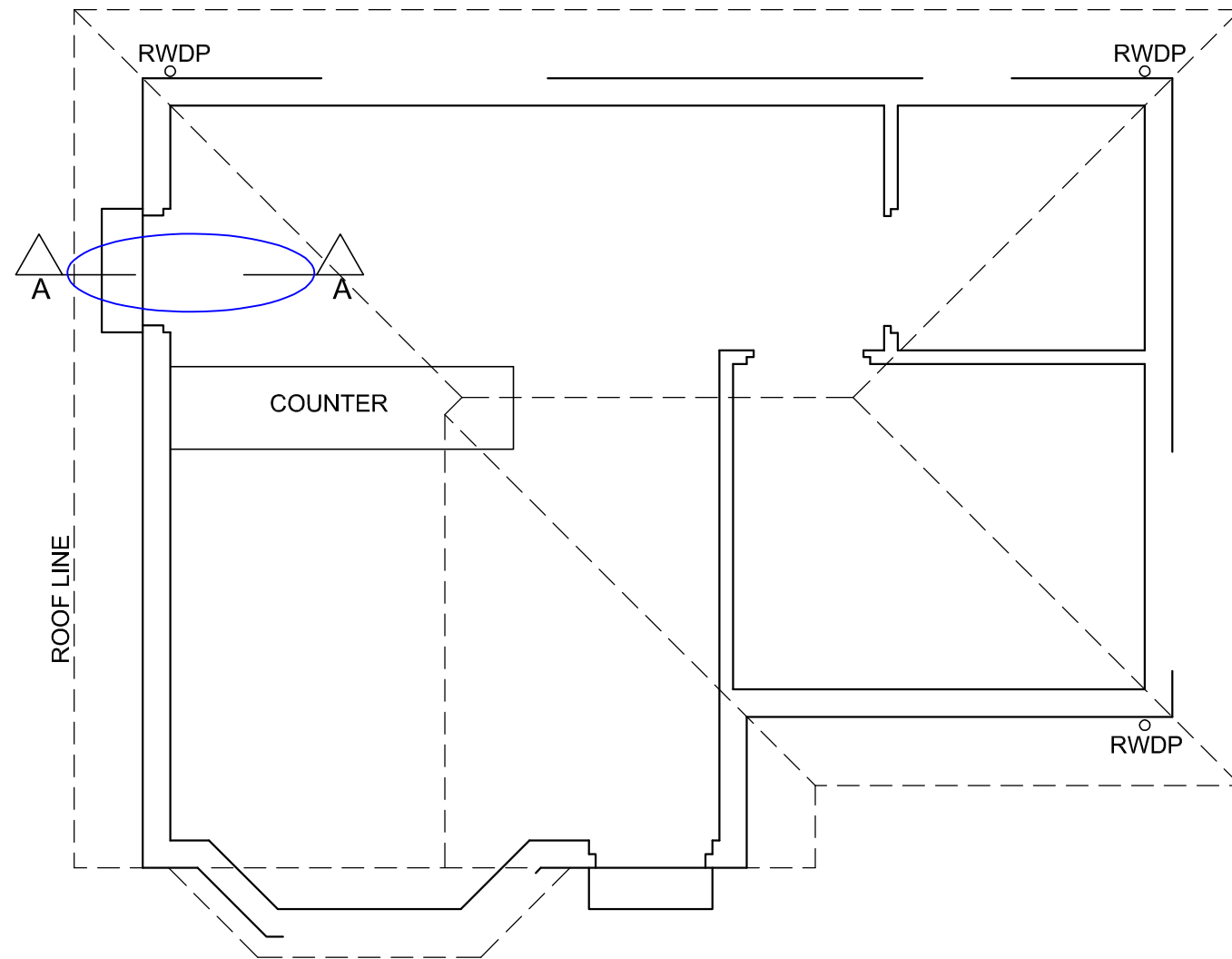
**ROOF NOTES:**  
 30° ROOF PITCH  
 114 x 38 mm ROOF TRUSS ON 114 x 38 mm WALL PLATES  
 500 mm ROOF OVERHANG TO END OF ROOF TRUSS  
 10 mm FIBRE CEMENT ROOF SHEETING ON 75 x 50 mm PURLINS @ 1000 mm c/c  
 200 x 9 mm BARGE BOARD ON GABLE ENDS  
 250 x 9 mm FASCIA BOARD WITH 150 x 100 mm GUTTERS ON ALL SIDES  
 9 mm CEILING BOARD ON 38 x 38 mm BRANDING STRIPS @ 400 mm c/c



**FLOOR FINISHES**  
 1 BATHROOM: TILE  
 2 BEDROOM: CARPET  
 3 LOUNGE: CARPET  
 4 KITCHEN: TILE

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





DETAILED SECTION A-A  
SCALE 1 : 20

FLOOR PLAN  
SCALE 1 : 50

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

MARK ALLOCATION FOR ROOF SECTION										
A	B	C	D	E	F	G	H	I	J	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	13½			
2	ELECTRICAL	9½			
3	FIXTURES	8½			
4	HATCHING	3			
5	LABELS	4			
<b>SUBTOTAL</b>		<b>38½</b>			
WEST ELEVATION					
1	ROOF + RWDP	12			
2	WALLS + FFL	6½			
3	DOOR + WINDOW	8			
4	LABELS	1½			
<b>SUBTOTAL</b>		<b>28</b>			
DETAILED SECTION					
1	ROOF DETAIL	11			
2	FOUNDATION + WALL + DOOR	9			
3	SINK	3			
4	HATCHING	4½			
5	LABELS	1			
<b>SUBTOTAL</b>		<b>28½</b>			
<b>TOTAL</b>		<b>95</b>			
PENALTIES (-)					
<b>GRAND TOTAL</b>					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
6					

