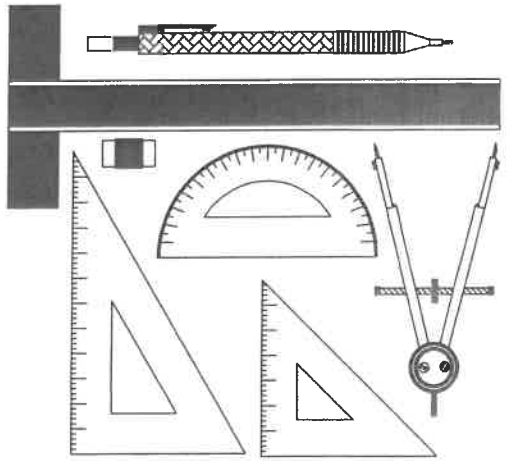


NATIONAL SENIOR CERTIFICATE EXAMINATION

2020

ENGINEERING GRAPHICS AND DESIGN

PAPER 1

MARKS: 200
TIME: 3 HOURS

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.

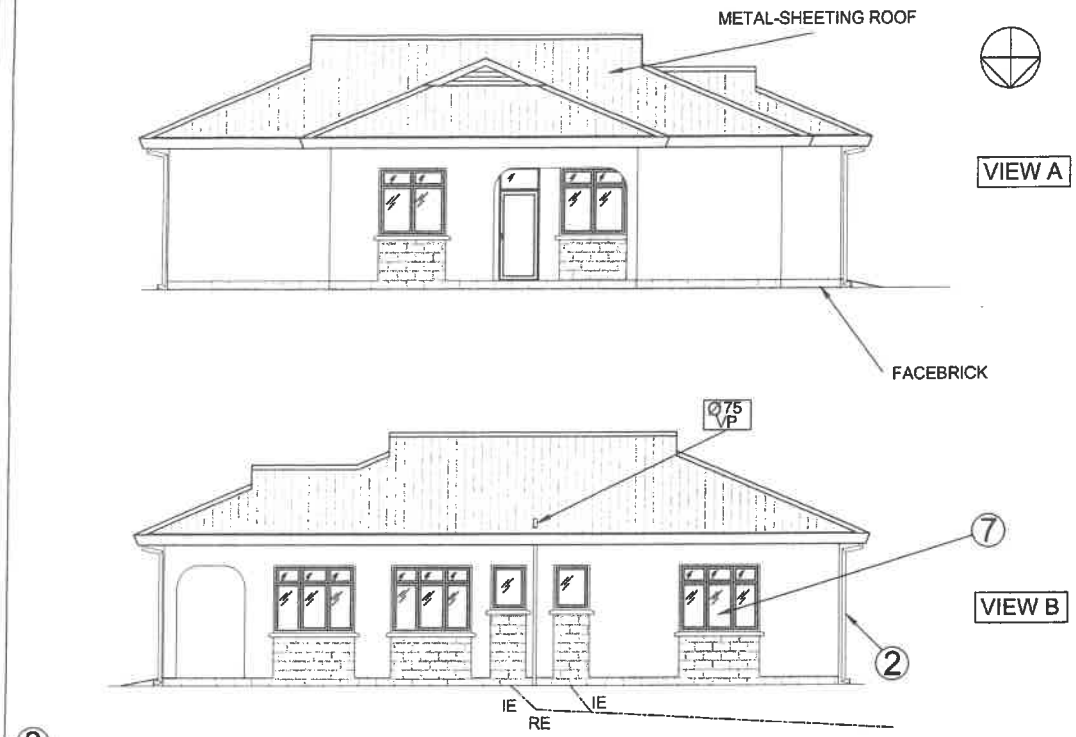
FOR OFFICIAL USE ONLY					
QUESTION	SECTION	MARK	MODERATED	MAXIMUM	CODE
1	CIVIL ANALYTICAL			20	
2	INTERPENETRATION & DEVELOPMENT			40	
3	TWO-POINT PERSPECTIVE			40	
4	CIVIL DRAWING			100	
	TOTAL			200	

CHECKED BY

EXAMINATION NUMBER

QUESTION 1

CIVIL ANALYTICAL



STUDY THE ADJACENT DRAWING AND ANSWER THE QUESTIONS THAT FOLLOW:		
1.1 What elevation is VIEW B?		1
1.2 What type of cover is used for the roof?		1
1.3 How many built-in cupboards are there in this dwelling?		1
1.4 How many panes of glass are used in a single ND74 window?		1
1.5 What is the diameter of the ventilation pipe?		1
1.6 What is the feature at 1 called?		1
1.7 What is the feature at 2 called? (No abbreviations)		1
1.8 What is the feature at 3 called?		1
1.9 What is the feature at 4 called?		1
1.10 What is indicated at feature 5?		1
1.11 What does the abbreviation 'RE' stand for?		1
1.12 What is the feature at 6 called? (No abbreviations)		1
1.13 How many windows would you see in the WEST elevation?		1
1.14 When walking UP the ramp, in which direction would you be moving?		1
1.15 What is the room designation of ROOM 8?		1
1.16 Using the dimension at 8, determine the scale of this drawing.		1
1.17 What should the dimension at X be? (In millimetres)		1
1.18 In which room would you be standing, if you were looking out of the window indicated at 7?		1
1.19 If the dimensions of VERANDAH 1 are 4000 x 12000, determine the area of VERANDAH 1. Give your answer in metres squared (m^2). Answer:		2

20 MARKS

EXAMINATION NUMBER

ANSWER SHEET 1

QUESTION 2

INTERPENETRATION & DEVELOPMENT

The drawings below show the COMPLETE Top and Left View as well as the INCOMPLETE Front View of a **CYLINDRICAL PIPE** which has been joined together with an **EQUILATERAL TRIANGULAR DUCT** and drawn in First-angle Orthographic Projection. An Auxiliary View of the triangular duct is also shown in the Top and Front Views.

Draw the following:

2.1 the complete Front View clearly showing the curve of interpenetration. **Show all hidden detail.**

2.2 the development of the triangular duct only, clearly showing the curve of interpenetration.

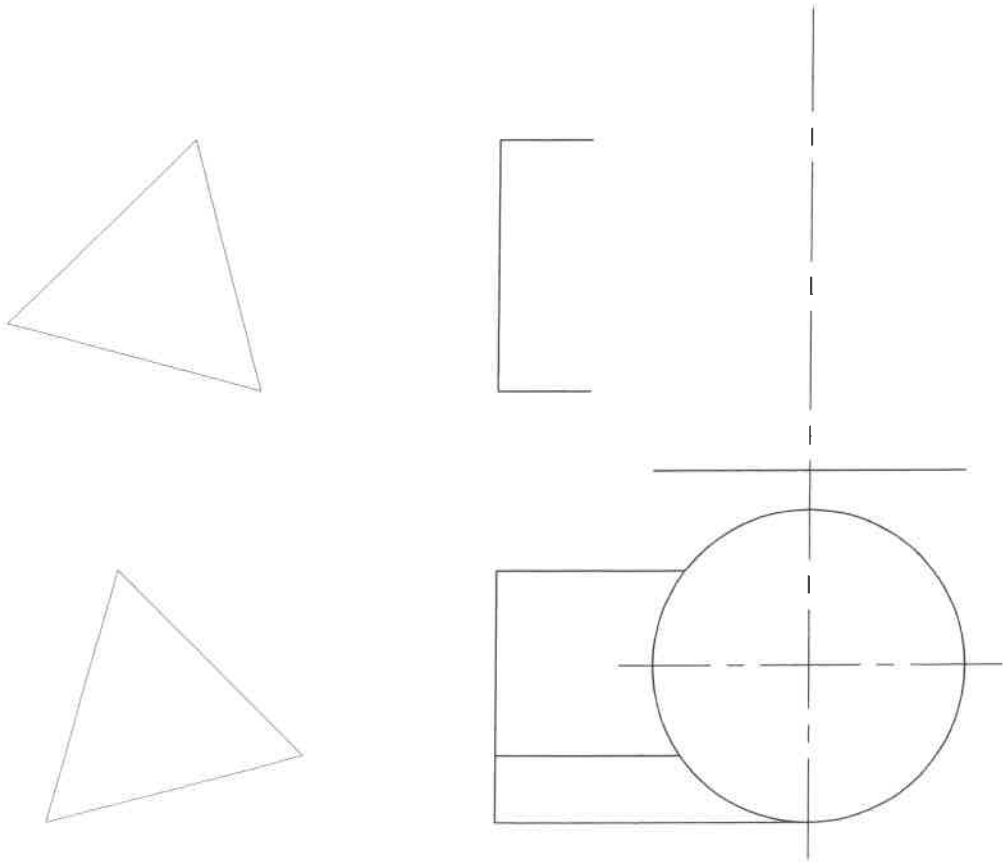
Show all construction.
Do not draw the Left view.

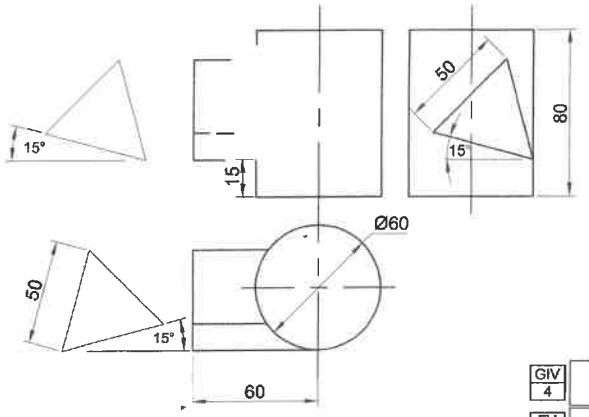
The complete Top View, incomplete Front View and two Auxiliary Views have already been drawn in position.

ASSESSMENT CRITERIA

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

• draw and complete the Front View	24
• show necessary construction	2
• draw the development of the triangular duct	14





GIV 4	
FV 20	
CON 2	
DEV 14	
40 MARKS	

ANSWER SHEET 2

EXAMINATION NUMBER

QUESTION 3

TWO-POINT PERSPECTIVE

The figures show the three views of an outside theatre with a semi-circular stage and a covered seating area. Draw a neat two-point perspective view of the outside theatre.

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

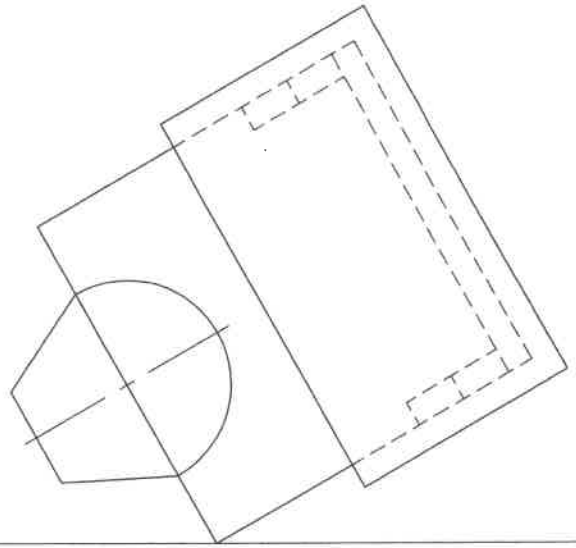
Neatly label the vanishing points RVP and LVP.

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

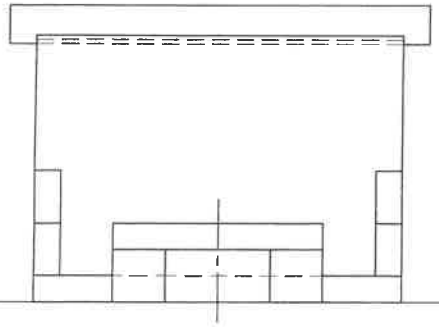


PP

HL

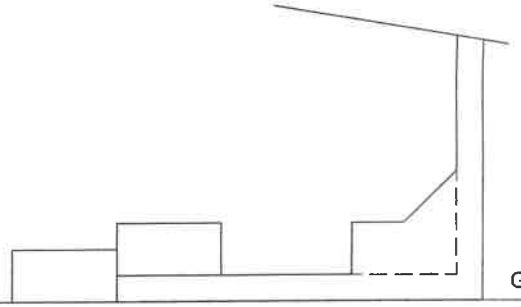
PP

HL



GL

SP



GL

PTS 17

PTS 10

Con 3

Arc 8

VPS 2

40 MARKS

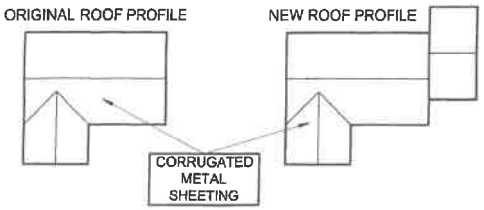
EXAMINATION NUMBER

ANSWER SHEET 3

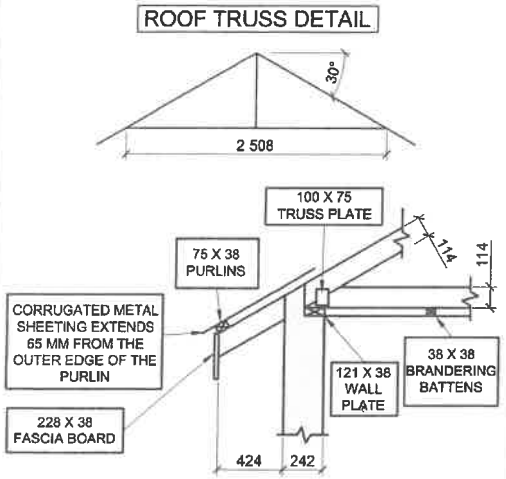
QUESTION 4

CIVIL DRAWING

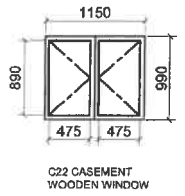
ROOF DETAIL



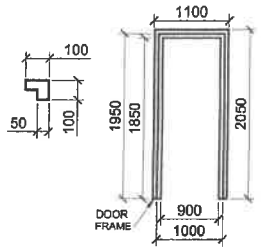
ROOF TRUSS DETAIL



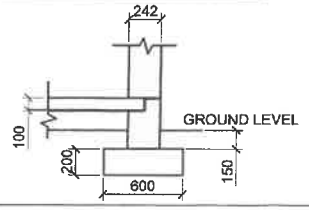
WINDOW DETAIL



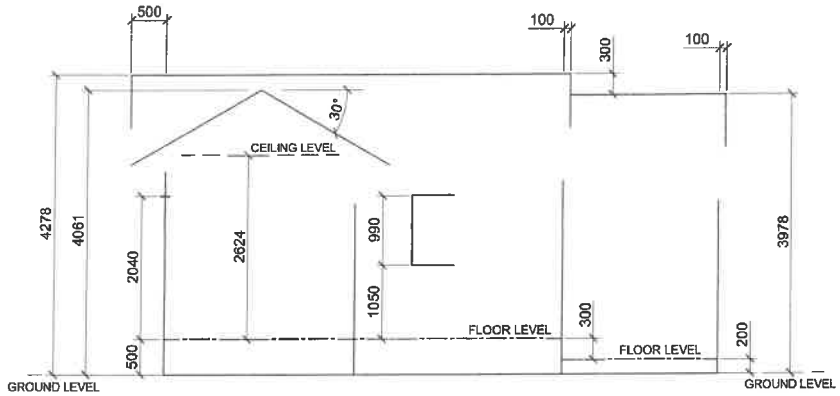
DOOR FRAME DETAIL

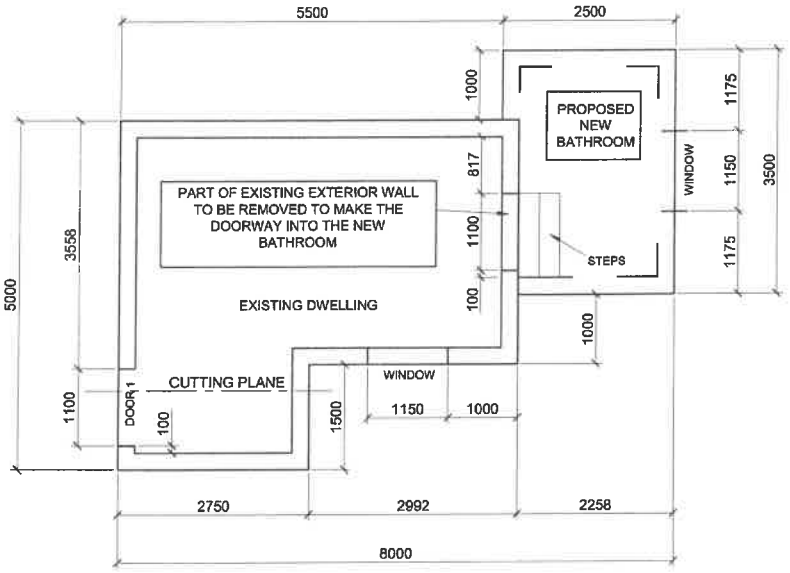


FOUNDATION DETAIL OF EXISTING DWELLING



SCHEMATIC SOUTH ELEVATION





SCHEMATIC FLOOR PLAN

NOTES:

- Floor tiles should be used for the entire floor area.
- Brickwork must be carried out as indicated on the schematic drawing.
- The finished floor level of the new bathroom is 300 mm below that of the original dwelling.
- The steps leading from the new bathroom have a width of 1200 mm. Each step has a 100 mm rise and a 300 mm tread.
- The pitch of the new roof matches that of the existing dwelling.
- The finished floor level is in line with the top of the screed.

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

The following are given:

- Roof detail
- Window detail
- Door frame detail
- Incomplete foundation detail
- An incomplete schematic elevation with
  - ► door and window positions, ground and floor levels
- An incomplete schematic floor plan of a tiled ***EXISTING DWELLING*** with a proposed new Bathroom addition with
  - ► window and door positions
  - ► perimeter dimensions

Draw the following on Answer Sheet 4 using a scale of 1:50:

1) The **complete FLOOR PLAN**
2) The **SECTIONAL SOUTH ELEVATION** on the indicated cutting plane

FLOOR PLAN INSTRUCTIONS

- Draw the complete floor plan of both the existing dwelling and the proposed new tiled bathroom.
- The following alterations must be made to the existing building:
  - ► Remove part of the existing eastern wall, as indicated, to make the doorway into the new bathroom.
- Draw and hatch all walls
- Insert all window details (The windows do not have any window sills)
- Insert the door detail of the external door (Door 1) only
- Draw the steps and indicate the direction
- Indicate the room designation and the floor finish of the bathroom only
- Insert the following electrical detail in the existing dwelling:
  - ► A two-tube, 40 watt fluorescent light in the centre of the room
  - ► a single-pole, wall-mounted light switch next to the **external door**
  - ► one switched socket outlet on the **northern** wall
- Label the floor plan and indicate the scale
- Draw and label the cutting plane A-A

SECTIONAL SOUTH ELEVATION INSTRUCTIONS

- Draw the complete SOUTH ELEVATION showing the section as per the indicated cutting plane and the remaining outside elevation of both the existing building and the added bathroom.
- Complete the foundation details
  - ► insert all floor slab details
  - ► use 390 mm compacted hardcore filling and 10 mm screed
- Label the ground level and damp-proof course
- Draw and label the finished floor level of the new bathroom only
- Draw in the sectional door detail using the given frame detail
  - ► use ONE 242 x 75 mm concrete lintel above the door
  - ► show the door frame detail
- 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 corrugated metal sheeting for the roof and a 30° pitch
  - ► use 228 x 38 mm fascia boards
  - ► use 9 mm gypsum ceiling boards
- Draw the existing outside window
- Show all hatching detail
- Label the sectional SOUTH ELEVATION

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	Roof	1	
8	Sectioned Walls	4	
9	Sectioned Door	4	
10	Floor & Foundation	6	
11	DPC	2	
12	Hatching	9	
13	External Window	5	
14	External Walls	3	
15	Fascia Boards	4	
16	Roof Detail	7	
17	Finished Floor Level	2	
18	Labels	2	
	Subtotal	67	

Floor Plan

19	Walls	7	
20	Hatching	5	
21	Windows	4	
22	Door	4	
23	Step	3	
24	Electrical	4	
25	Labels	4	
26	Cutting Plane	2	
	Subtotal	33	
	TOTAL	100	

100 MARKS

EXAMINATION NUMBER

ANSWER SHEET 4