



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

ENGINEERING GRAPHICS AND DESIGN P1

2023

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

STAPLE

LAND SURVEYOR'S CERTIFICATE OF THE CORNER HEIGHTS AND BOUNDARY LENGTHS OF STAND 1314

CORNER HEIGHTS AND CONTOUR LINES IN METRES		BOUNDARY LENGTHS IN MILLIMETRES	
A	82,3	AB	59700
B	77	BC	33000
C	77	CD	22000
D	78,5	DG	50500
E	77,2	DE	33400
F	80,4	EF	36600
G	80,5	FG	30400
		GA	53000

SYMBOL LEGEND:

1. INDIGENOUS TREES

2. PALM TREES

3. 2500 LITRE WATER TANK ON BASE

4. 25 kVA POWER GENERATOR

5. 1,9 m PALISADE 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 provided below, draw, in neat freehand, the SANS 10143 graphical symbol for:

20.1 A GREASE TRAP

20.2 An ELECTRICAL EARTH

20.1 GREASE TRAP

20.2 ELECTRICAL EARTH

REVISION

DATE

DESCRIPTION

1

2022/05/16

50 mm ASPHALT FOR DROP-OFF ZONE

MDR ARCHITECTS

14 LILLY RD

STONE HILL

EAST LONDON

3411

www.mdr-arch.co.za

018 385 7123

PRINTED BY:

EXPRESS PRINTERS

DATE OF PRINT:

03/07/2022

DRAWING TITLE:

SITE PLAN

PROJECT:

PROPOSED NEW COMPUTER CENTRE ON STAND 1314, 7 IMPALA RD, BEACONHURST, EAST LONDON

PROJECT NUMBER:

84-0213

DRAWING NUMBER:

1402-01

DATE:

17/03/2022

DRAWN:

DIANNE

CHECKED:

CAMERON

REFERENCE CODE:

MDR-1143/J

SCALE:

1 : 900

QUESTION 1: ANALYTICAL (CIVIL)

Given:

The site plan of an existing school with a proposed new computer centre, 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.

QUESTIONS

ANSWERS

1	What is the project number?	1		
2	Name the company that printed the site plan.	1		
3	What type of fencing surrounds STAND 1314?	1		
4	In which suburb is the architectural firm situated?	1		
5	What scale is indicated for the drawing?	1		
6	What is the proposed new extention on STAND 1314?	1		
7	How many parking bays are reserved for people with disabilities?	1		
8	What is the surface finish for the drop-off zone?	1		
9	What does the abbreviation <i>IE</i> at 1 stand for?	1		
10	Name the feature at 2.	1		
11	Name the feature at 3.	1		
12	Which elevation of the proposed new computer centre faces the parking area?	1		
13	What is the total amount of water that can be stored in all the water tanks shown on STAND 1314?	2		
14	What is significant about the contour line at 75 m?	2		
15	What does the abbreviation <i>WC</i> for a toilet stand for?	1		
16	In what colour must new glass be indicated on sectional elevations?	1		
17	What is the distance between the new computer centre and Impala Road in metres?	2		
18	In the space below (ANSWER 18), determine the total length of the fencing around the drop-off zone in metres.	3		
19	In the space below (ANSWER 19), determine the total area of the brick paving in square metres.	3		
20	In the space in the title panel (ANSWER 20), draw, in neat freehand, the SANS 10143 graphical symbol for: 20.1 a GREASE TRAP, and 20.2 an ELECTRICAL EARTH.	4		
TOTAL		30		

ANSWER 18

Show ALL calculations.

ANSWER 19

Show ALL calculations.

21000

11000

18000

25000

7000

29000

32000

BRICK PAVING

EXAMINATION NUMBER

EXAMINATION NUMBER

2

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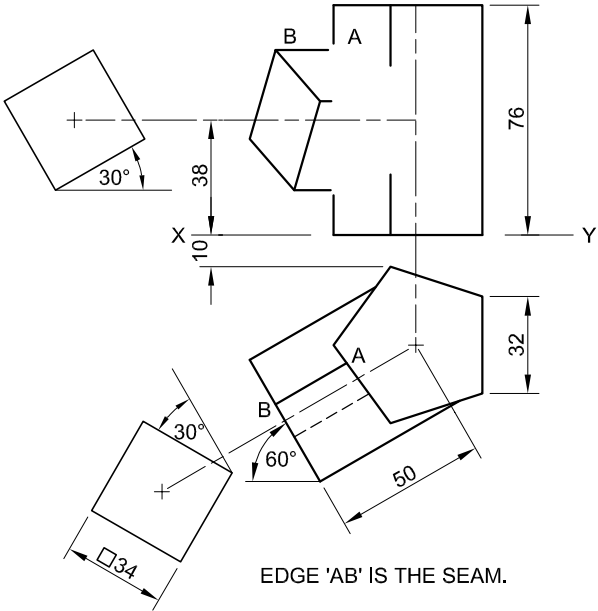
QUESTION 2: INTERPENETRATION AND DEVELOPMENT

- Given:**
- The top view and incomplete front view of a right square prism that has been shaped to fit around a right regular pentagonal prism. The axes of both solids lie in a common vertical plane.
 - Auxiliary views of the square prism

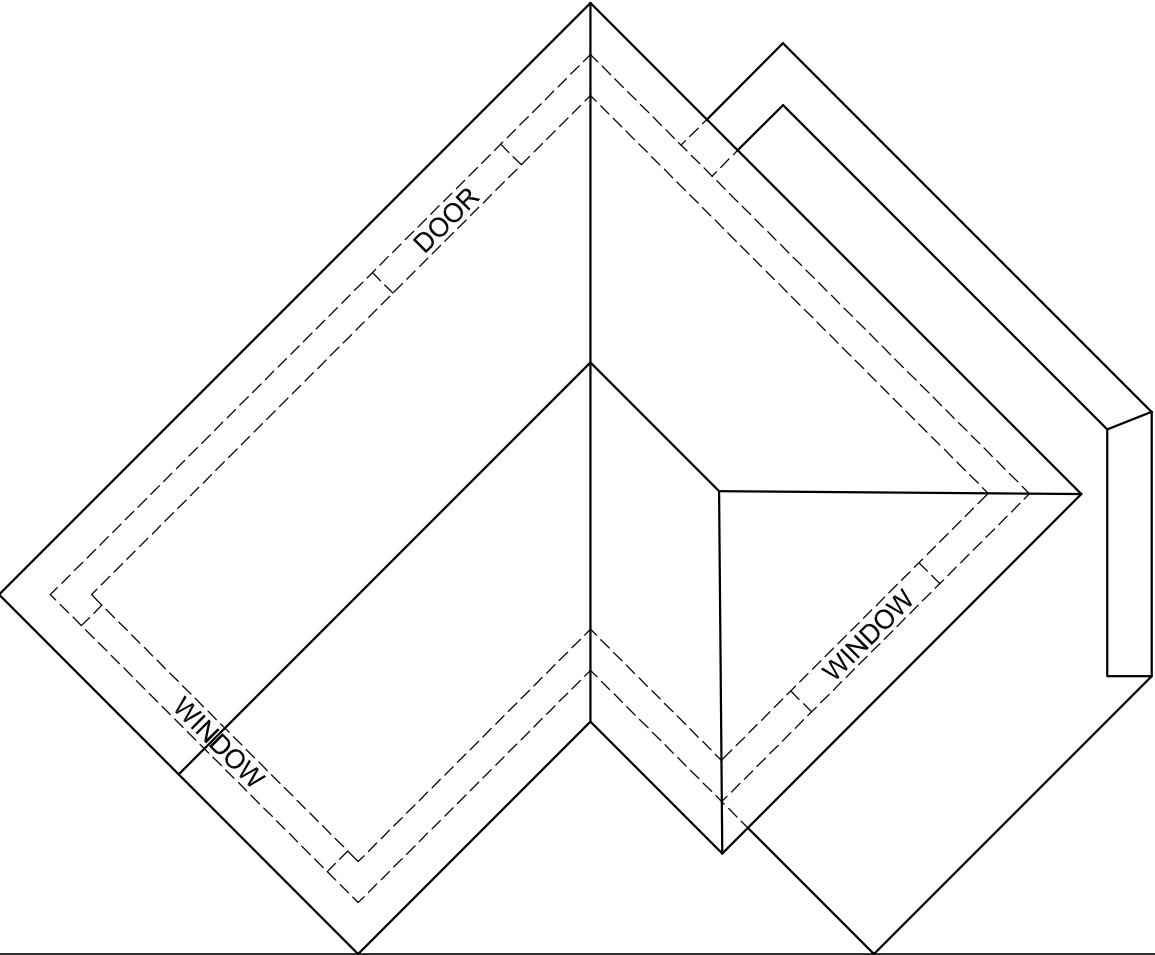
- Instructions:**
- Draw, to scale 1 : 1, the following views of the TWO solids:
- 2.1 The given top view
 - 2.2 The complete front view, clearly showing the curve of interpenetration
 - 2.3 The complete left view, clearly showing the curve of interpenetration
 - 2.4 The development of the surface of the square prism. Make edge 'AB' the seam.

- Planning is essential.
- Show ALL hidden detail.
- Show folding lines on the development.
- Show ALL construction.

[38]



ASSESSMENT CRITERIA					
1	TOP VIEW	6 ¹ / ₂			
2	FRONT VIEW	11 ¹ / ₂			
3	LEFT VIEW	12 ¹ / ₂			
4	DEVELOPMENT	7 ¹ / ₂			
PENALTIES (-)					
TOTAL		38			
EXAMINATION NUMBER					
EXAMINATION NUMBER					3



QUESTION 3: PERSPECTIVE

Given:
Three views of a house 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 the depth at the windows.
 - No hidden detail or internal detail is required.
- [40]

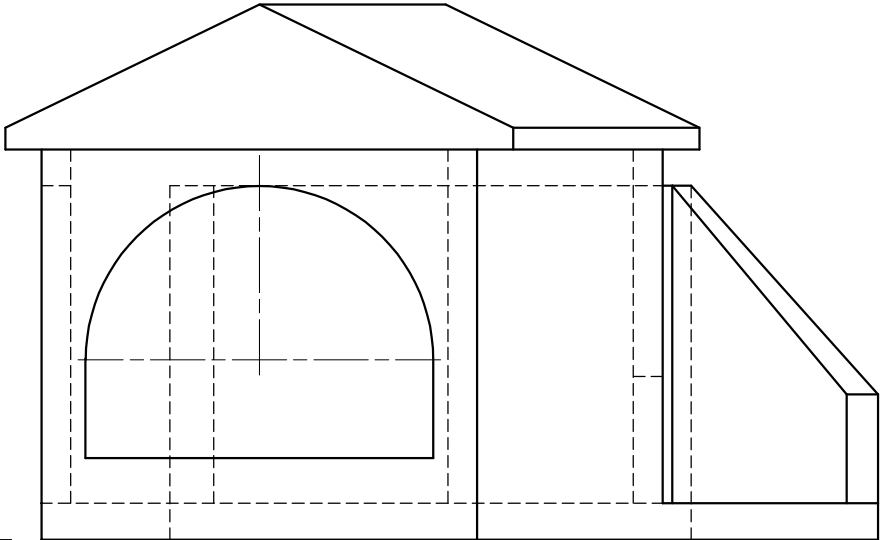
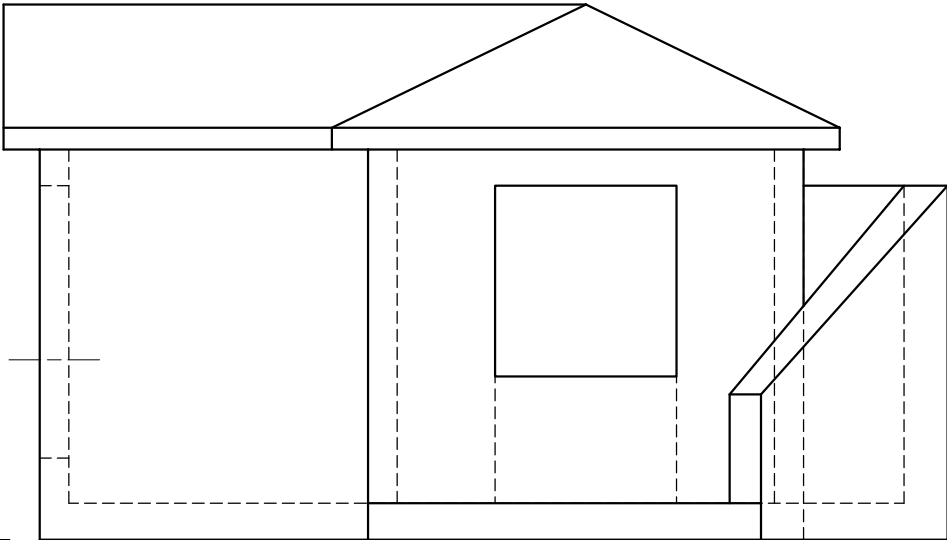
ASSESSMENT CRITERIA					
1	CONSTRUCTION	6			
2	STOEP + WALLS	12 ¹ / ₂			
3	ARCH + CONSTR	8 ¹ / ₂			
4	WINDOW	3 ¹ / ₂			
5	ROOF	9 ¹ / ₂			
PENALTIES (-)					
TOTAL		40			

PP

HL

GL

HL



SP

EXAMINATION NUMBER	
EXAMINATION NUMBER	4

WINDOW OPENING
ROOF CAP
RIDGE COVER
150 x 100 mm GUTTER ON 200 x 20 mm FASCIA BOARD
Ø100 mm RWDP THAT STOPS 50 mm ABOVE THE GULLEY
FINISHED FLOOR LEVEL
150 mm HIGH STEP
GROUND LEVEL
300 mm HIGH PORCH
CONCRETE KITCHEN STEPS

INCOMPLETE SOUTH ELEVATION

BEDROOM
BATHROOM
KITCHEN
LIVING AREA
PORCH

ROOM AND AREA DESIGNATIONS

FLOOR FINISHES
BEDROOM: CARPET
BATHROOM: TILES
LIVING AREA: WOOD
KITCHEN: TILES
PORCH: WOOD

ROOF COMPONENTS	
	150 x 100 mm GUTTER
	200 x 20 mm FASCIA BOARD AND BARGE BOARD
	ROOF CAP

1000
150
30°
1250
150
250
750
550
GL

KITCHEN STEP DETAIL

ELECTRICAL SYMBOLS	

DOOR AND WINDOW SCHEDULE		
TO FIT 2050 100 SLIDING DOOR (D1)	TO FIT 2050 DOOR FRAME AND DOOR (D2)	1100 900 550 WINDOW (W1)
2000 1500 600 WINDOW (W2)		600 600 WINDOW (W3)

WINDOW NOTES:

- A = OPENING SIDE
- B = FIXED PANEL
- ALL FRAMES = 50 mm
- 150 x 20 mm SILL TILES UNDER ALL WINDOWS

W2
W2
W3
W3
SH
WB
D2
D2
D1
S
W1

INCOMPLETE FLOOR PLAN

FEATURES
D1 SLIDING DOOR
D2 DOOR
W1 WINDOW
W2 WINDOW
W3 WINDOW

FIXTURES
WC TOILET
SH SHOWER
WB WASH BASIN
S SINK

ELECTRICAL FITTINGS
1. ONE-WAY SWITCH - SINGLE POLE
2. THREE-WAY SWITCH - SINGLE POLE
3. FLUORESCENT LIGHT 2 x 40 W
4. CEILING LIGHT
5. WALL-MOUNTED LIGHT
6. SWITCHED SOCKET OUTLET

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

900 c/c
900 c/c
400 c/c
400 c/c
400 c/c
400 c/c

SCHEMATIC DIAGRAM OF A ROOF TRUSS AT E-E

ROOF NOTES:
20° ROOF PITCH
114 x 40 mm ROOF TRUSSES ON 114 x 40 mm WALL PLATES
250 mm ROOF OVERHANG TO END OF ROOF TRUSSES
20 mm FIBRE CEMENT ROOF SHEETING ON 80 x 50 mm PURLINS @ 900 c/c
200 x 20 mm FASCIA BOARDS WITH 150 x 100 mm GUTTERS ON ALL SIDES
10 mm CEILING BOARDS ON 40 x 40 mm BRANDING STRIPS @ 400 mm c/c

200 x 80 mm LINTELS ABOVE ALL DOOR AND WINDOW OPENINGS
200
2050
950
500
350
GROUND LINE
2900

INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL

FIXTURES			
800 150 400 FLOOR LEVEL 500 300 100 1200 SINK (S)	1000 100 1000 SHOWER (SH)	800 250 300 500 WASH BASIN (WB)	800 400 650 400 200 TOILET (WC)

QUESTION 4: CIVIL DRAWING

Given:

- The incomplete south elevation of a **new house**, showing the walls, the sliding door and window openings, steps, porch, the roof and labels
- The incomplete floor plan showing the roof lines, walls, steps, positions of doors, windows and fixtures, as well as electrical layout
- Schematic diagram of a roof truss at E-E and roof notes
- The incomplete foundation and external wall detail
- Room designations and floor finishes
- A table of roof components
- Kitchen step detail
- 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 and a breakline 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 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 the numbers
- ALL hatching detail

4.1.2 **THE COMPLETE SOUTH ELEVATION**
Show the following features on the drawing:

- The outside walls, steps, porch, sliding door and window detail
- The roof detail, including the fascia boards, gutters and rainwater down-pipe
- The finished floor level

4.2 Using the incomplete foundation and break line on page 6, draw, to scale 1 : 20, a **DETAILED SECTION** on cutting plane E-E of the area in the ellipse shown on the incomplete floor plan.

Show the following features on the drawing:

- The complete foundation, kitchen step, external wall and door detail
- The roof detail, including the fascia board and gutter
- The kitchen step wall, window frame and fascia board below (south of) cutting plane E-E
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:

- The floor finishes
- Ground 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*.
- NO hidden detail is required.

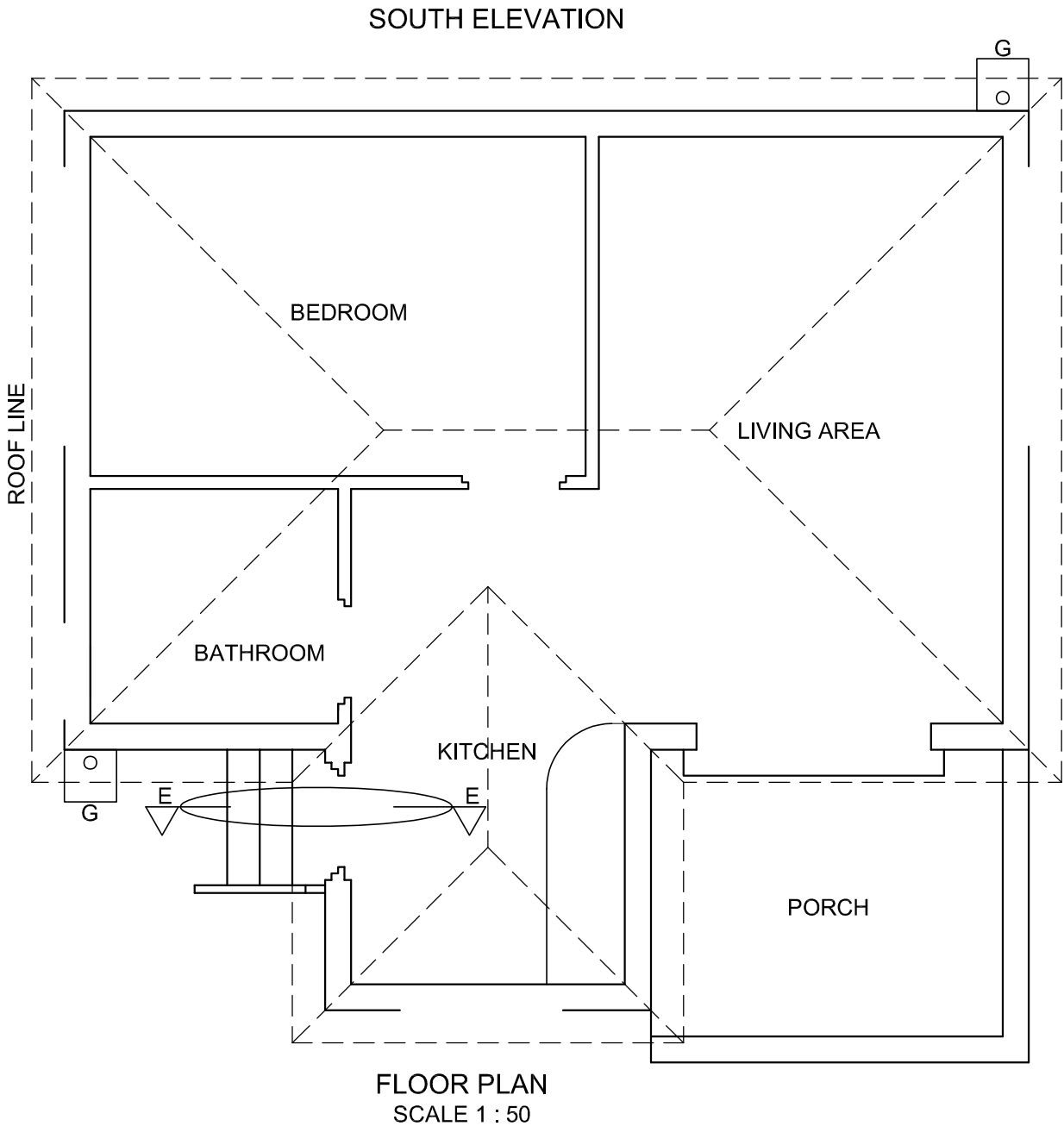
[92]

5

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SECTION ON E-E
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	13			
2	FIXTURES	8			
3	ELECTRICAL	9			
4	HATCHING	3			
5	LABELS	2 ¹ / ₂			
SUBTOTAL		35 ¹ / ₂			
SOUTH ELEVATION					
1	ROOF + RWDP + GULLEY	12			
2	WALLS + FFL	7			
3	DOOR + WINDOW	7			
4	LABELS	1			
SUBTOTAL		27			
DETAILED SECTION					
1	ROOF DETAIL	11 ¹ / ₂			
2	SLAB + WALL + STEP	9			
3	HATCHING	5 ¹ / ₂			
4	WINDOW + DOOR	2 ¹ / ₂			
5	LABELS	1			
SUBTOTAL		29 ¹ / ₂			
TOTAL		92			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6