**National Senior Certificate Examination 2016**

**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 are not attempted/blank.
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 may be assumed in good proportion.
11. Your drawings should comply with SANS 10143.

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**For Official Use Only**

<table>
<thead>
<tr>
<th>Question</th>
<th>Section</th>
<th>Mark</th>
<th>Moderated</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Civil Analytical</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Interpenetration &amp; Development</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Two-Point Perspective</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Civil Drawing</td>
<td>100</td>
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</tr>
</tbody>
</table>

**Symbol**

**Total**

200  
100

**Final Converted Mark**

100

**Checked By**

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**Examination Number**
1. What type of civil drawing is shown?
   - Floor Plan

2. How many bathrooms does this dwelling have?
   - 3

3. What is the diameter of the ventilation pipe?
   - 100 mm

4. Who is the owner of the property ERF 57?
   - M J Sithole

5. In which city is the architect's office located?
   - Cape Town

6. In which elevation would you see the main entrance door?
   - West

7. What is the feature at 1 called?
   - Septic Tank

8. What is the feature at 2 called?
   - Main/Master Bedroom

9. What is the room designation indicated by the number 3?
   - Main/Master Bedroom

10. What does the abbreviation "FP" represent as indicated at feature 4, stand for?
    - Fire Place

11. Suggest what the feature indicated by arrow 5 might be.
    - Smoke Extractor

12. What is the feature at 6 called?
    - Built-in Cupboard

13. How many ND17 windows are shown on this drawing?
    - 5

14. How many 40 watt fluorescent tubes are used in the kitchen?
    - 4

15. How many rooms have a tile floor finish?
    - 7

16. How many external doors are shown on this drawing?
    - 4

17. What type of brick must be used for the exterior walls?
    - Face Brick

18. What is the area of the wooden deck in square metres?
    - 6.75

19. In the space below, draw, in NEAT freehand, the PLAN VIEW and ELEVATION VIEW of the SABS convention for a wall-mounted urinal.

20 MARKS
1.1 What type of civil drawing is shown?  
**FLOOR PLAN**

1.2 How many bathrooms does this dwelling have?  
3

1.3 What is the diameter of the ventilation pipe?  
100 mm

1.4 Who is the owner of the property ERF 57?  
Mr M J SITHOLE

1.5 In which city is the architect's office found?  
CAPE TOWN

1.6 In which elevation would you see the main entrance door?  
WEST

1.7 What is the feature at 1 called?  
STEPS / STAIRS

1.8 What is the feature at 2 called?  
SEPTIC TANK

1.9 What is the room designation indicated by the number 3?  
MAIN/MASTER BEDROOM

1.10 What does the abbreviation 'FP', as indicated at feature 4, stand for?  
FIRE PLACE

1.11 Suggest what the feature indicated by arrow 5 might be.  
WALK-IN WARDROBE / CLOSET / DRESSING ROOM

1.12 What is the feature at 6 called?  
SMOKE EXTRACTOR

1.13 How many ND17 windows are shown on this drawing?  
5

1.14 How many 40 watt fluorescent tubes are used in the kitchen?  
4

1.15 How many rooms have a tile floor finish?  
7

1.16 How many external doors are shown on this drawing?  
4

1.17 What type of brick must be used for the exterior walls?  
FACE BRICK

1.18 What is the area of the wooden deck in square metres?  
6.75

1.19 In the space below, draw, in NEAT freehand, the PLAN VIEW and ELEVATION VIEW of the SABS convention for a wall-mounted urinal:

<table>
<thead>
<tr>
<th>PLAN VIEW</th>
<th>ELEVATION VIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Plan View" /></td>
<td><img src="image" alt="Elevation View" /></td>
</tr>
</tbody>
</table>

Total: 2
The figure below shows the INCOMPLETE Front View and the INCOMPLETE Top View of a CIRCULAR PIPE penetrated by an EQUILATERAL TRIANGULAR DUCT drawn in First-angle Orthographic Projection. The auxiliary view of the triangular duct is also shown in the Top View.

Draw the following:
2.1 the complete FRONT view clearly showing the curve of interpenetration. Show all hidden detail.
2.2 the complete TOP view.
2.3 the development of the triangular duct.

Show all construction.

**ASSESSMENT CRITERIA**

You will be assessed on your ability to do the following:
- draw the given views
- complete the front view
- complete the top view
- show necessary construction
- develop and label the triangular duct

** marks

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<table>
<thead>
<tr>
<th>Given</th>
<th>Front View: 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hidden Detail</td>
<td>5</td>
</tr>
<tr>
<td>Tri - Line</td>
<td>1</td>
</tr>
<tr>
<td>Top View: 2</td>
<td></td>
</tr>
<tr>
<td>Tri - Lines</td>
<td>2</td>
</tr>
<tr>
<td>Construct</td>
<td>4</td>
</tr>
<tr>
<td>Development</td>
<td>13</td>
</tr>
</tbody>
</table>
Switched Hidden/Back - 3
Wrong angle - 3
△ not positioned correctly - 3
Size Error - 3

<table>
<thead>
<tr>
<th>Given</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front View</td>
<td>17</td>
</tr>
<tr>
<td>Hidden Detail</td>
<td>5</td>
</tr>
<tr>
<td>Interpen</td>
<td>11</td>
</tr>
<tr>
<td>Tri-Line</td>
<td>1</td>
</tr>
<tr>
<td>Top View</td>
<td>2</td>
</tr>
<tr>
<td>Tri-Lines</td>
<td>2</td>
</tr>
<tr>
<td>Construct</td>
<td>4</td>
</tr>
<tr>
<td>Development</td>
<td>13</td>
</tr>
</tbody>
</table>

\[ \frac{1}{2} \]
\[ \frac{1}{2} \]
The figure shows the three views of an apartment. Draw a neat two-point perspective view of the dwelling.

**ASSESSMENT CRITERIA**

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

- determine and label the vanishing points
- determine the two-point perspective view

No hidden detail is required.

**40 MARKS**

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

Show the wall thickness where applicable.

Neatly label the vanishing points RVP and LVP.

**PTS** = 20
**CON** = 6
**Arc** = 9
**VPS** = 2

**ANSWER SHEET 3**