



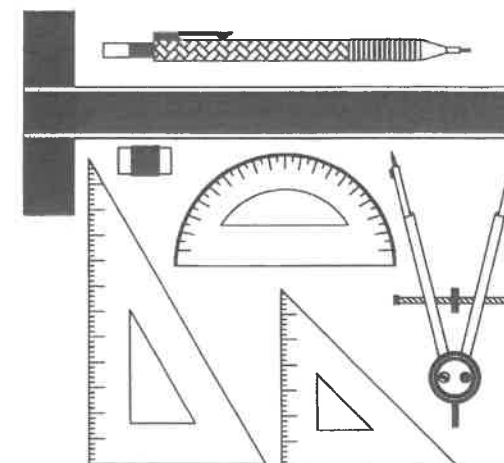
NATIONAL SENIOR CERTIFICATE EXAMINATION

2023

ENGINEERING GRAPHICS AND DESIGN

PAPER 1

MARKS: 200
TIME: 3 HOURS



FOR OFFICIAL USE ONLY

QUESTION	SECTION	MARK	MODERATED	MAXIMUM	CODE
1	CIVIL ANALYTICAL			20	
2	INTERPENETRATION & DEVELOPMENT			40	
3	TWO-POINT PERSPECTIVE			40	
4	CIVIL DRAWING			100	
TOTAL				200	

CHECKED BY

Please paste the barcode label here.

EXAMINATION NUMBER

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PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 6 pages including the cover page and 4 questions.
2. All questions must be answered.
3. Unless specified otherwise, all questions are in **First-angle Orthographic Projection**.
4. Unless specified otherwise, all questions are to be completed to a **scale of 1:1**.
5. All answer sheets must be re-stapled in numerical order, even questions that have not been answered.
6. All **construction work** must be shown.
7. Print your **examination number** neatly on each page.
8. Use only the **answer sheets** provided.
9. Your drawings should reflect **neatness** and **accuracy**.
10. All dimensions or detail not given must be **assumed** in **good proportion**.
11. Your drawings should comply with SANS 10143.

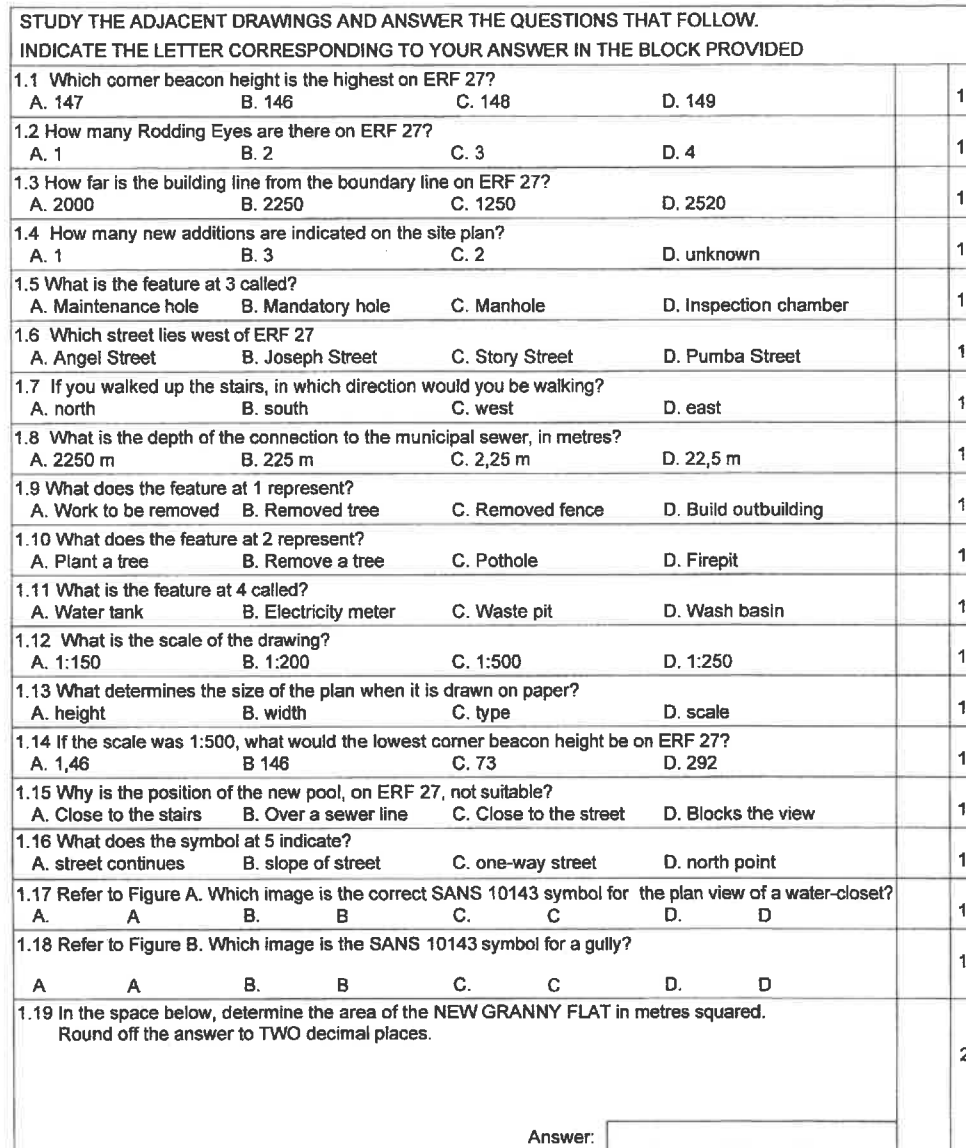
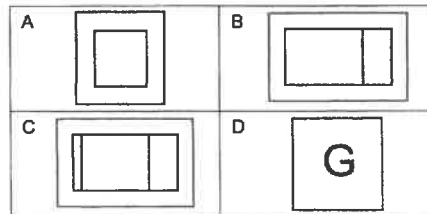


FIGURE B



Answer:

20 MARKS

EXAMINATION NUMBER

ANSWER SHEET 1

[illegible]

QUESTION 2
INTERPENETRATION
& DEVELOPMENT

- Given:
- The INCOMPLETE Front View, complete Top View and Right View of a right regular HEXAGONAL prism penetrated by a horizontal CYLINDRICAL pipe.
 - Auxiliary views of the cylinder.

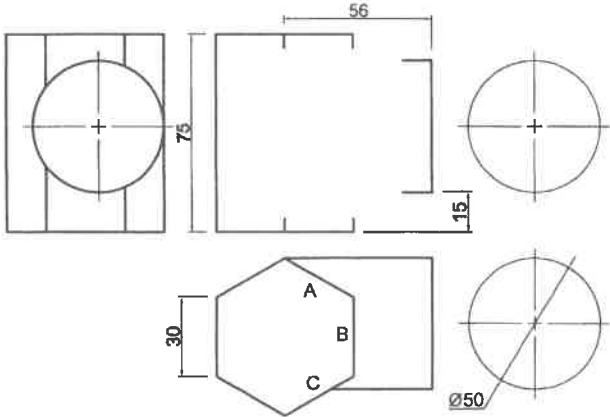
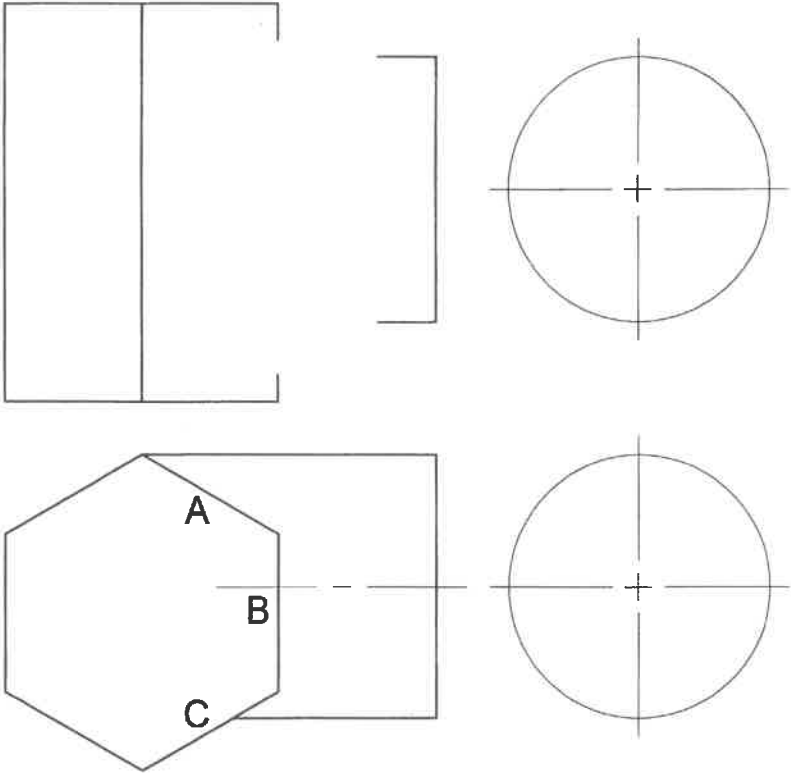
Draw the following:

- 2.1 the complete front view, clearly showing the curve of interpenetration.
- 2.2 the surface development of the 3 rectangular panels of the hexagonal prism which shows the hole. The rectangular panels have been indicated by A, B & C below.

Show the hidden detail.
Show all construction.
Do not draw the right view.

ASSESSMENT CRITERIA

You will be assessed on your ability to do the following:	
• draw the given	2
• complete the Front View	18
• show necessary construction	2
• draw the development	18



GIV	2
H/D	1
INT	14
SOL	3
CON	2
DEV	18

40 MARKS

EXAMINATION NUMBER

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ANSWER SHEET 2

QUESTION 3**TWO-POINT
PERSPECTIVE**

The figures show the three views of a partially covered verandah and fire pit area.

Draw a neat two-point perspective view of the verandah and fire pit area.

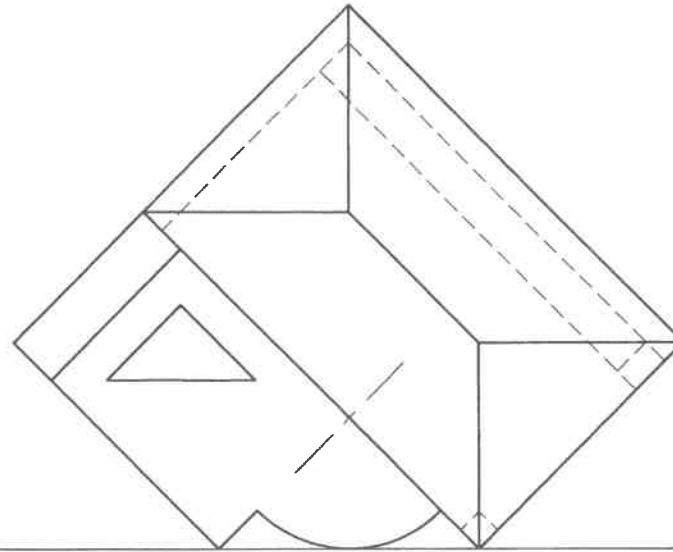
PP - Picture Plane
HL - Horizon Line
GL - Ground Line
SP - Station Point

Draw and label the vanishing points.
Show all necessary constructions.
NO HIDDEN DETAIL IS REQUIRED.

ASSESSMENT CRITERIA

You will be assessed on your ability to do the following:

- determine and label the vanishing points 2
- draw the two-point perspective view 38



PP

PP

HL

HL

GL

GL

SP+

PTS

40/2

PTS

4

Con

5

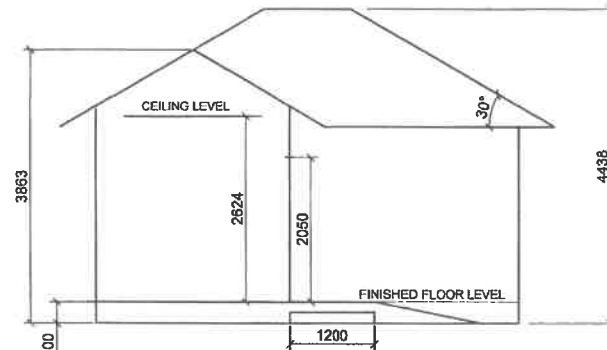
ARC

9

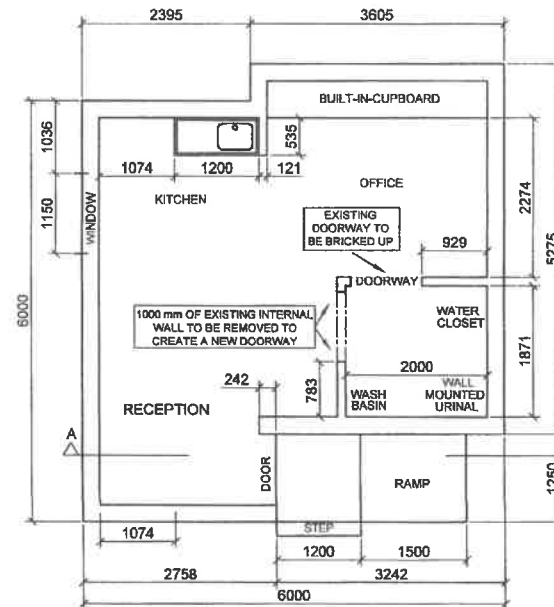
VPS

2

40 MARKS**EXAMINATION NUMBER****ANSWER SHEET 3**

CIVIL
DRAWING

SCHEMATIC SOUTH ELEVATION



SCHEMATIC FLOOR PLAN

Answer this question on ANSWER SHEET 4 (page 6).
All drawings must comply with SANS 10143.

- Roof detail
- Window detail
- Door frame detail
- Incomplete foundation detail
- An incomplete schematic south elevation with
 - ▶ roof heights, ground and floor levels
- An incomplete schematic floor plan of a tiled **HOME OFFICE** with
 - ▶ window and door positions
 - ▶ perimeter dimensions
 - ▶ the position of the fixtures

1) The **complete FLOOR PLAN**

FLOOR PLAN INSTRUCTIONS

- Draw the complete floor plan of the office
- The following alterations must be made to the office:
 - ▶ Remove and brick up the existing doorway
 - ▶ Remove part of the internal wall as indicated for a new doorway
- Draw and hatch all walls
- Insert all the window details
- Insert the external door details
- Draw the ramp and landing. Indicate the inclination of the ramp
- Draw the step and indicate the direction
- Insert the following electrical detail:
 - ▶ A two-tube, 40 watt fluorescent light in the kitchen
 - ▶ a single-pole, wall-mounted light switch for the fluorescent light, next to the external door
- Insert all the fixtures according to the correct SANS 10143 conventions, using appropriate measurements
- Draw the built-in cupboard
- Label the floor plan and indicate the scale
- Draw and label the cutting plane A-A

- Draw the complete SOUTH ELEVATION showing the section as per the indicated cutting plane and the remaining outside elevation
- Complete the foundation details
 - ▶ insert all floor slab and substructure details
 - ▶ use 190 mm compacted hardcore filling and 10 mm screed
- Label the ground level, damp-proof course and finished floor level
- Draw the section through the door opening
 - ▶ use ONE 242 x 75 mm concrete lintel above the door
- Roof details
 - ▶ draw the roof truss using 114 x 38 mm rafters and 100 x 75 mm truss plates
 - ▶ use FOUR 75 x 38 mm purlins spaced appropriately
 - ▶ use TWO 121 x 38 mm wall plates
 - ▶ use TWO 38 x 38 mm ceiling battens spaced appropriately
 - ▶ use metal sheet covering for the roof with a 30° pitch
 - ▶ use 9 mm gypsum ceiling boards
- Draw the step and ramp
- Show all hatching detail
- Label the SECTIONAL ELEVATION

100 MARKS

QUESTION 4

CIVIL
DRAWING

Assessment Criteria

Sectional Elevation

1	Ceiling Battens	2	
2	Wall Plates	2	
3	Ceiling Board	1	
4	Truss Plates	4	
5	Roof Truss	5	
6	Purlins	4	
7	Sectional Roof	1	
8	Sectioned Walls	4	
9	Sectioned Door	4	
10	Floor & Foundation	6	
11	DPC, NGL, FFL Labels	3	
12	Hatching	9	
13	External Walls	2	
14	Roof Detail	5	
15	Internal Detail	2	
16	Step and ramp	4	
17	Label	1	

Subtotal	59	
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Floor Plan

18	Walls	11	
19	Hatching	5	
20	Window	2	
21	Door	4	
22	Step	2	
23	Ramp	5	
24	Built-in-Cupboard	1	
25	Fixtures	4	
26	Electrical	3	
27	Labels	2	
28	Cutting Plane	2	

Subtotal	41	
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TOTAL	100	
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