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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

ENGINEERING GRAPHICS AND DESIGN P1

2022

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label

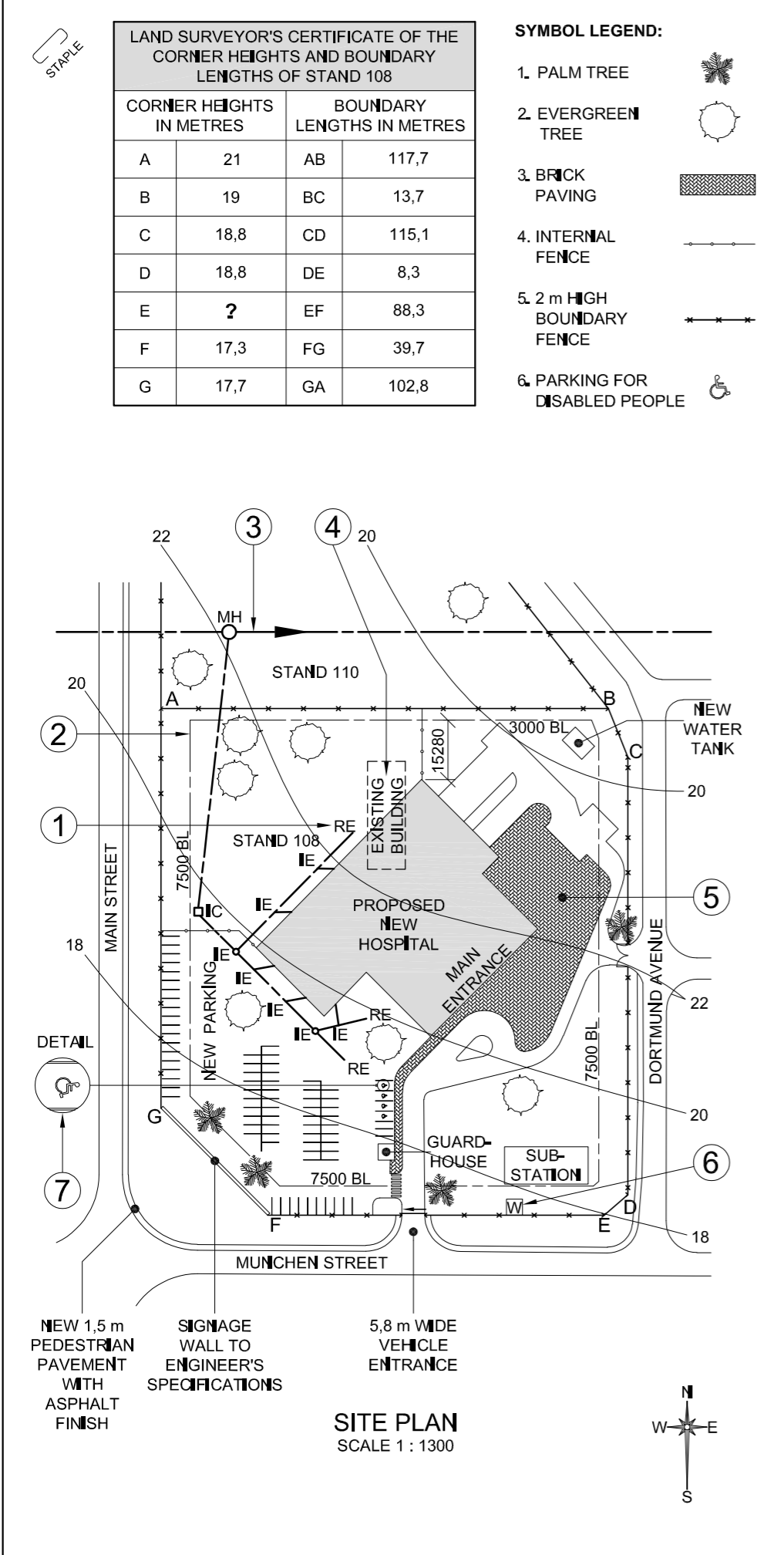
INSTRUCTIONS AND INFORMATION

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			$\frac{1}{2}$	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



QUESTION 1: ANALYTICAL (CIVIL)

Given:

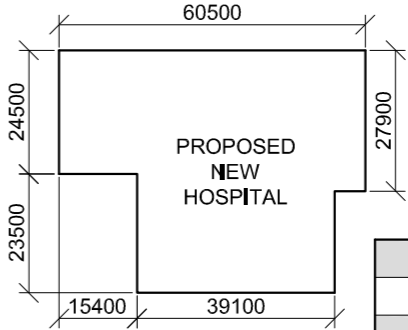
The site plan of a proposed new hospital, a title panel and a table of questions. The drawing has not been presented to the indicated scale.

Instructions:

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

QUESTIONS		ANSWERS		
1	What is the reference code of the drawing?		1	
2	What scale is indicated for the site plan?		1	
3	With reference to the title panel, what does CR 20200401 – 7 refer to?		1	
4	What architectural firm was responsible for the design of the new hospital?		1	
5	What does the arrow on the sliding gate into Munchen Street indicate?		1	
6	What does the abbreviation RE at 1 stand for?		1	
7	What is the height of the boundary fence in millimetres?		1	
8	Name the feature at 2.		1	
9	Name the feature at 3.		1	
10	What must happen to the existing building at 4?		1	
11	What finish is required at 5?		1	
12	Name the feature at 6.		1	
13	What does the symbol at 7 indicate?		1	
14	What is the shortest distance from the proposed new hospital building to boundary line AB in metres?		2	
15	What colour is used to represent new wood on sectional elevations and floor plans?		1	
16	What is the height of corner E in metres?		2	
17	Which elevation of the proposed new hospital entrance faces Dortmund Avenue?		2	
18	In the space below (ANSWER 18), determine the perimeter of STAND 108 in metres.		3	
19	In the space below (ANSWER 19), determine the total area of the proposed new hospital building in square metres.		3	
20	In the space provided in the title panel (ANSWER 20), draw, in neat freehand, the SANS 10143 graphical symbol for a: (20.1) NORTH POINT and (20.2) TWO-WAY SWITCH.		4	
TOTAL		30		

ANSWER 18
Show ALL calculations.



ANSWER 19
Show ALL calculations.

EXAMINATION NUMBER

EXAMINATION NUMBER

2

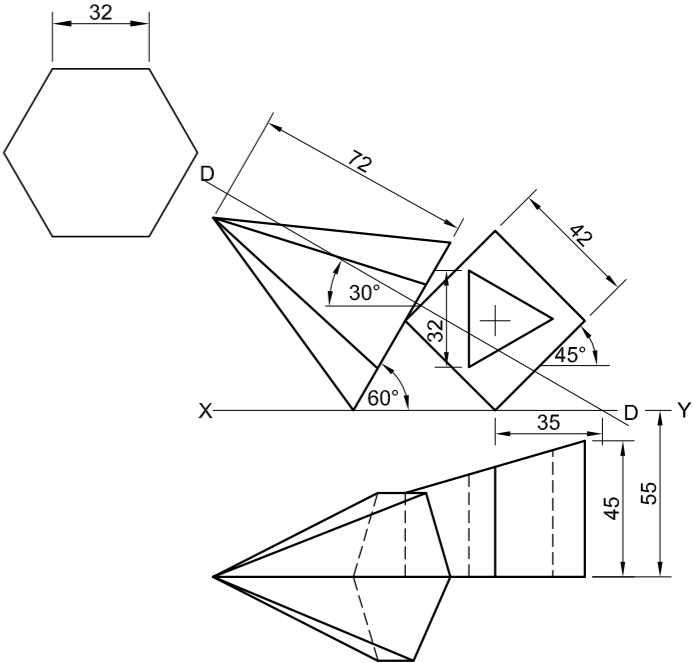


QUESTION 2: SOLID GEOMETRY

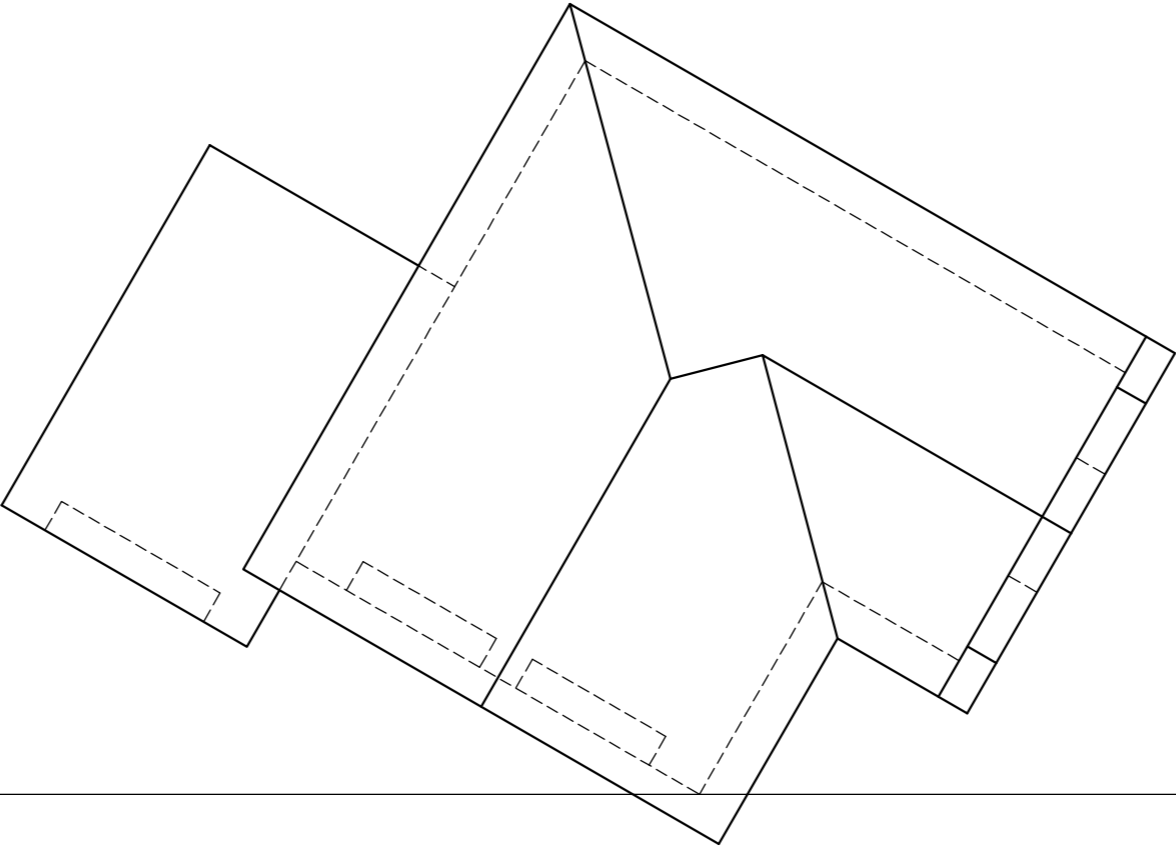
- Given:**
- The front view and the top view of a right regular hexagonal pyramid resting with its base on an edge of a truncated right square prism. The prism is centrally pierced by a right equilateral triangular prismatic hole.
 - An auxiliary view of the base of the hexagonal pyramid
 - Both solids are cut by cutting plane D-D

- Instructions:**
- Draw, to scale 1 : 1, the following views of both solids:
- 2.1 The given front view
 - 2.2 A sectional top view on cutting plane D-D
 - 2.3 The left view
 - 2.4 The true shape of the cut surface of the truncated prism

- Planning is essential.
 - Show ALL hidden detail.
 - Show ALL construction.
- [40]



ASSESSMENT CRITERIA					
1	FRONT VIEW	7 1/2			
2	SECTIONAL TOP VIEW	14			
3	LEFT VIEW	12 1/2			
4	TRUE SHAPE	6			
PENALTIES (-)					
TOTAL		40			
EXAMINATION NUMBER					
EXAMINATION NUMBER					3



PP

HL

GL

SP

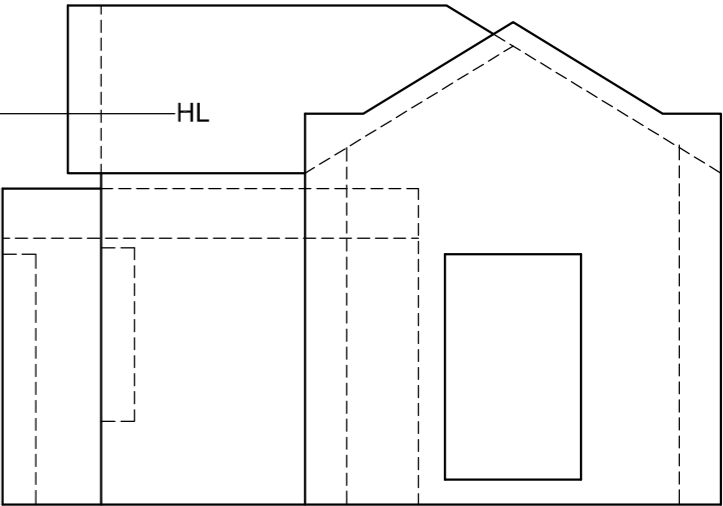
QUESTION 3: PERSPECTIVE

Given:
Three views of a 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 construction.
 - Show depth at the doors and windows.
 - NO hidden detail or interior detail is required.

[38]

ASSESSMENT CRITERIA					
1	CONSTRUCTION	6			
2	WALLS	11 ½			
3	ROOF	5			
4	WINDOWS	10			
5	GARAGE	5 ½			
PENALTIES (-)					
TOTAL		38			



EXAMINATION NUMBER

EXAMINATION NUMBER

4

ROOF CAP
RIDGE COVER
250 x 75 mm BARGE BOARD
150 x 100 mm GUTTER ON
250 x 20 mm FASCIA BOARD WITH Ø100 mm RWDP THAT STOPS 50 mm ABOVE GROUND LEVEL
WINDOW OPENING
FINISHED FLOOR LEVEL
GROUND LEVEL
SLIDING DOOR OPENING

INCOMPLETE SOUTH-WEST ELEVATION

INCOMPLETE FLOOR PLAN

SCHEMATIC DIAGRAM OF A SECTION OF THE ROOF TRUSS AT CUTTING PLANE A-A

ROOF NOTES:
20° ROOF PITCH
114 x 40 mm ROOF TRUSSES ON 114 x 40 mm WALL PLATES
300 mm ROOF OVERHANG TO END OF ROOF TRUSS
30 mm CORRUGATED ROOF SHEET ON 75 x 50 mm PURLINS @ 1080 mm c/c
250 x 75 mm FIBRE CEMENT BARGE BOARDS ON GABLE ENDS
BARGE BOARDS END FLUSH WITH OUTSIDE EDGE OF GUTTERS
250 x 20 mm FASCIA BOARDS WITH 150 x 100 mm GUTTERS ON ALL SIDES
10 mm CEILING BOARD ON 40 x 40 mm BRANDING STRIPS @ 450 mm c/c

INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL

BUILT-IN CUPBOARD DETAIL

ROOM DESIGNATIONS

FLOOR FINISHES
1. KITCHEN: TILES
2. BATHROOM: TILES
3. BEDROOM: CARPET
4. LIVING AREA: VINYL

RAINWATER ITEMS

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

FIXTURES
WC TOILET
WB WASH BASIN
SH SHOWER
S SINK
BIC BUILT-IN CUPBOARD

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

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

DOOR AND WINDOW SCHEDULE

TO FIT	TO FIT	TO FIT
SLIDING DOOR (D1)	DOOR FRAME AND DOOR (D2)	WINDOW (W1)

WINDOW NOTES:
• A = OPENING SIDE
• B = FIXED PANEL
• ALL FRAMES = 50 mm
• 150 x 20 mm FIBRE CEMENT SILL UNDER ALL WINDOWS

WINDOW (W2)	WINDOW (W3)

ROOF COMPONENTS	
	250 x 20 mm FASCIA BOARD
	150 x 100 mm GUTTER
	75 x 50 mm PURLINS
	250 x 75 mm BARGE BOARD
	ROOF CAP AND RIDGE COVER

ELECTRICAL SYMBOLS	

FIXTURES	

QUESTION 4: CIVIL DRAWING

Given:

- The incomplete south-west elevation of a **new house**, showing the walls, the window opening, the sliding door opening, the roof and labels
- The incomplete floor plan showing the walls, roof line, positions of the doors, windows and fixtures, as well as the electrical layout
- A schematic diagram of a section of a roof truss at cutting plane A-A and roof notes
- The incomplete foundation and external wall detail
- The built-in cupboard detail
- Room designations and floor finishes
- A table of rainwater items
- A door and window schedule
- A table of roof components
- A table of electrical symbols
- A table of fixtures
- The incomplete floor plan and position of the ground level of the **new house**, drawn to scale 1 : 50 and the incomplete foundation and a 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 and ground level, draw 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 numbers
- ALL hatching detail

4.1.2 THE COMPLETE SOUTH-WEST ELEVATION

Show the following features on the drawing:

- The outside walls, steps, window and sliding door detail
- ALL the roof detail, including the fascia board, barge boards, gutters and rainwater downpipe
- The finished floor level

4.2 Using the given foundation and break line 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.

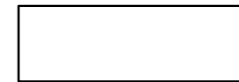
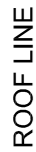
Show the following features on the drawing:

- The complete foundation, external wall and window detail
- The roof detail, including the fascia board, gutter and rainwater items
- The steps, roof, wall and built-in cupboard detail to the right of cutting plane A-A
- ALL hatching detail. **ONLY** the substructure may be hatched in neat freehand.

Label the following:

- The south-west elevation
- The floor finishes
- Ground level, finished floor 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**.



FLOOR PLAN
SCALE 1 : 50

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	11			
2	FIXTURES	9			
3	ELECTRICAL	9 $\frac{1}{2}$			
4	HATCHING	3			
5	LABELS	2			
SUBTOTAL		34 $\frac{1}{2}$			
SOUTH-WEST ELEVATION					
1	ROOF + RWDP	9 $\frac{1}{2}$			
2	WALLS + STEP + FFL	4 $\frac{1}{2}$			
3	DOOR + WINDOW	8 $\frac{1}{2}$			
4	LABELS	1			
SUBTOTAL		23 $\frac{1}{2}$			
DETAILED SECTION					
1	ROOF DETAIL	13			
2	SLAB + WALL + WINDOW + STEP	11 $\frac{1}{2}$			
3	HATCHING	5 $\frac{1}{2}$			
4	B/C	2 $\frac{1}{2}$			
5	LABELS	1 $\frac{1}{2}$			
SUBTOTAL		34			
TOTAL		92			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6