The Department of Basic Education has pleasure in releasing a subject exemplar booklet for School Based Assessment (SBA) to assist and guide teachers with the setting and development of standardised SBA tasks and assessment tools. The SBA booklets have been written by teams of subject specialists to assist teachers to adapt teaching and learning methods to improve learner performance and the quality and management of SBA.

The primary purpose of this SBA exemplar booklet is to improve the quality of teaching and assessment (both formal and informal) as well as the learner’s process of learning and understanding of the subject content. Assessment of and for learning is an ongoing process that develops from the interaction of teaching, learning and assessment. To improve learner performance, assessment needs to support and drive focused, effective teaching.

School Based Assessment forms an integral part of teaching and learning, its value as a yardstick of effective quality learning and teaching is firmly recognised. Through assessment, the needs of the learner are not only diagnosed for remediation, but it also assists to improve the quality of teaching and learning. The information provided through quality assessment is therefore valuable for teacher planning as part of improving learning outcomes.

Assessment tasks should be designed with care to cover the prescribed content and skills of the subject as well as include the correct range of cognitive demand and levels of difficulty. For fair assessment practice, the teacher must ensure that the learner understands the content and has been exposed to extensive informal assessment opportunities before doing a formal assessment activity.

The exemplar tasks contained in this booklet, developed to the best standard in the subject, is aimed to illustrate best practices in terms of setting formal and informal assessment. Teachers are encouraged to use the exemplar tasks as models to set their own formal and informal assessment activities.

MR HM MWELI
DIRECTOR-GENERAL
DATE: 13/09/2013
DEPARTMENT OF BASIC EDUCATION
ENGINEERING GRAPHICS & DESIGN
SCHOOL BASED ASSESSMENT

1. INTRODUCTION

The Engineering Graphics and Design (EGD) School Based Assessment (SBA) comprises of Course Drawings (CDs), Tests and Examinations, which contributes, as prescribed, to each learner’s SBA term mark as well as 25% toward each learners’ final National Senior Certificate (NSC)/promotional mark.

Although the Practical Assessment Task (PAT) is also a compulsory formal assessment component of EGD, it is essentially the third EGD NSC/promotional examination paper, which contributes 25% towards each learner’s final NSC/promotional mark only, and therefore not part of the SBA mark for any of the terms or for the final NSC/promotional SBA mark.

The EGD tasks included in/with this document is not intended for any specific SBA component and are merely examples of EGD tasks, intended to give guidance to EGD teachers when setting their own SBA tasks, or that can be used as tests and examination questions or even as informal Daily Developmental Exercises (DDEs) and CDs.

It therefore remains imperative, as instructed by the EGD CAPS, that every EGD learner must have a grade specific CAPS compliant EGD Textbook, which should be the primary source of DDEs and CDs.

A grade specific CAPS compliant EGD textbooks should also be each EGD learners’ primary informative, instructional, referential, preparatory and developmental resource. A CAPS compliant EGD textbook may therefore not be substituted by an EGD workbook/work file or the tasks included in/with this document, as workbooks/work files and the included tasks only have preparatory and developmental value. EGD workbooks/work files and the included tasks may therefore only be used in conjunction with a CAPS compliant EGD textbook and should primarily serve as resources from which teachers can freely source additional SBA tasks and DDEs.

The other primary resource that EGD teachers should regularly refer too or use as an additional source for SBA tasks, are the previous EGD NSC, Exemplar and Pilot examination papers of the Department of Basic Education (DBE), which are all freely available on the DBE’s website.

NOTE:
The most common practice implemented by schools that continuously perform very well in EGD is that the learners do as many tasks as possible (3 to 5 different tasks a week), of which most are assessed by using simplified rubrics, and the learners given constructive feedback thereon. For the purpose of this document as well as a common national terminology and understanding, these informal tasks are referred to as Daily Developmental Exercises (DDEs).

2. FORMAT OF EGD SBA TASKS

Even though the included tasks have very similar formats, there are differences in terms of wording, presentation and assessment criteria as the tasks were supplied by various developers. This then implies that there is not an absolute correct format but rather a general format where the wording, given drawings and assessment criteria should be on the right side of the task/drawing sheet with more than enough space for the answer to the left of the given information. Where the given drawings and information requires all the space on the task sheet, e.g. for civil working drawings, mechanical assemblies etc., the wording and assessment criteria should still be on the right side of the sheet.
It is however important that the format of especially test and examination questions should familiarise and prepare learners for the final NSC/promotional examination papers.

The DBE’s latest EGD NSC (grade 12) papers should therefore be referred to as best practice examples for the format, i.e. the layout, wording, drawing presentation and assessment criteria, for especially tests and examination questions.

Although the included grade 10 tasks are on A4 task/drawing sheets and the grade 11 and 12 tasks on A3 task/drawing sheets, neither of the grades are restricted to either A4 or A3 task/drawing sheets. Grade 10, 11 and 12 tasks, especially DDEs and CDs, can therefore, depending on the size of the answer/drawing, be done on either A4 or A3 task/drawing sheets.

NOTE: When DDEs and CDs are done (sourced) from a textbook, borders and title blocks/panels are not required on the ‘clean’ A4 or A3 drawing sheets, unless specifically asked as a question or as part of a question or when required by the specific type of task, e.g. a Civil working drawing.

The learners should rather be encouraged to do as many DDEs as possible, without unnecessarily burdening them with borders and title blocks/panels. The learner’s name, the task number/name and the date of completion must however be clearly indicated in the bottom-right-hand-corner of the ‘clean’ drawing sheet.

3. EGD SBA REQUIREMENTS

3.1 The minimum SBA requirements for EGD are as follow:

GRADE 10:
• Two tests
• Twelve course drawings
• Mid-year examination

GRADE 11:
• Two tests
• Thirteen course drawings
• Mid-year examination

GRADE 12:
• One test (See DBE Circular S11 of 2013 and DBE CAPS Errata of December 2013.)
• Fifteen course drawings
• Mid-year examination
• Trail/prelim/preparatory examination

3.2 The weightings of the cognitive levels for EGD SBA tasks are as follow:

<table>
<thead>
<tr>
<th>The application of BLOOM’S TAXONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>The weighting of the COGNITIVE LEVELS for ALL EGD formal assessment tasks</td>
</tr>
<tr>
<td>LOW (Understanding and remembering)</td>
</tr>
<tr>
<td>MEDIUM (Analysing and applying)</td>
</tr>
<tr>
<td>HIGH (Creating and evaluating)</td>
</tr>
</tbody>
</table>

3.3 Programmes of compulsory SBA tasks and the promotion/NSC mark composition

These programmes give a detailed overview of each term’s compulsory SBA tasks. ALL the compulsory SBA tasks of a specific term, excluding the PAT, must be recorded during that term and included in that term’s reported mark.

NOTE:
• More than one task should be used to obtain each recorded Course Drawing mark.
### 3.3.1 Grade 10 programme of compulsory SBA tasks

<table>
<thead>
<tr>
<th>GRADE 10 SBA TASKS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERM 1</strong></td>
<td><strong>TERM 2</strong></td>
<td><strong>TERM 3</strong></td>
</tr>
<tr>
<td>Assessment Tasks &amp; contribution for the term</td>
<td>Assessment Tasks &amp; contribution for the term</td>
<td>Assessment Tasks &amp; contribution for the term</td>
</tr>
<tr>
<td>Course Drawings:</td>
<td>Course Drawings:</td>
<td>Course Drawings:</td>
</tr>
<tr>
<td>- Freehand drawing</td>
<td>- 1st mechanical drawing</td>
<td>- Solid geometry</td>
</tr>
<tr>
<td>- Geometrical construction</td>
<td>- 2nd mechanical drawing</td>
<td>- Descriptive geometry</td>
</tr>
<tr>
<td>- Ellipse</td>
<td>- Isometric drawing</td>
<td>- Civil floor plan</td>
</tr>
<tr>
<td></td>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>Test(s)</td>
<td>Mid-year examination: Paper 1 &amp; Paper 2</td>
<td>Test(s)</td>
</tr>
<tr>
<td>60%</td>
<td>75%</td>
<td>60%</td>
</tr>
</tbody>
</table>

### GRADE 10 PROMOTION MARK COMPOSITION

<table>
<thead>
<tr>
<th>Assessment Tasks</th>
<th>Compulsory contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBA</td>
<td>ALL tests</td>
</tr>
<tr>
<td>ALL Course Drawings</td>
<td></td>
</tr>
<tr>
<td>Mid-year examination: Paper 1 &amp; Paper 2</td>
<td></td>
</tr>
<tr>
<td>Practical Assessment Task (PAT)</td>
<td></td>
</tr>
<tr>
<td>November (final) examination: Paper 1 (100 marks) &amp; Paper 2 (100 marks)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>

### 3.3.2 Grade 11 programme of compulsory SBA tasks

<table>
<thead>
<tr>
<th>GRADE 11 SBA TASKS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERM 1</strong></td>
<td><strong>TERM 2</strong></td>
<td><strong>TERM 3</strong></td>
</tr>
<tr>
<td>Assessment Tasks &amp; contribution for the term</td>
<td>Assessment Tasks &amp; contribution for the term</td>
<td>Assessment Tasks &amp; contribution for the term</td>
</tr>
<tr>
<td>Course Drawings:</td>
<td>Course Drawings:</td>
<td>Course Drawings:</td>
</tr>
<tr>
<td>- Mechanical analytical exercise</td>
<td>- Civil floor plan with elevations</td>
<td>- Interpenetration &amp; development</td>
</tr>
<tr>
<td>- 1st mechanical assembly</td>
<td>- Civil sectional elevation</td>
<td>- Development of transition piece</td>
</tr>
<tr>
<td>- Isometric drawing</td>
<td>- Solid geometry</td>
<td>- Loci (Helix)</td>
</tr>
<tr>
<td>- Two-point perspective</td>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>Test(s)</td>
<td>Mid-year examination: Paper 1 &amp; Paper 2</td>
<td>Test(s)</td>
</tr>
<tr>
<td>60%</td>
<td>75%</td>
<td>60%</td>
</tr>
<tr>
<td>TERM 4</td>
<td>Assessment Task</td>
<td></td>
</tr>
<tr>
<td>Electrical drawing</td>
<td>For final/promotional Course Drawing mark only</td>
<td></td>
</tr>
</tbody>
</table>

### GRADE 11 PROMOTION MARK COMPOSITION

<table>
<thead>
<tr>
<th>Assessment Tasks</th>
<th>Compulsory contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBA</td>
<td>ALL tests</td>
</tr>
<tr>
<td>ALL Course Drawings</td>
<td></td>
</tr>
<tr>
<td>Mid-year examination: Paper 1 &amp; Paper 2</td>
<td></td>
</tr>
<tr>
<td>Practical Assessment Task (PAT)</td>
<td></td>
</tr>
<tr>
<td>November (final) examination: Paper 1 (100 marks) &amp; Paper 2 (100 marks)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>
3.3.3 Grade 12 programme of compulsory SBA tasks

<table>
<thead>
<tr>
<th>GRADE 12 SBA TASKS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERM 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment Tasks &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>contribution for the term</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Drawings:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1st mechanical assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Mechanical analytical exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Civil sectional elevation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Civil floor plan with elevations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Civil site plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Two-point perspective</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TERM 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment Tasks &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>contribution for the term</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Drawings:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Isometric drawing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Solid geometry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Interpenetration &amp; development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2nd mechanical assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TERM 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment Tasks &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>contribution for the term</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Drawings:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Development of transition piece</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Loci (Helix)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Loci (Cam)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Loci (Mechanisms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 3rd mechanical assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test(s)</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-year examination: Paper 1 &amp; Paper 2</td>
<td>75%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparatory examination: Paper 1 &amp; Paper 2</td>
<td>75%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRADE 12 NSC MARK COMPOSITION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Tasks</td>
<td>Compulsory contribution</td>
</tr>
<tr>
<td>SBA</td>
<td>15 (3.75%)</td>
</tr>
<tr>
<td>ALL tests</td>
<td>15 (3.75%)</td>
</tr>
<tr>
<td>ALL course drawings</td>
<td>30 (7.5%)</td>
</tr>
<tr>
<td>Mid-year examination: Paper 1 and Paper 2</td>
<td>20 (5%)</td>
</tr>
<tr>
<td>Trail/prelim/preparatory examination: Paper 1 and Paper 2</td>
<td>35 (8.75%)</td>
</tr>
<tr>
<td>Practical Assessment Task (PAT)</td>
<td>100 (25%)</td>
</tr>
<tr>
<td>November (final) examination: Paper 1 (100 marks) &amp; Paper 2 (100 marks)</td>
<td>200 (50%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>400</td>
</tr>
</tbody>
</table>

3.4 Descriptions and/or requirements of the SBA tasks

NOTE:
Tasks/questions on content that is beyond the prescribed content of the CAPS, e.g. isometric circle for grade 10 and site plans for grade 11, may not be included/used as SBA tasks.

3.4.1 Course Drawings (CDs)

As EGD is both a knowledge and application/skill-based subject, many DDEs, on the content of each topic and in accordance with the Annual Teaching Plan (ATP), must be done on a regular (daily) basis.

From this essential developmental process, various DDEs should be formally assessed and recorded as part of the programme of compulsory SBA tasks. These assessed and recorded DDEs will then be referred to as Course Drawings (CDs).

The purpose of the CDs:
• To provide evidence that the prescribed content of each topic has been adequately covered;
• To provide evidence that ALL the learners have been assessed and given sufficient feedback on their acquired knowledge and skills on common tasks of each topic;
• To ensure that EGD teachers will be accountable towards the learners, their parents/guardians, the Department of Education and all other stakeholders.

Requirements for Course Drawings (CDs):
• The CDs must come from the normal developmental teaching and learning process of EGD and should therefore be some of the regular (daily) tasks, i.e. the DDEs;

NOTE:
CDs may therefore be sourced directly from textbooks.
Teachers must ensure that each CD is each learner's own work;

**NOTE:**
- It is recommended that a **standing rule** in every EGD classroom should be that any DDE (task) of a specific topic can be used to contribute to the CD mark of that topic
- Teachers must then **randomly**, without prior notification, select various DDEs to be used as CDs. This will put the focus on DDEs instead of CDs, which should encourage learners to do most or all their DDEs. The correct implementation of the practice should ensure that the CDs are each learners' own work.
- This practice should also ensure the validity of CDs

**ALL the learners** must be afforded extended opportunities, within realistic time frames, to attempt to complete, correctly or incorrectly, each of the CDs;

**NOTE:**
Extended opportunities should be within the specific term of the topic as ALL the compulsory SBA tasks of a specific term must be recorded during that term and included in that term's reported mark.

The recorded CD mark should address all, or most of, the grade-specific content of the topic and it must be of an appropriate higher order of complexity for the specific grade. However, more than one task should be used to obtain the recorded CD mark;

**NOTE:**
It is recommended that **3 to 4 DDEs should be used to obtain the recorded DC mark for each topic. This should ensure that all the content is covered within the CD mark.**

To ensure that all the CDs comply with test and examination requirements and standards, all CDs, with the exception of the analytical exercises and the perspective drawing(s), **must be tasks that are completely redrawn**;

**NOTE:**
Sourcing CDs from textbooks will ensure compliance to this requirement.

The questions and model answer of ALL the CDs must be in the teacher's working file;

**NOTE:**
If the CD was sourced from a textbook, a copy of the task, i.e. the question, and of the model answer must be placed in the teacher's working file.

ALL the assessed and recorded CDs of each learner must be in his/her EGD file;

CDs are compulsory formal assessment tasks that must contribute to the final NSC/promotion mark;

Simplified rubrics should be used to assess ALL the CDs;

It is important to note that the CDs are not tests.

**NOTE:**
Detailed descriptions of the content requirements of all CDs are on pages 47 to 50 of the CAPS.

**3.4.1 Tests**

- All the questions of the EGD tests must be of a similar or higher standard than the corresponding questions of the DBE's examination/exemplar papers;
- The mark allocations must also correlate with the DBE's EGD NSC, Exemplar and Pilot examination paper questions;
- The question or questions for each test must justify a minimum time allocation of 60 minutes and a minimum mark allocation of 50 marks. Most tests will therefore have to consist of at least TWO questions;
- However, if the time allocated for a test is not sufficient for the completion of both questions, the two questions can be written as two separate tests, on two or more separate topics, to make up the required 60 minutes and 50 marks.
3.4.2 Examinations

The EGD examination papers must, in terms of format and content, be of a similar or higher standard than the DBE’s EGD NSC, Exemplar and Pilot examination papers. The mark allocations must also be in-line with the DBE’s latest NSC examination papers.

To ensure the validity of examination papers, complete previous EGD exam papers, whether internally or externally set, may not be used again. However, individual questions (only ONE per examination paper) from previous question papers may, preferably with some changes, be used again.

Format and composition of the final/November EGD Examination Papers

<table>
<thead>
<tr>
<th>GRADE 10</th>
<th>GRADE 11</th>
<th>GRADE 12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PAPER 1 - CIVIL-</strong></td>
<td><strong>PAPER 2 - MECHANICAL-</strong></td>
<td><strong>PAPER 2 - MECHANICAL-</strong></td>
</tr>
<tr>
<td>In first-angle orthographic projection</td>
<td>In third-angle orthographic projection</td>
<td>In third-angle orthographic projection</td>
</tr>
<tr>
<td>Q 1A</td>
<td>Q 1</td>
<td>Q 1</td>
</tr>
<tr>
<td>Civil analytical</td>
<td>Mechanical analytical</td>
<td>± 15%</td>
</tr>
<tr>
<td>Q 1B</td>
<td>Q 2</td>
<td>Q 2</td>
</tr>
<tr>
<td>Electrical circuits</td>
<td>Geometrical construction</td>
<td>± 20%</td>
</tr>
<tr>
<td>Q 2</td>
<td>Q 3</td>
<td>Q 3</td>
</tr>
<tr>
<td>Descriptive geometry and/or Solid geometry</td>
<td>Isometric drawing</td>
<td>± 25%</td>
</tr>
<tr>
<td>Q 3</td>
<td>Q 4</td>
<td>Q 4</td>
</tr>
<tr>
<td>1-point perspective drawing</td>
<td>Mechanical working drawing</td>
<td>± 25%</td>
</tr>
<tr>
<td>Q 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil working drawing</td>
<td></td>
<td>± 30%</td>
</tr>
</tbody>
</table>

**NOTE:** For the June examination, the TWO 2-hour papers may be substituted by ONE 3-hour paper.
3.5 Assessment of SBAs

Assessment is an integral part of teaching and learning, and should be done on a regular basis. It is therefore essential that most DDEs should also be assessed.

However, to ensure that assessment successfully contributes to the teaching and learning process, it is imperative that ALL assessment tasks, whether formal or informal, must be assessed, recorded and filed within ONE week of being submitted/completed.

3.5.1 Course Drawings (CDs)

• A mark out of 10 according to a simplified rubric
  NOTE:  
  The complete model answer of each CD must be in the teacher’s EGD working file and used as a guideline for obtaining the mark

• or, a mark according to a marking memorandum, converted back to 10

3.5.2 Tests

• Marks allocated according to marking memoranda/marking guidelines

3.5.3 Examinations

• Marks allocated according to marking memoranda/marking guidelines

NOTE:

• Rubrics may not be used to assess tests or examinations;

• The DBE’s latest NSC examination paper memos should be referred to as best practice examples for the allocation of marks for test and examination marking memoranda/marking guidelines
  The allocation of $\frac{1}{2}$ (half) marks is therefore strongly recommended as the learners will benefit for each correct line and/or aspect of his/her answer.

• As accuracy is a fundamental and essential component of EGD drawings, a deviation of only 1 mm is permissible on the accuracy of ALL aspects of ALL drawings. However, the principles of ‘mark with the mistake’ and ‘the learner should be given the benefit of the doubt’ must also be applied when the required level of evidence of knowledge has been displayed.

• With the exception of the concessions referred to in the DBE’s 2017 EGD Examination Guidelines or when instructed to do so, all other drawings or aspects of drawings drawn in freehand should not be assessed.

3.6 Assessment rubrics

PTO for the simplified rubrics!
3.6.1 A simplified RUBRIC for assessing CDs and DDEs

**NOTE:**
- If the task is a CD, the complete model answer of the drawing must be used as a guideline for obtaining the mark.
- This RUBRIC may not be used for assessing multi-view Civil or Mechanical drawings.

<table>
<thead>
<tr>
<th>DESCRIPTION for MARK</th>
<th>GENERAL INDICATORS</th>
<th>± PERCENTAGE</th>
<th>MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSTANDING</td>
<td>Error free</td>
<td>100%</td>
<td>7</td>
</tr>
<tr>
<td>MERITORIOUS (VERY GOOD)</td>
<td>Few errors</td>
<td>± 85%</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A distinction drawing</td>
<td></td>
</tr>
<tr>
<td>SUBSTANTIAL (GOOD)</td>
<td>Some errors (± ½ right and ½ wrong)</td>
<td>± 70%</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A good ‘C’ to ‘B’ drawing</td>
<td></td>
</tr>
<tr>
<td>ADEQUATE (SATISFACTORY)</td>
<td>Many errors</td>
<td>± 55%</td>
<td>4</td>
</tr>
<tr>
<td>MODERATE (ACCEPTABLE)</td>
<td></td>
<td>± 40%</td>
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<tr>
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<td></td>
<td>LESS than a 50%</td>
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<tr>
<td>ELEMENTARY (UNACCEPTABLE)</td>
<td></td>
<td>± 33%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only a few correct features</td>
<td></td>
</tr>
<tr>
<td>NOT ACHIEVED (VERY BAD)</td>
<td>Completely wrong</td>
<td>± 25% &amp; LESS</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘Something’ drawn very wrongly</td>
<td></td>
</tr>
<tr>
<td>NON-COMPLIANCE</td>
<td>No work was handed in</td>
<td>Nothing to mark</td>
<td>NC</td>
</tr>
</tbody>
</table>

**RUBRIC for the QUALITY and NEATNESS of the drawing**

Assess the consistency and quality of line work, printing/writing, dimensioning techniques and general neatness of the drawing.

<table>
<thead>
<tr>
<th>DESCRIPTION for MARK</th>
<th>GENERAL INDICATORS</th>
<th>± PERCENTAGE</th>
<th>MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSTANDING (VERY GOOD)</td>
<td>Very easy to ‘read’</td>
<td>80% +</td>
<td>3</td>
</tr>
<tr>
<td>ADEQUATE (SATISFACTORY)</td>
<td>‘Readable’, but could be better</td>
<td>60% +</td>
<td>2</td>
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<tr>
<td>NOT ACHIEVED (VERY BAD)</td>
<td>Difficult to ‘read’</td>
<td>50% &amp; LESS</td>
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<tr>
<td>NON-COMPLIANCE</td>
<td>No work was handed in</td>
<td>Nothing to mark</td>
<td>NC</td>
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</tbody>
</table>

**TOTAL**

10
### 3.6.2 A simplified RUBRIC for assessing MULTI-VIEW Civil working drawings

#### EXAMPLES OF CRITERIA

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>2 VIEWS</th>
<th>3 VIEWS</th>
<th>4 VIEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIEW 1</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>VIEW 2</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>VIEW 3</td>
<td>-</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>VIEW 4</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>BORDER and COMPLETE TITLE BLOCK</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ANNOTATIONS / NOTES / SECTION PLANE</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>PRESENTATION: Planning, Quality and Neatness</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
<td><strong>20</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

**CALCULATION**

\[
\text{RECORDED TOTAL} = \frac{\text{TOTAL}}{2} = \frac{20}{2} = 10
\]

**RECORDED TOTAL**

<table>
<thead>
<tr>
<th>No work was handed in</th>
<th>NC</th>
</tr>
</thead>
</table>

**NOTE:**
The total for the OWN CRITERIA could also be out of **30 or 40 or even more**. It is, however, advisable that a total that is easily convertible back to 10 should be used.

### 3.6.3 A simplified RUBRIC for assessing MULTI-VIEW Mechanical working drawings

#### EXAMPLES OF CRITERIA

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>2 VIEWS</th>
<th>3 VIEWS</th>
<th>4 VIEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIEW 1</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>VIEW 2</td>
<td>6</td>
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<tr>
<td>VIEW 3</td>
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</tr>
<tr>
<td>VIEW 4</td>
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<td>-</td>
<td>3</td>
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<tr>
<td>BORDER and COMPLETE TITLE BLOCK</td>
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<tr>
<td>SECTION PLANE(S)</td>
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<td>PROJECTION SYMBOL</td>
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<tr>
<td>DIMENSIONS</td>
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<td>2</td>
<td>2</td>
</tr>
<tr>
<td>PRESENTATION: Planning, Quality and Neatness</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
<td><strong>20</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

**CALCULATION**

\[
\text{RECORDED TOTAL} = \frac{\text{TOTAL}}{2} = \frac{20}{2} = 10
\]

**RECORDED TOTAL**

<table>
<thead>
<tr>
<th>No work was handed in</th>
<th>NC</th>
</tr>
</thead>
</table>

**NOTE:**
The total for the OWN CRITERIA could also be out of **30 or 40 or even more**. It is, however, advisable that a total that is easily convertible back to 10 should be used.
### 3.7 Topics & cognitive analysis grids

**ENGINEERING GRAPHICS AND DESIGN**

**GRADE ___ COURSE DRAWING TOPICS & COGNITIVE ANALYSIS**

<table>
<thead>
<tr>
<th>COURSE DRAWING (CD)</th>
<th>TOPICS</th>
<th>REVISED TAXONOMY</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>±30% ±40% ±30%</td>
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<tr>
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<tr>
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<td></td>
<td></td>
<td>CREATING</td>
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<td></td>
<td></td>
<td>EVALUATING</td>
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<tr>
<td></td>
<td></td>
<td>LOW MEDIUM HIGH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EASY MED DIFF.</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>✓ THE APPLICABLE TOPIC(S) FOR EACH CD</td>
<td>MARK DISTRIBUTION</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>COMBINED TOTAL FOR ALL COURSE DRAWINGS</td>
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</tr>
<tr>
<td>TOPICS</td>
<td>BLOOMS REVISED TAXONOMY</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>±30%</td>
<td>±40%</td>
</tr>
<tr>
<td>DESIGN</td>
<td>UNDERSTANDING</td>
<td>RECALLING</td>
</tr>
<tr>
<td>PROCESS</td>
<td>APPLYING</td>
<td>CREATING</td>
</tr>
</tbody>
</table>

- **Grade 10**: LOW, MED, HIGH
- **Grade 11 and 12**: EASY, MED, DIFF.

<table>
<thead>
<tr>
<th>TESTS</th>
<th>TOPICS</th>
<th>BLOOMS REVISED TAXONOMY</th>
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<tbody>
<tr>
<td></td>
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<td>±30%</td>
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<tr>
<td></td>
<td></td>
<td>UNDERSTANDING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>APPLYING</td>
</tr>
</tbody>
</table>

**NOTE:**
- The examples of the grade 10 EGD SBA tasks, which are all presented on A4 task/drawing sheets, are contained in the separate A4 annexure.
- The examples of the grade 11 and 12 EGD SBA tasks, which are all presented on A3 task/drawing sheets, are contained in the separate A3 annexure.
ENGINEERING GRAPHICS & DESIGN

SCHOOL-BASED ASSESSMENT

GRADE 10

EXAMPLES
GRADE 10 EXAMPLES

QUESTIONS
ENGINEERING GRAPHICS AND DESIGN

FREEHAND
Given:
FLOOR PLAN

Instruction:
Use the space provided and redraw the floor plan in freehand according to the given size

GRADE 10
FREEHAND
ENGINEERING GRAPHICS AND DESIGN

FREEHAND
Given:
FLOOR PLAN

Instruction:
Use the space provided and redraw the floor plan in freehand according to the given size.
ENGINEERING GRAPHICS AND DESIGN

GEOMETRICAL CONSTRUCTION
Given:
- A view of a TENSION PLATE
- The position of point A on the drawing sheet

Instruction:
Duplicate the given view according to scale 1 : 2.
- Complete the title block.
ENGINEERING GRAPHICS AND DESIGN

CONSTRUCTION DRAWING
Given: Reference points and lines

Instructions:
- Construct an ellipse through A, B, C and D.
- Construct a ribbed circle inside triangle AEF.
- Divide line GH with line division into 5 equal parts.
- Construct a regular hexagon using J as the centre point and side lengths = 9mm. Two sides have to be horizontal.
- Print the following in pencil between the given guide lines beneath the drawing: "EGD WHALE"

NOTE:
- ALL printing and line work to be done in pencil.
- Show ALL construction.

GRADE 10
ELLIPS
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
A pictorial drawing of a BRACKET.

INSTRUCTIONS:
Do not copy this drawing.
Convert the drawing into third-angle orthographic projection.

Draw the following views:
- A sectional front view on AA.
- A top view.
- A right view.
Show ALL hidden detail.

GRADE 10 MECHANICAL
ENGINEERING GRAPHICS
AND DESIGN

GIVEN:
A pictorial drawing of a BRACKET.

INSTRUCTIONS:
Do not copy this drawing. Study the drawing carefully then convert the drawing into THIRD-ANGLE ORTHOGRAPHIC PROJECTION.

Draw the following views:
- A sectional front view on AA.
- A top view.
- A right view.
Show ALL hidden detail.

GRADE 10
MECHANICAL
MECHANICAL DRAWINGS
Given:
A front view and top view of a BEARING BLOCK

Instructions:
Draw according to Scale 1 : 2 and in third angle orthographic projection the following:
- The Front view
- The Top view
- The Right view on cutting plane A-A
- Supply each view with at least 3 important dimensions

Note: All drawings must comply to the SABS 10111 code.

ENGINEERING GRAPHICS AND DESIGN
MECHANICAL DRAWINGS

Given:

- The front view and top view of a GUIDE BLOCK
- Two centre lines and the cutting plane A-A

Instructions:

Draw to scale 1 : 1 and in third-angle orthographic projection, the following views of the guide block:

- The top view. Add the three marked dimensions.
- A sectional front view.
GIVEN: The figure shows three views of a casting drawn in third-angle orthographic projection.

INSTRUCTIONS: Convert the bracket into an isometric drawing. Marked the corner marked A the lowest point of the drawing.
ISOMETRIC

Given:
- The front and top view of a PAPER WEIGHT in third angle orthographic projection.
- Point A as the starting position

Instruction:
Draw according to scale 1:1 the following:
- Draw an isometric view of the PAPER WEIGHT so that the front-top-left views will be visible.
- Show all the necessary constructions
- No hidden detail is needed.
ENGINEERING GRAPHICS AND DESIGN

ISOMETRIC DRAWING
Given:
● The front view and top view of a machine piece
● The position of A on the drawing sheet

Instructions:
Use scale 1 : 1 and convert the orthographic views of the machine piece into an isometric drawing.
● Make A the lowest point of the drawing.
● No hidden detail is required.
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
The top view and front view of a right regular hexagonal pyramid is shown below. The pyramid is cut by a cutting plane VT.

INSTRUCTIONS:
Draw the following views of the pyramid:
1. The given front view
2. The sectional top view
3. The sectional right view
4. The true shape of the cut surface.

Note:
Show All hidden detail

GRADE 10
SOLID GEOMETRY
SOLID GEOMETRY

Given:
The front view and top view of a right regular pentagonal prism with a cutting plane.

Instruction:
Use the given information and draw to scale 1 : 2 the sectioned front view. Then project:
- the top view and the left view with the section
- the view showing the true shape of the sectioned plane

NOTE:
- Show ALL construction
- Show ALL hidden detail.
Engineering Graphics and Design

Given:
The front view of a right regular hexagonal prism is shown below. The prism is cut by a cutting plane VT.

Instructions:
Draw the following views of the prism:
- The given front view
- The sectional top view

Note:
Show all hidden detail
**GIVEN:**
The front view of a right regular hexagonal prism of 32 mm base edge that has been cut by an inclined plane AB.

**INSTRUCTIONS:**
- Draw the following views of the prism:
  - The given front view
  - The complete top view
  - The true shape of the cut surface
- Show all necessary construction and hidden detail.
ENGINEERING GRAPHICS AND DESIGN

DESCRIPTIVE GEOMETRY
Given:
- The front-right-top view of a tent
- Scale 10mm = 1 meter
- Illustration of the tent

Instructions:
Determine the following by means of projection:
- The true shape of the roof marked abcd
- The true length of the anchor rope marked ef
- The true angle of the anchor rope with the horizontal plane

NOTE:
- ALL answers must be given in meters
- Add the necessary labeling.

GRADE 10
DESCRIPTIVE GEOMETRIE
ENGINEERING GRAPHICS AND DESIGN

DESCRIPTIVE GEOMETRY
Given:
The front view and top view of a crane frame with four anchor cables

Instruction:
Determine through projection
- the true length of cable d
- the true angle of cable d with the HP

Determine by means of construction:
- the true length of cable a
- the true angle of cable a with the VP

Project a left view of the crane frame with the four anchor cables
ENGINEERING GRAPHICS AND DESIGN

CIVIL AREA & PERIMETER
Given: The profiles of the floor plans of three houses

Instruction:
- Determine the floor area of each house and the perimeter of the outside walls
- Show all your calculations and neatly print the answers in the table below

NOTE: The total area of a dwelling includes the outside walls and not only the floor area of the rooms

<table>
<thead>
<tr>
<th>AREA (m²)</th>
<th>PERIMETER (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

GRADE 10 CIVIL
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
The diagram below is drawn to scale 1:10, and shows a section through the foundation and a non-load bearing wall of a dwelling.

INSTRUCTIONS:
1. In neat freehand, add ALL the hatching detail numbered.
2. Complete the table below by naming the parts.
3. Fill in the missing values to the THREE dimensions.

Note:
All drawing must comply with the SABS 0143:

[20]

NAME PARTS
1
2
3
4
5

6 (ABBREVIATION)
7 (LINE FEATURE)

ANSWERS
1
2
3
4
5
6
7
ENGINEERING GRAPHICS AND DESIGN

**GIVEN:**
An incomplete view of a section through a foundation, slab and load-bearing walls of a basic structure. There is no hatching detail on the view.

In the given space, copy, to scale 1:20, the complete section through the given foundation, a slab and load-bearing walls of the structure.

**Your drawing must include:**
- All hatching detail according to SANS 10143.
- The DPC and the NGL labelled.
- The foundation and wall dimensioned.
- The drawing labelled.
- The scale used.

---

AN INCOMPLETE SECTIONAL ELEVATION
SCALE 1:20

---

GRADE 10
CIVIL
**ENGINEERING GRAPHICS AND DESIGN**

**GIVEN:**
1) The incomplete floor plan of the outer perimeter of a new storage room, showing the position of the windows and the door.
2) The incomplete foundation; wall and slab detail.
3) The profile of the door frame.

**INSTRUCTIONS:**
Using instruments, draw to scale 1 : 50 and in first-angle orthographic projection the following:
1) The complete plan
2) The sectional elevation on the cutting plane A-A. Show the foundation to slab detail.

Note: The drawing must comply with the SANS 10143.

The following must be included on your drawing:
1) ALL hatching detail
2) The door
3) TWO window
4) Room designation and grano floor finish
5) The cutting plane labeled A-A
6) ALL labels
7) Labels both views.

[45]
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
Two views of a simple house and the information needed to draw a single-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 horizon line (HL)
- Locate and label the vanishing point
- NO hidden detail is required
- Show ALL necessary construction

GRADE 10 COURSE DRAWINGS PERSPECTIVE
ENGINEERING GRAPHICS AND DESIGN

PERSPECTIVE
Given
- The front view and top view of a house
- The perspective layout

Instruction:
Use the given information and make a neat one-point perspective drawing of the house.
ENGINEERING GRAPHICS AND DESIGN

PERSPECTIVE

Given:
- The front view and top view of the paperweight.
- The perspective layout.

Instruction:
Use the given information and make a neat one-point perspective drawing of the paperweight.
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
An incomplete circuit diagram where the symbols have been replaced by numbers. A table of symbols to be used to complete the diagram.

INSTRUCTIONS:
Re-draw the circuit and replace the numbers with the correct symbol for the component.

The components are:
1. Battery
2. Resistor
3. LED
4. Voltmeter
5. Switch
6. Motor
7. Connection

[15]
## SCHEDULE OF COMPONENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>COMPONENT</th>
<th>SYMBOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAMP (LIGHTING)</td>
<td>![Lamp Icon]</td>
<td>![Cross Symbol]</td>
</tr>
<tr>
<td>SWITCH</td>
<td>![Switch Icon]</td>
<td>![Switch Symbol]</td>
</tr>
<tr>
<td>CELL</td>
<td>![Battery Icon] (1.5v)</td>
<td>![Battery Symbol]</td>
</tr>
<tr>
<td>LED</td>
<td>![LED Icon]</td>
<td>![LED Symbol]</td>
</tr>
</tbody>
</table>

## ENGINEERING GRAPHICS AND DESIGN

**GIVEN:**
A simple electrical circuit with TWO lamps, a LED, a switch and TWO cells.

**INSTRUCTIONS:**
- In neat *frehand* and good proportion convert the simple circuit into a schematic circuit diagram.
- Use the correct symbol for each of the components.

[15]

---

**GRADE 10 ELECTRICAL**
GRADE 10 EXAMPLES

MODEL ANSWERS
ENGINEERING GRAPHICS & DESIGN

SCHOOL-BASED ASSESSMENT EXAMPLES

GRADE 10 MODEL ANSWERS
FREEHAND
Given:
FLOOR PLAN

Instruction:
Use the space provided and redraw the floor plan in freehand according to the given size.
ENGINEERING GRAPHICS AND DESIGN

GEOMETRICAL CONSTRUCTION
Given:
- A view of a TENSION PLATE
- The position of point A on the drawing sheet

Instruction:
Duplicate the given view according to scale 1:2.
- Complete the title block.
CONSTRUCTION DRAWING

Given:
Reference points and lines

Instructions:
- Construct an ellipse through A, B, C and D.
- Construct a ribbed circle inside triangle AEF.
- Divide line GH with line division into 5 equal parts.
- Construct a regular hexagon using J as the centre point and side lengths = 9mm. Two sides has to be horizontal.
- Print the following in pencil between the given guide lines beneath the drawing: "EGD WHALE"

NOTE:
- ALL printing and line work to be done in pencil.
- Show ALL construction.
GIVEN:
A pictorial drawing of a BRACKET.

INSTRUCTIONS:
Do not copy this drawing.
Convert the drawing into third-angle orthographic projection.

Draw the following views:
- A sectional front view on AA.
- A top view.
- A right view.
Show ALL hidden detail.

ASSESSMENT CRITERIA
FRONT VIEW 13
TOP VIEW 9
LEFT VIEW 8
TOTAL 30
**GIVEN:**
A pictorial drawing of a Bracket.

**INSTRUCTIONS:**
Do not copy this drawing.
Study the drawing carefully then convert the drawing into THIRD-ANGLE ORTHOGRAPHIC PROJECTION.

Draw the following views:
- A sectional front view on AA.
- A top view.
- A right view.
Show ALL hidden detail.

[Diagram of a bracket with dimensions and orthographic views annotated]
MECHANICAL DRAWINGS

Given:
A front view and top view of a BEARING BLOCK

Instructions:
Draw according to Scale 1 : 2 and in third angle orthographic projection
the following:
- The Front view
- The Top view
- The Right view on cutting plane A-A
- Supply each view with at least 3 important dimensions

Note: All drawings must comply to the SABS 10111 code.
MECHANICAL DRAWINGS
Given:
• The front view and top view of a GUIDE BLOCK
• Two centre lines and the cutting plane A-A

Instructions:
Draw to scale 1 : 1 and in third-angle orthographic projection, the following views of the guide block:
• The top view. Add the three marked dimensions.
• A sectional front view.

PRESENTATION
1. LINE TYPES
2. CONNECTIONS
3. NEATNESS

4. ALL IN ONE DIRECTION
4. EQUAL SPACING
** -½ IF HATCHED
GIVEN:
The Figure shows three views of a casting drawn in third-angle orthographic projection.

INSTRUCTIONS:
Convert the bracket into an isometric drawing.

Marked the corner marked A the lowest point of the drawing. [17]
ISOMETRIC
Given:
- The front and top view of a PAPER WEIGHT in third angle ortographic projection.
- Point A as the starting position

Instruction:
Draw according to scale 1:1 the following:
- Draw an isometric view of the PAPER WEIGHT so that the front, top- and left views will be visible.
- Show all the necessary constructions
- No hidden detail is needed.

GRADE 10
ISOMETRIC
ENGINEERING GRAPHICS AND DESIGN

ISOMETRIC DRAWING
Given:
- The front view and top view of a machine piece
- The position of A on the drawing sheet

Instructions:
Use scale 1:1 and convert the orthographic views of the machine piece into an isometric drawing.
- Make A the lowest point of the drawing.
- No hidden detail is required.
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
The top view and front view of a right regular hexagonal pyramid is shown below. The pyramid is cut by a cutting plane VT.

INSTRUCTIONS:
Draw the following views of the pyramid:
1. The given front view
2. The sectional top view
3. The sectional right view
4. The true shape of the cut surface.

Note:
Show All hidden detail

[GRADE 10]
SOLID GEOMETRY

FRONT VIEW 5
TOP VIEW 8
RIGHT VIEW 11
TRUE SHAPE 8
TOTAL 32
SOLID GEOMETRY

Given:
The front view and top view of a right regular pentagonal prism with a cutting plane.

Instruction:
Use the given information and draw to scale $1 : 2$ the sectioned front view. Then project:
- the top view and the left view with the section
- the view showing the true shape of the sectioned plane

NOTE:
- Show ALL construction
- Show ALL hidden detail.
GIVEN:
The front view of a right regular hexagonal prism is shown below. The prism is cut by a cutting plane VT.

Instructions:
Draw the following views of the prism:
- The given front view
- The sectional top view

Note:
Show All hidden detail
ENGINEERING GRAPHICS AND DESIGN

**GIVEN:**
The front view of a right regular hexagonal prism of 32 mm base edge that has been cut by an inclined plane AB.

**INSTRUCTIONS:**
Draw the following views of the prism:
- The given front view
- The complete top view
- The true shape of the cut surface

Show all necessary construction and hidden detail.
ENGINEERING GRAPHICS
AND DESIGN

DESCRIPTIVE GEOMETRY
Given:
- The front- right- and top view of a tent
- Scale 10mm = 1 meter
- Illustration of the tent

Instructions:
Determine the following by means of projection:
- The true shape of the roof marked abcd
- The true length of the anchor rope marked ef
- The true angle of the anchor rope with the horizontal plane

NOTE:
- ALL answers must be given in meters
- Add the necessary labeling.

TRUE AREA = 3.0 m x 5.6 m
= 16.8 m²

TRUE ANGLE = 33.67°

TRUE LENGTH = 30 mm
= 1.8 m

SCALE 10 mm = 1 m

GRADE 10
DESCRIPTIVE GEOMETRIE
ENGINEERING GRAPHICS AND DESIGN

DESCRIPTIVE GEOMETRY
Given:
The front view and top view of a crane frame with four anchor cables

Instruction:
Determine through projection
- the true length of cable d
- the true angle of cable d with the HP

Determine by means of construction:
- the true length of cable a
- the true angle of cable a with the VP

Project a left view of the crane frame with the four anchor cables

GRADE 10
DESCRIPTIVE GEOMETRIE
ENGINEERING GRAPHICS AND DESIGN

CIVIL AREA & PERIMETER
Given:
The profiles of the floor plans of three houses

Instruction:
- Determine the floor area of each house and the perimeter of the outside walls
- Show all your calculations and neatly print the answers in the table below

NOTE:
The total area of a dwelling includes the outside walls and not only the floor area of the rooms

<table>
<thead>
<tr>
<th>AREA / OPPERVLAKTE (m²)</th>
<th>PERIMETER / OMTREK (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(13 x 6) + (4 x 2) = 78 + 8</td>
</tr>
<tr>
<td></td>
<td>= 86 m²</td>
</tr>
<tr>
<td>2</td>
<td>(13 x 6) + (4 x 2) = 78 + 8</td>
</tr>
<tr>
<td></td>
<td>= 86 m²</td>
</tr>
<tr>
<td>3</td>
<td>(6 x 4) + (7 x 6) + (6 x 4) = 24 + 42 + 24</td>
</tr>
<tr>
<td></td>
<td>= 90 m²</td>
</tr>
</tbody>
</table>

GRADE 10
CIVIL
<table>
<thead>
<tr>
<th>TABLE</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>HATCHING</td>
<td>8</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>3</td>
</tr>
<tr>
<td>NEATNESS</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
</tr>
</tbody>
</table>

**ANSWERS**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCREED</td>
</tr>
<tr>
<td>2</td>
<td>SLAB</td>
</tr>
<tr>
<td>3</td>
<td>HARDCORE</td>
</tr>
<tr>
<td>4</td>
<td>UNDISTURBED EARTH</td>
</tr>
<tr>
<td>5</td>
<td>FOUNDATION</td>
</tr>
<tr>
<td>6</td>
<td>DPC</td>
</tr>
<tr>
<td>7</td>
<td>LINE BREAK</td>
</tr>
</tbody>
</table>

**GRADE 10 CIVIL**
AN INCOMPLETE SECTIONAL ELEVATION
SCALE 1:20

SECTIONAL VIEW A-A
SCALE 1:20

ENGINEERING GRAPHICS AND DESIGN

GIVEN:
An incomplete view of a section through a foundation, slab and load-bearing walls of a basic structure. There is no hatching detail on the view.

In the given space, copy, to scale 1:20, the complete section through the given foundation, a slab and load-bearing walls of the structure.

Your drawing must include:
- All hatching detail according to SANS 10143.
- The DPC and the NGL labelled.
- The foundation and wall dimensioned.
- The drawing labelled.
- The scale used.

GRADE 10
CIVIL
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
Two views of a simple house and the information needed to draw a single-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 horizon line (HL)
- Locate and label the vanishing point
- NO hidden detail is required
- Show ALL necessary construction

GRADE 10
PERSPECTIVE

VANISHING PNT  2
CONSTRUCTION  2
PERSPECTIVE   26
              30
ENGINEERING GRAPHICS AND DESIGN

PERSPECTIVE
Given
- The front view and top view of a house
- The perspective layout

Instruction:
Use the given information and make a neat one-point perspective drawing of the house.
ENGINEERING GRAPHICS AND DESIGN

PERSPECTIVE
Given
- The front view and top view of the paperweight
- The perspective layout

Instruction:
Use the given information and make a neat one-point perspective drawing of the paperweight.
**ENGINEERING GRAPHICS AND DESIGN**

**GIVEN:**
An incomplete circuit diagram where the symbols have been replaced by numbers. A table of symbols to be used to complete the diagram.

**INSTRUCTIONS:**
Re-draw the circuit and replace the numbers with the correct symbol for the component.

The components are:
1. Battery
2. Resistor
3. LED
4. Voltmeter
5. Switch
6. Motor
7. Connection

---

**MARK ALLOCATION**
CORRECTNESS 8
NEATNESS 6
FREEHAND 1
TOTAL 15

GRADE 10
ELECTRICAL
GIVEN:
A simple electrical circuit with two lamps, a LED, a switch, and two cells.

INSTRUCTIONS:
1. Draw the circuit diagram using the correct symbols.
2. Label each component with a description.
3. Use the correct symbol for each component.
4. Ensure neatness and proportionality in the circuit diagram.

MARK ALLOCATION
CORRECTNESS 8
NEATNESS 6
FREEHAND 1
TOTAL 15
ENGINEERING GRAPHICS & DESIGN

SCHOOL-BASED ASSESSMENT

GRADE 11 EXAMPLES
**ANALYTICAL (MECHANICAL)**

**Given:**
A detailed drawing showing THREE views of a vertical guide, a title block and a table of questions. The drawing has not been prepared to the indicated scale.

**Instructions:**
Complete the table below by neatly answering the questions, all of which refer to the accompanying drawing and title block. [30]

---

**QUESTIONS**  |  **ANSWERS**
--- | ---
What material is used to manufacture the vertical guide? | 1
How many revisions have been made to the drawing? | 1
What was the reason for the last revision? | 1
What was Peter responsible for? | 1
What scale was used for the drawing? | 1
What is the title of the drawing? | 1
What is the drawing number? | 1
Which Company was responsible for the design? | 1
What drawing program was used? | 1
What is view 1 called? | 1
What is view 2 called? | 2
What is view 3 called? | 2
What is the dimension of hole A? | 1
What is feature B called? | 1
What is feature C called? | 1
What is the thickness of rib D? | 2
Determine the dimension at E? | 2
Determine the dimension at F? | 2
In the space provided at the bottom of the page draw, in neat freehand the symbol for the convention of a bearing. | 2
In the space provided at the bottom of the page draw, in neat freehand the symbol for the orthographic system used. | 4

---

**TOTAL**  |  **30**
--- | ---

**BEARING CONVENTION**

**VIEW 1**

**VIEW 2**

**VIEW 3**

---

**SYMBOL**

**NOTE:** All dimensions in millimeters and all radii to be 5mm unless otherwise stated.

| **Material** | **CAST IRON** | **Checked by** | **Shawn** | **08-06-2015** |
| **Required** | **25** | **Drawn by** | **Magaret** | **05-06-2015** |

**AUTOGRAPH 2009**

**DATING No. 1569-GC-J**

**JANCOR DESIGNS**

**EST 1985**

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**ENGINEERING GRAPHICS AND DESIGN**

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**B** | Material changed | Magaret | 12-06-2015
--- | --- | --- | ---
**A** | Centre points changed | Magaret | 11-06-2015

**REVISION No.**  |  **REASON**  |  **DATE**
--- | --- | ---
--- | --- | ---
MECHANICAL ANALYTICAL MEGANIES ANALITIES

1. What is the total components of the PIPE CLAMP? Hoeveel komponenten het die PYPLAMP?
2. Why is the base hatched in the right view? Waarom is die basis in die regteraan sig gerasereer?
3. Is it standard practice to draw the hidden detail at (b)? Is dit normale praktijk om verborge detail by (b) te teken?
4. What feature does (c) represent? Wat is verwerk stel (c) voor?
5. Why is the pipe hatched in the front view? Waarom is die pip gerasereer in die voor aan sig?
6. What is the inside diameter of the pipe? Wat is die binnn diameter van die pip?
7. What is the total length of the stud? Wat is die totale lengte van die tapbout?
8. What is the length of the bolt? Wat is die lengte van die boul?
9. What is the drawing's state of approval? Wat is die teken se datum van goedkeuring?
10. How many PIPE CLAMPS is required? Hoeveel PYPLAMPE word benodig?
11. Insert the title and scale in the space provided. Voeg die tyt en skaal in die spase voor zien by.
12. Draw the projection symbol in the space provided. Tekn die projektsimbool in die spase voor zien.
ASSEMBLY DRAWING
GIVEN:
• The exploded isometric drawing of the parts of the TROLLEY WHEEL assembly, showing the position of each part relative to all the others
• Orthographic views of each of the parts of the TROLLEY WHEEL assembly

INSTRUCTIONS:
Answer this question on the ANSWER SHEET:

Draw to scale 2:1 the following views of the TROLLEY WHEEL assembly:
• The sectional front view as seen from the direction of arrow A.
• The right view. NO hidden detail is required.

NOTE:
• A vertical cutting plane A-A passes through the centre of the assembly as indicated on the right view of the body.
• Show 3 faces for the M8 nut. Show ALL necessary construciton for the bolts. NO stencils may be used,
• ALL drawings must comply with the guidelines contained in the SANS 10111.

<table>
<thead>
<tr>
<th>PARTS LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
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<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>
ASSEMBLY DRAWING

GIVEN:
- The exploded isometric drawing of the parts of a vertical support bracket, showing the position of each part relative to all the others.
- Orthographic views of each of the parts of the vertical support bracket.

INSTRUCTIONS:
Answer this question on the ANSWER SHEET. Draw to scale 1:2 the following views of the assembled parts of the vertical support bracket:
- The full sectional front view on A-A as seen from the arrow indicated in the exploded isometric drawing. The vertical cutting plane passes through the centre line of the assembly as shown on the top view of the support bracket.
- An top view of the the assembly. No hidden detail is required.
- ALL drawing must comply with the guidelines contained in the SANS 10111.

Add the following feature to the drawing:
- The cutting plane. Label it A-A.

Note:
- Show THREE faces of the M22 nut and ALL necessary construction.

<table>
<thead>
<tr>
<th>PART</th>
<th>QUANTITY</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SUPPORT BRACKET</td>
<td>1</td>
<td>CAST IRON</td>
</tr>
<tr>
<td>2. SHAFT</td>
<td>1</td>
<td>MILD STEEL</td>
</tr>
<tr>
<td>3. BUSH</td>
<td>1</td>
<td>BRASS</td>
</tr>
<tr>
<td>4. PULLEY</td>
<td>1</td>
<td>CAST IRON</td>
</tr>
<tr>
<td>5. KEY</td>
<td>1</td>
<td>MILD STEEL</td>
</tr>
<tr>
<td>6. WASHER</td>
<td>1</td>
<td>SPRING STEEL</td>
</tr>
<tr>
<td>7. M44 NUT</td>
<td>1</td>
<td>MILD STEEL</td>
</tr>
</tbody>
</table>
MECHANICAL ASSEMBLY

Given:
- The exploded isometric drawing of the parts of a pipe clamp assembly, showing the position of each part relative to all the others.
- Orthographic views of each of the parts of the pipe clamp assembly.

Instructions:
- Answer this question on page 5.
- Draw, to scale 1:1 and in third-angle orthographic projection, the following views of the assembled parts of the pipe clamp assembly:
  4.1 A sectional front view on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, which passes vertically through the centre of the assembly, is shown on the left view of the base (part 1).
  4.2 The left view
- ALL drawing must comply with the guidelines contained in the SANS 10111.

NOTE:
- Show THREE faces and ALL the necessary construction of the M10 bolt in the front view.
- Insert cutting plane A-A.
- NO hidden detail is required.

<table>
<thead>
<tr>
<th>PARTS LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

PIECE CLAMP

ALL DIMENSIONS ARE IN MILLIMETRES. ALL UNSPECIFIED RADI ARE R2
ASSEMBLY
Given:
- Fig 1 - Isometric drawing of the BLACK POWDER MEASURE.
- Different parts of the machine

Instruction:
Draw according to scale 1 : 1 in third angle orthographic projection the following:
- A full sectional front view. The nut must show three faces,
- A right view without any hidden detail.
- Print the title and scale.
- Draw the projection symbol.
- The section line must be shown.
- Insert eight important dimensions.

SAMESTELLING
Gegee:
- Fig 1 - Isometriese aansig van die BUSKRUIT AFMETER.
- Verskillende onderdele van die toestel.

Instruksie:
Teken volgens skaal 1 : 1 en in derdehoekse ortografiese projekse die volgende:
- ’n Volsnit voorafgaans. Die moer moet drie vlakke toon.
- ’n Regteraanig sonder verborge detail.
- Drukskryf die titel en die skaal.
- Teken die projeksesymbool.
- Dui die skroeffas aan.
- Voeg acht belangrike afmetings by.

ONDERDELELYS / PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>NAME / NAAM</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RAAMWERK / BODY</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>AS / SHAFT</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>SPY / KEY</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>BUS / BUSH</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>HANDVATSEL / HANDLE</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>WASSER / WASHER</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>M13 MOER / M13 NUT</td>
<td>1</td>
</tr>
</tbody>
</table>

BUSKRUIT AFMETER
BLACK POWDER MEASURE

SCALE / SKAAL 1:1
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
Two views of a SOCKET KEY drawn in 3rd angle orthographic projection.

INSTRUCTIONS:
Draw to scale 1:1, the ISOMETRIC view of the SOCKET KEY.
Make A the lowest point.

Note:
- Show ALL necessary construction.
- NO hidden detail required.
ISOMETRIC

Given:
The figure shows a support drawn in first angle orthographic projection.

Instructions:
- Do not copy or draw the given views.
- Draw a neat isometric drawing of the support.

NOTE:
- The lowest point of the drawing is at A.

ISOMETRIES

Gegee:
Die figuur toon ’n steunplaat wat in eenhoekse orthografiese projeksele geteken is.

Instruksies:
- Moenie hierdie aangsekte kopieer of oorteken nie
- Teken ’n netjies isometriese sketsing van die steunplaat.

LET WEL:
- Die laagste punt van die skêring is by punt A.
ISOMETRIES

Given:
The figure show the front and top view of a MODEL.

Instruction:
Draw according to scale 1 : 1 the Isometric drawing of the model.
Use point P as reference.
ENGLISH GRAPHICS AND DESIGN

GIVEN:
Two views of a simple 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.

- Locate and label the vanishing points.
- NO hidden detail is required.
- Show ALL necessary construction.
- Align the drawing sheet with the horizon line (HL).

PP

HL

GL

SP
PERSPECTIVE
Given:
The views of a dwelling as well as all other information needed for the completion of a perspective drawing.

Instructions:
Using the information on this worksheet, draw a two-point perspective drawing of the dwelling. Note the following:
- Use drawing instruments
- Label the vanishing points
- Show all necessary construction.

PERSPEKTIEF
Gegee:
Die aansig van 'n woonhuis asook al ander besonderhede vir die voltooiing van 'n perspektieftekening.

Instruksies:
Gebrauk die inligting op die werkvel om 'n tweepunt-perspektieftekening van die woonhuis te voltooi. Let wel:
- Gebruik tekeninstrumente
- Bepaal en benoem die verdwynpunte
- Toon alle nodige konstruksies,
PERSPECTIVE

Given:
The views of a building as well as all other information needed for the completion of a perspective drawing.

Instructions:
Using the information on this worksheet, draw a two-point perspective drawing of the building. Note the following:
- Use drawing instruments
- Label the vanishing points.

PV/PP

HL

GL

SP
7. In the space provided below, draw in neat freehand, the front view and top view of the SABS 0143 convention for a bath.

8. In the space provided below, draw in neat freehand, the front view and top view of the SABS 0143 convention for a kitchen sink.

9. In the space provided below, draw in neat freehand, the symbol for the north point according to SABS 0143.

**ANALYTICAL (CIVIL)**

**Given:**
A detailed drawing of a section through the substructure of a load-bearing wall, questions on conventions, a title panel and a table of questions. The drawings have not been prepared to the indicated scale.

**Instructions:**
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and title panel.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>With reference to the detailed drawing of a section through the substructure of a load-bearing wall and a window, link the alphabetic letter on the drawing with the correct component in the column to the right of this question.</td>
</tr>
<tr>
<td>2</td>
<td>What does the abbreviation MH stand for?</td>
</tr>
<tr>
<td>3</td>
<td>What does the abbreviation IE stand for?</td>
</tr>
<tr>
<td>4</td>
<td>What does the abbreviation RE stand for?</td>
</tr>
<tr>
<td>5</td>
<td>What does the abbreviation B/L stand for?</td>
</tr>
<tr>
<td>6</td>
<td>What does the abbreviation WC stand for?</td>
</tr>
<tr>
<td>7</td>
<td>In the space provided below, draw in neat freehand, the front view and top view of the SABS 0143 convention for a bath.</td>
</tr>
<tr>
<td>8</td>
<td>In the space provided below, draw, in neat freehand, the front view and top view of the SABS 0143 convention for a kitchen sink.</td>
</tr>
<tr>
<td>9</td>
<td>In the space provided below, draw, in neat freehand, the symbol for the north point according to SABS 0143.</td>
</tr>
<tr>
<td>10</td>
<td>In the space below, determine the total area of the new guest house in square metres.</td>
</tr>
</tbody>
</table>

**ANSWER 10**
Show ALL calculations.

[Diagram showing measurements and calculations for area calculation]
16. In the space provided, draw, in neat freehand, draw the front view and top view of the SANS 10143 symbol for a bath.
Instruction:
Use the space provided and redraw the floor plan in freehand according to the given size.

FREEHAND
Given:
FLOOR PLAN

FLOOR PLAN / VLOERPLAN

BATHROOM
TILES

ROOM / KAMER
CARPET / MAT

KITCHEN / KOMBUI
TILES / TEELS

LOUNGE / SITKAMER
TILES / TEELS

VERANDA / VERANDA
GRANO / GRANET

RWDP / RWAP

BIC / IBK

BIC / IBK
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
- The incomplete floor plan and an incomplete schematic elevation of a bathroom showing the position of the features and the fixtures. The hatching detail and labels have all been left off the drawing.
- The door and window schedule.
- The fixtures.
- The electrical symbols.

DRAW:
In the space provided on the drawing sheet, draw to a scale of 1:50 the following views of the bathroom:
3.1 the complete floor plan; and
3.2 the complete sectional elevation on A-A.

NOTE:
The walls of the plan have been drawn for you on the drawing sheet.

Add the following features to the completed drawing:
- The door and window.
- All fixtures drawn as symbols.
- All electrical fitting shown as numbers.
- The room designation and a tile floor finish.
- The following labels: GFL and DPC.
- All hatching detail.
- Label both views and include the scale.
- Any TWO dimensions.

All drawing must comply with the guidelines contained in the SANS 10143.

NOTE: Any dimension not included in the views are left to your discretion and should be made in good proportion.

GRADE 11
COURSE DRAWINGS
CIVIL ASSEMBLY
CIVIL DRAWING

Given:
- The incomplete north elevation of a new ablation block for a campsite showing the walls and the position of the windows
- The incomplete floor plan showing the walls, position of the windows, doors, sanitary fixtures and the electrical layout
- The incomplete foundation and wall detail of wall
- A door and window schedule
- A table of electrical symbols
- A table of sanitary fixtures

The incomplete floor plan of the new ablation block, drawn to scale 1 : 50.

Instructions:
- Answer this question on the answer sheet.
- Using the given incomplete floor plan, draw, to scale 1 : 50 and to the specifications, the following views of the new ablation block:
  1. The complete floor plan
  2. The north elevation
  3. A sectional elevation on cutting plane A-A
- ALL drawings must comply with the guidelines and conventions contained in the SABS 0142.

SPECIFICATIONS:
- THE FLOOR PLAN
  Add the following features to the drawing:
  - ALL the doors and windows
  - The sanitary fixtures as indicated with the abbreviations
  - ALL the electrical fixtures as indicated with the numbers

- THE NORTH ELEVATION
  Show the following features on the drawing:
  - The outside walls
  - The window detail
  - The finished floor level

- THE SECTIONAL ELEVATION
  Show the following features on the drawing:
  - The complete foundation, wall, slab detail
  - The window, with a single lintel, and door detail
  - ALL features and fixtures on and to the east of cutting plane A-A
  - ALL hatching detail

Label the following:
- The floor plan, including the scale
- The room designation and floor finish (ceramic tile)
- The north elevation and the sectional elevation
- Using the correct abbreviations, label the following features in the correct view: ground level, finished floor level and damp-proof course.

NOTE:
- ALL substructure hatching may be drawn in freehand.

ENGINEERING GRAPHICS AND DESIGN

FITTINGS
- D TOILETS
- W1 WINDOW OPENINGS
- B BATH
- SH SHOWER
- WC TOILET
- WB WASHBASIN

ELECTRICAL FITTINGS
1. TWO POLE LIGHT SWITCH
2. OUTSIDE LIGHT
3. 2 x 40 W FLUORESCENT TUBES
4. CEILING LIGHT
5. SWITCH SOCKET OUTLET

NOTE: THE ARROWS SHOW THE LIGHT CONNECTION TO THE SWITCH.

DIMENSIONS OF SANITARY FIXTURES

BATH TUB (B)

SHOWER (SH)
SOLID GEOMETRY
Given:
The front and top view of a right regular square prism with blind square hole and a section line.

Instruction:
Draw according to scale 1 : 1 and in first angle orthographic projection the following:
- The given front and top view
- The sectioned top view
- The sectioned left view
- The true shape of the section.

VASTE LIGGAME
Gegewe:
Die voor- en bo-aansig van 'n regte reëelmatige vierkantige prisma met 'n blinde vierkantige gat asook 'n snyvlak.

Instruksie
Teken volgens skaal 1 : 1 en in eerstehoeke orthografiese projeksie die volgende:
- Die gegewe bo- en vooraansig
- Die gesnyde bo-aansig
- Die gesnyde linkeraansig
- Die ware vorm van die gesnyde vlak.
SOLID GEOMETRY

Given:
The front view as well as the auxiliary view of a

PAPERWEIGHT with a cutting plane.

Instructions:
1. Draw according to scale 1:1 and in first
   angle projection the front view and auxiliary view.
2. The top view.
3. A sectioned left view.
4. Show all constrictions.

VASES: LIGGANGEN

Die vormaanleg en hulpbeperking van 'n PAPERWEIGHT

met 'n smyk.

Instruksie:
Teken volgens skaal 1:1 en in eerstehoekse
perspektiewe die volgende:
1. Die vooruitskynning
2. Die boewysing van die koriumsnavel
3. Die dunnteiksnaviging
SOLID GEOMETRY
Given:
- The front view and the auxiliary view of a paper weight
- Cutting plane A-A

Instructions:
- Draw, to scale 1:1 and in first angle orthographic projection, the given front view and the auxiliary view.
- The top view.
- The sectional left view.

NOTE:
- Show ALL necessary construction.
- NO hidden detail is required.

SOLIEDE GEOMETRIE
Gegee:
- Die vooraansig en hulpaansig van die papiergewig.
- Snyvlak A-A

Instruksies:
- Teken, volgens skaal 1:1 en in eerstehoekse ortografiese projeksie die gegewe vooraansig en hulpaansig.
- Die boaaansig
- Die gesnyde linkeraansig.

LET WEL:
- Toon ALLE nodige konstruksies.
GEEN verborge besonderhede word verlang nie.
INTERPENETRATION AND DEVELOPMENT

Given:
- The front view, top view and isometric drawing of a connecting pipe for the ventilation system consisting of hexagonal main pipe (A) and a hexagonal branch pipe (B).
- The axis of both pipes lie in a common vertical plane.

Instruction:
Draw in first-angle orthographic projection the following views of the connecting piece clearly showing the curve of interpenetration:
- The front view
- The top view
- The left view
- Develop the surface of the branch pipe (B).

NB: Show all necessary constructions and calculations.

DEURDRINGING EN ONTWIKKELING

Gegeen:
- Die voorwaardige, bo-aansig en isometriese tekening van die heggewag vir die ventilasiestelsel bestaande uit 'n seshoekige pyp (A) en 'n seshoekige takopp (B).
- Die asse van albei pypë lie in 'n gemenekeplike vertikale vlak.

Instruksies:
Tekken in eerstehoekige ortografiese projeksie, die volgende aansigte van die heggewag met die deurdringingskuurve duidelik toon:
- Die voorwaardige
- Die bo-aansig
- Die linkeraansig
- Ontwikkel die oppervlak van takopp (B).

NS-Toon ALLE nodige konstruksies en berekeninge.
TRANSITION PIECES
Given:
The figure shows the front view and top view of a square to square transition piece.

Instruction:
Copy both views according to scale 1 : 1 and determine the following:
* The surface development of the transition piece.
* Show ALL construction and the "FOLD LINES" on the development.

OORGANGSTUKKE
Gegewe:
Die figuur toon die vooraansig en bo-aansig van 'n vierkant tot vierkant oorgangstuk.

Instruksie:
Teken beide aansigte volgens skaal 1 : 1 en bepaal die volgende:
* Die oppervlakontwikkeling van die oorgangstuk.
* Toon ALLE konstruksies asook die "VOULYNE" op die ontwikkeling.
TRANSITION PIECES
Given:
The figure shows the front view and top view of a square to round transition piece.

Instruction:
Copy both views according to scale 1 : 1 and determine the following:
• The surface development of the transition piece.
• Show ALL construction and the "FOLD LINES" on the development.

ORGANSTUKKE
Gegee:
Die figuur toon die vooraan en bo-aanzig van 'n vierkant na ronde oorgangstuk.

Instruksies:
Teken beide aansigte volgens skaal 1 : 1 en bepaal die volgende:
• Die oppervlakontwikkeling van die oorgangstuk,
• Toon ALLE konstruksies asook die "VOULYNE" op die ontwikkeling.
LOCUS: HELIX

Given:
Fig 1 - the top view of an AUGER as well as an illustration.

Specifications:
- One and a half revolutions, starting at point A
- The pitch is 60 mm

Instructions:
Use the given information, draw a left handed AUGER by applying the given specifications

NOTE:
- ALL construction must be shown
- NO hidden detail required

LOKUSSE: HELIKS

Gegewe:
Fig 1 - die bo-aansig van 'n AWEGAAR asook 'n illustrasie.

Speelikaasies:
- Een en 'n halwe omwenteling wat by punt A begin
- Die steek is 60 mm

Instruksies:
Gebruik die gegewe inligting en teken 'n linkershendige AWEGAAR deur die gegewe inligting toe te pas:

NOTA:
- ALLE konstruiklikes moet getoon word
- GEEN verborge detail moet getoon word nie.
QUESTION 1

ENGINEERING GRAPHICS AND DESIGN

GIVEN:
A camshaft and a wedge-ended follower that reciprocates on a vertical centreline that passes through the centre of the cam shaft.

INSTRUCTIONS:
In the space provided draw a displacement graph that will impart the following motion to the given wedge-ended follower:
- From 0° to 150° a follower rises with uniform motion to a height of 75 mm
- Over the next 45° the follower is at rest
- Over the next 45° the follower rises a further 20 mm with uniform motion
- Over the last 90° the follower returns to its original position with uniform motion

The displacement graph has a horizontal scale of 6 mm equals 30° and a vertical scale of 1:1

From the given information draw:
The cam profile if the cam rotates in a clockwise direction.

Add the following to the drawing:
- Centreline.
- Direction of rotation.
- All necessary construction.

GRADE 11
COURSE DRAWINGS
LOCI: CAM
<table>
<thead>
<tr>
<th><strong>VERDUIDELIKING / DESCRIPTION</strong></th>
</tr>
</thead>
</table>

**SWITCHES / SKAKELAARS**

- Enkel Skakelaar
  - Single Switch
- Twee Skakelaars
  - Two Switches
- Drie Skakelaars
  - Three Switches
- Twee Rigting Skakelaar
  - Two Way Switch

**POWERPOINTS / KRAPPUNTE**

- Powerpoint with a switch
- Krappunt met ‘n skakelaar
- Powerpoint without a switch
- Krappunt sonder ‘n skakelaar

**ELECTRICAL ELEKTRIES**

INLIGTINGSBLAD

INFORMATION SHEET
ELECTRICAL DRAWINGS
Given:
- A floor plan of a house.
- The electrical wiring of the lights and plugs.
- The main supply and the geyser and stove isolators

Instruction:
Supply a schematic presentation of the wiring.

ELEKTRIESE TEKENINGE
Gegee:
- 'n Vloerplan van 'n huis.
- Die elektriese bedrading van die ligte en muurprope.
- Die hoof kragtoevoer en die geyser en stoof isolators.

Instruksie:
Verstrek 'n skematiese voorstelling van die bedrading.
CIVIL and ELECTRICAL DRAWING

GIVEN:
- A table of electrical symbols
- A table of fixtures
- The incomplete floor plan showing the walls, windows, doors and position of the fixtures and the electrical fixtures
- A diagram showing the room designations and floor finishes

INSTRUCTIONS:
Complete the given floor plan by adding the following:
- ALL fixtures as indicated by the abbreviations
- ALL the electrical fixtures as indicated by the numbers
- ALL hatching detail

Label the following:
The room designations with floor finishes

NOTE:
ALL drawings must comply with the guidelines and conventions contained in the SANBS 10143.
<table>
<thead>
<tr>
<th>VRAE</th>
<th>ANTWOORDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wanneer is die tekening goedgekeur?</td>
<td>09-06-2015</td>
</tr>
<tr>
<td>Wat is die materiaal wat gebruik vir die vervaardiging?</td>
<td>GEGOTTE YSTER</td>
</tr>
<tr>
<td>Hoeveel hersienings is daar van die tekening gemaak?</td>
<td>2</td>
</tr>
<tr>
<td>Wat was die rede vir die laaste hersiening?</td>
<td>MATERIAAL VERANDER</td>
</tr>
<tr>
<td>Waarvoor was Peter verantwoordelik?</td>
<td>TEEKING GOEDKEUR</td>
</tr>
<tr>
<td>Wat is die skaal vir die tekening?</td>
<td>SKAAL 1:1</td>
</tr>
<tr>
<td>Wat is die titel van die tekeninig?</td>
<td>VERTIKALE GIDS</td>
</tr>
<tr>
<td>Wat is die nommer van die tekening?</td>
<td>1569-GC-J</td>
</tr>
<tr>
<td>Wat is die onderneming vir die ontwerp?</td>
<td>JANCOR DESIGNS</td>
</tr>
<tr>
<td>Wat is die tekenprogramma gebruik?</td>
<td>AUTOCAD 2009</td>
</tr>
<tr>
<td>Wat is die aansig 1 genoem?</td>
<td>BO-AANSG</td>
</tr>
<tr>
<td>Wat is die aansig 2 genoem?</td>
<td>DEURSNEE VOORAANSIG of DEURSNEE A-A</td>
</tr>
<tr>
<td>Wat is die aansig 3 genoem?</td>
<td>REGTER AANSG</td>
</tr>
<tr>
<td>Wat is die afmeting van gat A?</td>
<td>6</td>
</tr>
<tr>
<td>Wat is die afmeting van gat B?</td>
<td>RIB/WEB</td>
</tr>
<tr>
<td>Wat is die dikte van plaat D?</td>
<td>FILLET</td>
</tr>
<tr>
<td>Wat is die dikte van plaat E?</td>
<td>10</td>
</tr>
<tr>
<td>Wat is die dikte van plaat F?</td>
<td>40</td>
</tr>
<tr>
<td>Wat is die dikte van plaat F?</td>
<td>10</td>
</tr>
<tr>
<td>Tekken, in netjiesse vryhand, in die voorsiening spasie, die konfensie simbool wat gebruik word om 'n laer voor te stel.</td>
<td>2</td>
</tr>
<tr>
<td>Tekken die orthografiese simbool in die oop spasie aan die linker onderste hoek van die tekening.</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>On what date was the drawing approved?</td>
<td>09-06-2015</td>
</tr>
<tr>
<td>What material is used to manufacture the vertical guide?</td>
<td>CAST IRON</td>
</tr>
<tr>
<td>How many revisions have been made to the drawing?</td>
<td>2</td>
</tr>
<tr>
<td>What was the reason for the last revision?</td>
<td>Material changed</td>
</tr>
<tr>
<td>What was Peter responsible for?</td>
<td>Approve Drawing</td>
</tr>
<tr>
<td>What scale was used for the drawing?</td>
<td>SCALE 1:1</td>
</tr>
<tr>
<td>What is the title of the drawing?</td>
<td>VERTICAL GUIDE</td>
</tr>
<tr>
<td>What is the drawing number?</td>
<td>1569-GC-J</td>
</tr>
<tr>
<td>Which Company was responsible for the design?</td>
<td>JANCOR DESIGNS</td>
</tr>
<tr>
<td>What drawing program was used?</td>
<td>AUTOCAD 2009</td>
</tr>
<tr>
<td>What is view 1 called?</td>
<td>TOP VIEW</td>
</tr>
<tr>
<td>What is view 2 called?</td>
<td>SECTIONAL FRONT VIEW or SECTION A-A</td>
</tr>
<tr>
<td>What is view 3 called?</td>
<td>RIGHT VIEW</td>
</tr>
<tr>
<td>What is the dimension of hole A?</td>
<td>6</td>
</tr>
<tr>
<td>What is feature B called?</td>
<td>RIB/WEB</td>
</tr>
<tr>
<td>What is feature C called?</td>
<td>FILLET</td>
</tr>
<tr>
<td>What is the thickness of rib D?</td>
<td>10</td>
</tr>
<tr>
<td>Determine the dimension at E?</td>
<td>40</td>
</tr>
<tr>
<td>Determine the dimension at F?</td>
<td>10</td>
</tr>
<tr>
<td>In the space provided at the bottom of the page, in neat hand the symbol for the convention of a bearing.</td>
<td>2</td>
</tr>
<tr>
<td>In the space provided at the bottom of the page, in neat hand the symbol for the orthographic system used.</td>
<td>4</td>
</tr>
</tbody>
</table>

| GRADE 11 COURSE DRAWINGS MECHANICAL ANALYTICAL                      |         |
MARK ALLOCATION OF THE M10 BOLT, WASHER AND HATCHING
PUNTETOEKENNING VIR DIE M10-BOUT, WASTER EN ARSERING
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
Two views of a SOCKET KEY drawn in 3rd angle orthographic projection.

INSTRUCTIONS:
Draw to scale 1:1, the ISOMETRIC view of the SOCKET KEY.
Make A the lowest point.

Note:
- Show ALL necessary construction.
- NO hidden detail required.

If used as an assessment task it would be marked out of out of 35.

LOWER ORDER 7
✓ MIDDLE ORDER 10
✓ HIGHER ORDER 18
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
Two views of a built structure 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.
- Locate and label the vanishing points.
- NO hidden detail is required.
- Show ALL necessary construction.
- Align the drawing sheet with the horizon line (HL).

If used as an assessment task it would be marked out of out of 45.
✓ LOWER ORDER 12
✓ MIDDLE ORDER 23
✓ HIGHER ORDER 10
ANSWERS

1. FOUNDRY A
   DAMP-PROOF COURSE F
   GROUND LEVEL C
   PLASTER BRICK J
   WINDOWSILL G
   COMPACTED HARDCORE D
   UNDISTURBED EARTH B
   WINDOW GLASS H
   Lintel I
   FINISHED FLOOR LEVEL E

2. MANNHOLE 2
3. INSPECTION EYE 2
4. RODDING EYE 2
5. BUILDING LINE 2
6. WATER Closet 2
7. 3
8. 3
9. 3
10. 3

TOTAL 32

FREEHAND ✓

FREEHAND ✓

CIRCLE ARROW 1
FREEHAND ✓

ANSWER 10
Show ALL calculations.

(4.5 x 10.5) + (4.5 x 10.5) = 94.5 m²

ANTWOORD

1. FONDASIE A
   VOEGWERELGA F
   GRONDVLAK C
   PLEISTERSTEEN J
   VENSTERBANK G
   GEKOMPAKTEERDE HARDEPUIN D
   ONGESTEURDE AARDE B
   VENSTERGLAS H
   BETONLATEI I
   VOLTOOIDE VLOEVLAK E

2. MANGAT 2
3. INSPEKSIE OOG 2
4. STEEK OOG 2
5. BOULYN 2
6. WATERKLOSET 2
7. 3
8. 3
9. 3
10. 3

TOTAL 32

FREEHAND ✓

FREEHAND ✓

CIRCLE ARROW 1
FREEHAND ✓

ANTWOORD 10
Toon ALLE berekeninge.

(4.5 x 10.5) + (4.5 x 10.5) = 94.5 m²
ENGLISH GRAPHICS AND DESIGN

ANALYTICAL: Two views and a title panel of a proposed new dwelling are shown. Complete the table below by neatly answering the questions, which all refer to the accompanying drawing and title block.

1. What is the reference number of the drawing? 15-SSD-2012
2. What is the address of the proposed new dwelling? 32 HIGH STREET INANDA
3. What is the reason for the revision of the proposed new dwelling? CHANGE AND MOVE WINDOWS
4. How many doors are shown on the plan? 5
5. How many different sized windows are shown on the plan? 3
6. How many different floor finishes are there? 3
7. What does the line numbered 1 indicate? WINDOW OPENING
8. What does the line numbered 2 indicate? FFL
9. What does the line numbered 3 indicate? NGL
10. What is the feature numbered 4? STEP
11. What is the abbreviation for the fixture numbered 5? BIC
12. What does the label numbered 6 show? ROOM DESIGNATION
13. What does the symbol numbered 7 indicate? NORTH POINT
14. What would VIEW 1 be called? PLAN / FLOORPLAN
15. What would VIEW 2 be called? SOUTH WEST ELEVATION
16. With reference to view 2, on which side of the view would you place the south east elevation? RIGHT HAND SIDE
17. What SI unit are the dimensions given in? MILLIMETRES
18. In the space provided on the title panel, draw, in neat freehand, the front view and top view of the SANS 10143 symbol for a bath.
19. Determine the perimeter of the dwelling in metres. 6.8 + 6.8 + 9.8 + 3.9 + 3.9 + 1.65 + 1.65 + 4 = 36.5m
20. Determine the total area of the dwelling in m². (5.15 * 9.8) + (4 * 1.65) + (3.9 * 1.65) = 63.505m²

TOTAL

GRADE 11 COURSE DRAWINGS CIVIL ANALYTICAL
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
- The incomplete floor plan and an incomplete schematic elevation of a bathroom showing the position of the features and the fixtures. The hatching detail and labels have all been left off the drawing.
- The door and window schedule.
- The fixtures.
- The electrical symbols.

DRAW:
In the space provided on the drawing sheet, draw to a scale of 1:50 the following views of the bathroom:
- 3.1 the complete floor plan; and
- 3.2 the complete sectional elevation on A-A.

NOTE:
The walls of the plan have been drawn for you on the drawing sheet.

Add the following features to the completed drawing:
- The door and window.
- All fixtures drawn as symbols.
- All electrical fitting shown as numbers.
- The room designation and a tile floor finish.
- The following labels: NGL and DPC
- All hatching detail.
- Label both views and include the scale.
- Any TWO dimensions.

All drawing must comply with the guidelines contained in the SABS 0143.

NOTE: Any dimension not included in the views are left to your discretion and should be made in good proportion.

If used as an assessment task it would be marked out of out of 52.
- LOWER ORDER 16
- MIDDLE ORDER 26
- HIGHER ORDER 10
ware hoogte
vd LAS!
true height
of the SEAM!

OMTREK  = Pi x Diameter
Circumference  = Pi x Diameter
= 3.14 x 30 mm
= 94.2 mm

1 Sekse / Section = 94.2 mm / 12
= 7.85 mm
QUESTION 1

ENGINEERING GRAPHICS AND DESIGN

GIVEN:
A camshaft and a wedge-ended follower that reciprocates on a vertical centreline that passes through the centre of the cam shaft.

INSTRUCTIONS:
In the space provided draw a displacement graph that will impart the following motion to the given wedge-ended follower:
- From 0° to 150° a follower rises with uniform motion to a height of 75 mm
- Over the next 45° the follower is at rest
- Over the next 45° the follower rises a further 20 mm with uniform motion
- Over the last 90° the follower returns to its original position with uniform motion

The displacement graph has a horizontal scale of 8 mm equals 30° and a vertical scale of 1:1

From the given information draw:
The cam profile if the cam rotates in a clockwise direction.

Add the following to the drawing:
- Centrelines.
- Direction of rotation.
- ALL necessary construction.

If used as an assessment task it would be marked out of out of 25,
- LOWER ORDER 5
- MIDDLE ORDER 9
- HIGHER ORDER 11

GRADE 11
COURSE DRAWINGS
LOCI: CAM
CIVIL and ELECTRICAL DRAWING

GIVEN:
- A table of electrical symbols
- A table of fixtures
- The incomplete floor plan showing the walls, windows, doors and position of the fixtures and the electrical fixtures
- A diagram showing the room designations and floor finishes
- The incomplete floor plan.

INSTRUCTIONS:
Complete the given floor plan by adding the following:
- ALL fixtures as indicated by the abbreviations
- ALL the electrical fixtures as indicated by the numbers
- ALL hatching detail

Label the following:
The room designations with floor finishes

NOTE:
ALL drawings must comply with the guidelines and conventions contained in the SANBS 10143.

If used as an assessment task it would be marked out of 40.
LOWER ORDER 10
MIDDLE ORDER 16
HIGHER ORDER 14
ENGINEERING GRAPHICS & DESIGN

SCHOOL-BASED ASSESSMENT

GRADE 12

EXAMPLES
MECHANICAL

Given:
A drawing showing the incomplete front view, left view and an isometric drawing of a bracket with a
title block and a table of questions. Not all the drawings have been prepared to the indicated scale.

Instructions:
Complete the table below by neatly answering the questions, which all refer to the accompanying
carings and the title block.

QUESTIONS | ANSWERS
--- | ---
1. On what date was the drawing first completed?
2. What scale is indicated for the drawing?
3. Name the feature marked symbol A?
4. Name the symbol marked C, indicated on the welding symbol.
5. Determine the complete dimension at D.
6. Add the All-round-weld-symbol to the welding symbol.
7. Complete the front view by completing the M28 full threaded bolt, showing three faces of the bolt head.
8. Complete the front view by completing the 35 mm long threaded shaft of M28 Bolt as well as the rest of the threaded hole.
9. Complete the front view by adding the needed hatchings.
10. Complete the left view to show the tapped hole only.
11. Add the cutting plane and label it S-S.
### Analytical (Mechanical)

**Given:**
Three views and two detailed enlargements of a tapping valve assembly, a title block and a table of questions. The drawings have not been prepared to the indicated scale.

**Instructions:**
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and the title block.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 What is the title of the assembly?</td>
<td>1</td>
</tr>
<tr>
<td>2 On what date was the drawing drawn?</td>
<td>1</td>
</tr>
<tr>
<td>3 What is the drawing number?</td>
<td>1</td>
</tr>
<tr>
<td>4 What scale is indicated for the drawing?</td>
<td>1</td>
</tr>
<tr>
<td>5 Which drawing program was used?</td>
<td>1</td>
</tr>
<tr>
<td>6 Who approved the drawing?</td>
<td>1</td>
</tr>
<tr>
<td>7 What material is used to manufacture the main base?</td>
<td>1</td>
</tr>
<tr>
<td>8 What would VIEW 2 be called?</td>
<td>1</td>
</tr>
<tr>
<td>9 How many socket head bolts are there in the assembly?</td>
<td>1</td>
</tr>
<tr>
<td>10 Give the complete dimensions at: A: B: C:</td>
<td>3</td>
</tr>
<tr>
<td>11 Name the feature at F.</td>
<td>FILLET</td>
</tr>
<tr>
<td>12 Name the type of section at D.</td>
<td>PARTIAL SECTION</td>
</tr>
<tr>
<td>13 Why is the component at E filled in solid?</td>
<td>SPECIFIC PART HATCHING e.g. RUBBER or THIN PART</td>
</tr>
<tr>
<td>14 What is the total height of the assembly?</td>
<td>29</td>
</tr>
<tr>
<td>15 What is the purpose of the two enlarged detailed views?</td>
<td>TO SHOW DETAIL</td>
</tr>
<tr>
<td>16 What is indicated by the convention at G?</td>
<td>INTERRUPTED VIEW CONTINUES</td>
</tr>
<tr>
<td>17 With reference to the tolerance, determine the maximum dimension at H?</td>
<td>Ø6.35</td>
</tr>
<tr>
<td>18 With reference to the tolerance, determine the minimum dimension at H?</td>
<td>Ø6.47</td>
</tr>
<tr>
<td>19 Insert the cutting plane on VIEW 3 and label it A-A.</td>
<td>3</td>
</tr>
<tr>
<td>20 In the space provided below, draw, in neat freehand, the symbol for the projection system used.</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total** 30

---

**Parts List**

<table>
<thead>
<tr>
<th>PARTS LIST</th>
<th>FILE NAME: RCDVK0002.dwg</th>
<th>TITLE TAPPING VALVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 VALVE ASSEMBLY</td>
<td>1 REP: DETAILED DRAWING</td>
<td>APPROVED: ANDREW BRAND</td>
</tr>
<tr>
<td>2 SOCKET HEAD BOLT</td>
<td>3 TOOL STEEL</td>
<td>DRAWING No. 2015-A-005</td>
</tr>
<tr>
<td>3 SQUARE BOLT WITH PUNCH</td>
<td>1 TOOL STEEL</td>
<td>CHECKED: SOON DENTON</td>
</tr>
<tr>
<td>4 MAIN BASE</td>
<td>1 PEWTER</td>
<td>DRAWN: CHRISTI GREEF</td>
</tr>
<tr>
<td>5 CAP</td>
<td>1 PEWTER</td>
<td>2015/01/23</td>
</tr>
<tr>
<td>8 O-RING</td>
<td>1 RUBBER</td>
<td>2015/01/16</td>
</tr>
<tr>
<td>7 O-SEAL</td>
<td>1 RUBBER</td>
<td>2015/01/05</td>
</tr>
</tbody>
</table>

**Grade 12 Analytical (Mechanical)**

ReCO Refrigeration

10 Edison Blvd
Industrial Park
1911

TAP VALVE TO BE USED FOR TAPPING OF 1/4", 1/2", 3/4" AND 1" REFRIGERANT PIPES ONLY

Scale 2:1
QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
The front view and right view of a copper pipe cutter assembly, a parts list, a title block and a table of questions. The drawings has not been prepared to the given scale.

Instructions:
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and the title block.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 What is the title of the drawing?</td>
<td>1</td>
</tr>
<tr>
<td>2 What scale is indicated for the drawing?</td>
<td>1</td>
</tr>
<tr>
<td>3 Which drawing program was used?</td>
<td>1</td>
</tr>
<tr>
<td>4 Who approved the drawing?</td>
<td>1</td>
</tr>
<tr>
<td>5 In which unit are the dimensions presented?</td>
<td>1</td>
</tr>
<tr>
<td>6 What material is used to manufacture the cutter?</td>
<td>1</td>
</tr>
<tr>
<td>7 How many components make up the pipe cutter assembly?</td>
<td>1</td>
</tr>
<tr>
<td>8 What would VIEW 2 be called?</td>
<td>1</td>
</tr>
<tr>
<td>9 Determine the complete dimensions at A: B: C: D:</td>
<td>4</td>
</tr>
<tr>
<td>10 Measure the angle at E?</td>
<td>2</td>
</tr>
<tr>
<td>11 What is the thickness of the feature at F?</td>
<td>1</td>
</tr>
<tr>
<td>12 Name the type of finish at G.</td>
<td>1</td>
</tr>
<tr>
<td>13 What is the purpose for the feature at G?</td>
<td>2</td>
</tr>
<tr>
<td>14 How many surfaces of the pipe cutter assembly must be machined?</td>
<td>1</td>
</tr>
<tr>
<td>15 Referring to the parts list, name the part at H.</td>
<td>1</td>
</tr>
<tr>
<td>16 Referring to the parts list, name the part at J.</td>
<td>2</td>
</tr>
<tr>
<td>17 With reference to the tolerance, determine the minimum dimension at K?</td>
<td>2</td>
</tr>
<tr>
<td>18 With reference to the tolerance, determine the maximum dimension at K?</td>
<td>2</td>
</tr>
<tr>
<td>19 In the space below, draw, in neat hand, the symbol for the projection system used.</td>
<td>4</td>
</tr>
</tbody>
</table>

TOTAL 30
<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>SECTIONAL FRONT VIEW</th>
<th>PROPERTY</th>
<th>NOTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 MB BOLT</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 SMALL WASHER</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 CAP</td>
<td>4 1/2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 BASE + SPHERE</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 O' RING</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 TOGGLE</td>
<td>6 1/2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 BLOCK ATTACHMENT</td>
<td>9 1/2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 LARGE WASHER + M10 NUT</td>
<td>7 1/2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 HATCHING</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SUBTOTAL</td>
<td>62</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOP VIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MB BOLT</td>
</tr>
<tr>
<td>2 GAP</td>
</tr>
<tr>
<td>3 BASE</td>
</tr>
<tr>
<td>SUBTOTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CENTRE LINES</td>
</tr>
<tr>
<td>2 ASSEMBLY</td>
</tr>
<tr>
<td>SUBTOTAL</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL PENALTIES(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRAND TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRADE 12</td>
</tr>
<tr>
<td>COURSE DRAWINGS</td>
</tr>
<tr>
<td>MECHANICAL ASSEMBLY</td>
</tr>
</tbody>
</table>
ENGINEERING GRAPHICS AND DESIGN

MECHANICAL ASSEMBLY

Given:
• The exploded isometric drawing of the parts of a tractor joint assembly, showing the position of each part relative to all the others.
• Orthographic views of each of the parts of the tractor joint assembly.

Instructions:
Answer this question on page 6. Draw, to scale 1 : 1 and in third-angle orthographic projection the following views of the assembled tractor joint.
• A sectional front view on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, which passes vertically through the centre of the assembly, is shown on the top view of the base (part 4).
• The top view. NO hidden detail is required.

NOTE:
• ALL drawings must comply with the guidelines as contained in the SANS 10111.
• Show TWO faces of the M8 bolts.
• Show THREE faces of the M16 nut.

<table>
<thead>
<tr>
<th>PARTS LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARTS</td>
</tr>
<tr>
<td>1 M8 BOLT</td>
</tr>
<tr>
<td>2 SMALL WASHER</td>
</tr>
<tr>
<td>3 CAP</td>
</tr>
<tr>
<td>4 BASE</td>
</tr>
<tr>
<td>5 SPHERE</td>
</tr>
<tr>
<td>6 O-RING</td>
</tr>
<tr>
<td>7 TOGGLE</td>
</tr>
<tr>
<td>8 BLOCK ATTACHMENT</td>
</tr>
<tr>
<td>9 LARGE WASHER</td>
</tr>
<tr>
<td>10 M16 NUT</td>
</tr>
</tbody>
</table>

GRADE 12 COURSE DRAWINGS MECHANICAL ASSEMBLY
MECHANICAL ASSEMBLY

Given:
- The exploded isometric drawing of the parts of a distribution box lock assembly, showing the position of each part relative to all the others.
- Orthographic views of each of the parts of the distribution box lock assembly.

Instructions:
- Answer this question on page 6.
- Draw, to scale 2:1 and in third-angle orthographic projection, the following views of the assembled parts of the distribution box lock assembly:
  4.1 A sectional front view on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, which passes vertically through the centre of the assembly, is shown on the right view of the base (part 3).
  4.2 The right view
- ALL drawing must comply with the guidelines contained in the SANS 10111.

NOTE:
- Show THREE faces and ALL necessary construction of the M12 nut.
- Show ALL necessary construction of the ellipse.
- Show ALL necessary construction of the triangle.
- Add cutting plane A-A to the drawing.
- NO hidden detail is required.

<table>
<thead>
<tr>
<th>PARTS LIST DOE 12.1 - 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART</td>
</tr>
<tr>
<td>SHAFT</td>
</tr>
<tr>
<td>SEAL</td>
</tr>
<tr>
<td>BASE</td>
</tr>
<tr>
<td>GUIDE PIN</td>
</tr>
<tr>
<td>LOCKING LEVER</td>
</tr>
<tr>
<td>WASHER</td>
</tr>
<tr>
<td>M12 NUT</td>
</tr>
</tbody>
</table>

123 STRUBEN STREET
PRETORIA
0000
www.jpwengineering.co.za
011 963 7200

DISTRIBUTION BOX LOCK

ALL DIMENSIONS ARE IN MILLIMETRES
ALL UNSPECIFIED RADIi ARE R0
NOTE:

Contractors must verify all dimensions and levels on site before commencing with any work.

ARCHITECT’S SIGNATURE

EGD ARCHITECTS
SCHOEMANSTRAAT 188
PRETORIA 0001
Tel: 012 555 2345

CRITICAL DETAILS

LOAD-BEARING WALL
DAMP-PROOF COURSE
LINE BREAK
SCREEN
COMPACTED HARDSCAPE

NOTE: The hatching on the drawings is not in accordance with the SABS 0143 guidelines.

VIEW 2

ARCHITECTURAL PLAN

PROPOSED NEW DWELLING
FOR P MSOMI ON
SUB 3 OF STAND No 49 AT
01 PLANE STREET
CENTURION

PROJECT NUMBER
2009 - 351
REFERENCE CODE
Q1P1 - N - 2009

GRADE 12

CIVIL ANALYTICAL

SIVIEL ANALITIES
NOTE:
Contractors must verify all dimensions and levels on site before commencing work. Architects must be notified immediately of any discrepancies.

ARCHITECT'S SIGNATURE.................................
CLIENT'S SIGNATURE.................................

QUESTION 1: ANALYTICAL (CIVIL)
Given:
The site plan of an existing house with a proposed new garage and timber deck, a title panel and a table of questions. The drawing has not been prepared to the indicated scale.

Instructions:
Complete the table below by neatly answering the questions, which refer to the accompanying drawing and title panel.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What is the project number?</td>
</tr>
<tr>
<td>2</td>
<td>How many signatures are required?</td>
</tr>
<tr>
<td>3</td>
<td>How many revisions have been made to the drawing?</td>
</tr>
<tr>
<td>4</td>
<td>Who is the client?</td>
</tr>
<tr>
<td>5</td>
<td>On what date was the site plan printed?</td>
</tr>
<tr>
<td>6</td>
<td>How many new additions are indicated on the site plan?</td>
</tr>
<tr>
<td>7</td>
<td>What does the abbreviation IC stand for?</td>
</tr>
<tr>
<td>8</td>
<td>What is indicated by the arrows on the line at 1?</td>
</tr>
<tr>
<td>9</td>
<td>Name the feature at 2.</td>
</tr>
<tr>
<td>10</td>
<td>In what colour should the feature at 3 be shown?</td>
</tr>
<tr>
<td>11</td>
<td>What does the line at 4 indicate?</td>
</tr>
<tr>
<td>12</td>
<td>What does the broken line at 5 indicate?</td>
</tr>
<tr>
<td>13</td>
<td>What is the length of the boundary line at 6 in metres?</td>
</tr>
<tr>
<td>14</td>
<td>What is the width of Freedom Street in millimetres?</td>
</tr>
<tr>
<td>15</td>
<td>What is the difference in ground level height between corner A and corner B of the buildings in metres?</td>
</tr>
<tr>
<td>16</td>
<td>On which side of the existing house is the new timber deck?</td>
</tr>
<tr>
<td>17</td>
<td>Which municipal service is found on the land adjacent to stand 21?</td>
</tr>
<tr>
<td>18</td>
<td>In the space below, determine the perimeter of the existing house in metres.</td>
</tr>
<tr>
<td>19</td>
<td>In the space below, determine the combined total area of the existing house and the new garage in square metres.</td>
</tr>
<tr>
<td>20</td>
<td>In the space provided in the title panel, draw, in neat freehand, the front view and top view of the SANS 10143 graphical symbol for a BATH.</td>
</tr>
</tbody>
</table>

TOTAL 30

ANSWER 18
Show ALL calculations.

ANSWER 19
Show ALL calculations.

GRADE 12
COURSE DRAWINGS
CIVIL ANALYTICAL
NOTE: Contractors must verify all dimensions and levels on site before commencing work. Architect to be notified immediately of any discrepancies.

ARCHITECT’S SIGNATURE

CLIENT’S SIGNATURE

20. In the space provided below, draw, in neat freehand, the front view and top view of the SANS 10143 graphical symbol for a single kitchen sink.

**MINKI’S DREAM HOMES**

**101 PAUL KRUGER STREET**

**PRETORIA**

**Tel 012 552 2785**

**PRINTED BY**

**D&E PRINTERS**

**DATE OF PRINT**

**2013-10-30**

**SITEMAP**

**PROJECT**

**PROPOSED NEW CONSULTING ROOMS**

**REFERENCES**

**PROJECT NUMBER**

**001**

**DRAWING NUMBER**

**1 of 4**

**REFERENCE CODE**

**12PALEXEMP20/14**

**DRAWN BY**

**G.M. VISHNU**

**CHECKED BY**

**M. G. H. SEVERS**

**DATE**

**2013-09-12**

**SCALE**

**1:250**

**ANALYTICAL (CIVIL)**

**Given:**
A site plan for proposed new consulting rooms, a title panel and a table of questions. The drawing has not been prepared to the indicated scale.

**Instructions:**
Complete the table below by neatly answering the questions, which all refer to the accompanying drawing and title panel.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. On what date was the stand surveyed?</td>
<td>1</td>
</tr>
<tr>
<td>2. What was Vishnu responsible for?</td>
<td>1</td>
</tr>
<tr>
<td>3. How wide is the pavement on Duiker Avenue in metres?</td>
<td>1</td>
</tr>
<tr>
<td>4. What is the client’s name?</td>
<td>1</td>
</tr>
<tr>
<td>5. How many new parking bays are indicated?</td>
<td>1</td>
</tr>
<tr>
<td>6. How many new inspection eyes are required?</td>
<td>1</td>
</tr>
<tr>
<td>7. On which property is the municipal sewer connection located?</td>
<td>1</td>
</tr>
<tr>
<td>8. In what colour is a new building presented on a site plan?</td>
<td>1</td>
</tr>
<tr>
<td>9. In what colour is a new sewer line presented on a site plan?</td>
<td>1</td>
</tr>
<tr>
<td>10. What does the arrow at 1 indicate?</td>
<td>1</td>
</tr>
<tr>
<td>11. What does the line at 2 indicate?</td>
<td>1</td>
</tr>
<tr>
<td>12. What does the line at 3 indicate?</td>
<td>1</td>
</tr>
<tr>
<td>13. Name the feature at 4.</td>
<td>1</td>
</tr>
<tr>
<td>14. What must be done to the existing building on the stand?</td>
<td>1</td>
</tr>
<tr>
<td>15. What is the difference in height between the highest and the lowest corner of the stand in metres?</td>
<td>1</td>
</tr>
<tr>
<td>16. What is the distance from wall X to Duiker Avenue in metres?</td>
<td>2</td>
</tr>
<tr>
<td>17. What would be the elevation of the new consulting rooms facing stand 78 be called?</td>
<td>2</td>
</tr>
<tr>
<td>18. In the space below, determine the perimeter of the new consulting rooms in metres. Show ALL calculations.</td>
<td>4</td>
</tr>
<tr>
<td>19. In the space below, determine, in square metres, the total floor area that needs to be tiled if the outside walls are 200 mm thick. Show ALL calculations.</td>
<td>4</td>
</tr>
<tr>
<td>20. In the space provided in the title panel, draw, in neat freehand, the front view and top view of the SANS 10143 graphical symbol for a single kitchen sink.</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL 30**
CIVIL ASSEMBLY DRAWING
Given:
- The incomplete complete south elevation of new consulting rooms, showing the walls, the window, the front door, the roof and notes
- The incomplete floor plan, showing the walls, position of the window, doors, fixtures and the electrical fittings
- Roof notes and a schematic diagram of a roof truss
- Incomplete foundation and wall detail
- The floor finishes and a diagram showing the room designations
- A door and window schedule
- A table of roof components
- A table of electrical symbols
- A table of sanitary fixtures
- The incomplete floor plan of the new consulting rooms, drawn to scale 1:50, answer sheet

Instructions:
- Answer the question on the answer sheet.
- Using the given incomplete floor plan, draw, in first-angle orthographic projection and to scale 1:50, the following views of the new consulting rooms:
  - 4.1 The complete floor plan
  - 4.2 The complete south elevation
  - 4.3 A sectional elevation on cutting plane A-A
- ALL drawings must comply with the guidelines and graphical symbols contained in the SANS 10143.

SPECIFICATIONS:
THE FLOOR PLAN
- Add the following features to the drawing:
  - ALL doors and windows
  - ALL the sanitary fixtures as indicated by the abbreviations
  - ALL the electrical fittings as indicated by the numbers
  - ALL hatching detail

THE SOUTH ELEVATION
- Show the following features on the drawing:
  - The outside walls and finished floor level
  - The roof detail, including the gutter, fascia board and rainwater downpipe
  - The window detail

DETAILED SECTION
- In the space provided, 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 and external wall detail
- The window detail, with a DOUBLE lintel
- The roof detail, including the fascia board and gutter
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:
- The room designations with floor finishes
- The sectional elevation and north-east elevation
- Using the correct abbreviations, label the following features in the correct view: ground level and damp-proof course.

NOTE:
- ALL substructure hatching may be drawn in freehand.
**Civil Drawing**

**Given:**
- The incomplete south elevation of a new cottage, showing the walls, the window, the door opening, the roof and notes.
- The incomplete floor plan showing the walls, position of the doors; windows, fixtures and electrical layout.
- Roof notes with a schematic diagram of a roof truss.
- The incomplete foundation and wall detail.
- Room designations and floor finish.
- A door and window schedule.
- A table of fixtures.
- A table of roof components.
- A table of electrical symbols.
- A table of rainwater items.
- The incomplete floor plan of the new cottage, drawn to scale 1:50 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 cottage:

4.1.1 THE COMPLETE FLOOR PLAN
Add the following features to the drawing:
- ALL doors and windows.
- ALL fixtures as indicated by abbreviations.
- ALL electrical fittings as indicated by numbers.
- ALL hatching detail.

4.1.2 THE COMPLETE SOUTH ELEVATION
Show the following features on the drawing:
- The outside walls, window and door detail.
- The roof detail, including the fascia board, gutter, rainwater down pipe and gulley.
- The finished floor level.

4.2 In the space provide on page 6, draw, to scale 1:20, a DETAILED SECTION according to cutting plane A-A of the area in the ellipse shown on the floor plan:
- Show the following features on the drawing:
  - The complete foundation, external wall and door detail.
  - The roof detail, including the fascia board and gutter.
  - ALL features to the left of the section.
  - ALL hatching detail. ONLY the substructure hatching may be drawn in neat free hand.

Label the following:
- The south elevation including the scale.
- The room designations and floor finishes.
- Using the correct abbreviations, label the following features in the correct view: ground level, finished floor level and damp proof course.

**NOTE:**
- ALL drawings must comply with the guidelines and graphical symbols contained in the SANS 10143.
1. Roof Notes:
- Roof pitch: 20°
- Spans: 115 x 38 mm roof truss on 115 x 38 mm wall plates
- Overhang: 300 mm
- Roof cover: 15 mm fibre cement sheet on 75 x 50 mm purlins @ 1000 mm c/c
- Fasica board on all sides and 300 x 10 mm barge board on gabled ends
- 9 mm ceiling board on 38 x 38 mm boarding strips @ 315 mm c/c

2. Roof Components (NTS):
- 115 x 38 mm wall plate
- 75 x 50 mm purlin
- 300 x 10 mm fibre cement barge board
- 200 x 20 mm fasica board

3. Electrical Symbols:
- Switch
- Light
- Socket
- Ceiling light
- Switched socket outlet
- One way switch - single pole
- One way switch - double pole
- Fluorescent light 2 x 40 W
- Ceiling light
- Wall mounted light

4. Electrical Fittings:
- The arrow shows the light connection to the switch.

5. CIVIL DRAWING:
- Given:
  - The incomplete south elevation of a new cottage, showing the walls, the window, the door opening, the roof and notes
  - The incomplete floor plan showing the walls, position of the doors, windows, fixtures and electrical layout
  - Roof notes with a schematic diagram of a roof truss
  - The incomplete foundation and external wall detail
  - The incomplete foundation and internal wall detail
  - A table of roof components
  - A table of electrical symbols
  - Room designations and floor finish
  - A door and window schedule
  - A table of fixtures
  - The incomplete floor plan of the new cottage, drawn to scale 1:50, as well as the break line and incomplete internal wall foundation, drawn to scale 1:20, on page 6

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 cottage:

4.1.1 The Complete Floor Plan
- All doors and windows
- All fixtures as indicated by abbreviations
- All electrical fittings as indicated by numbers
- All hatching detail

4.1.2 The South Elevation
- The outside walls, window and door detail
- The roof detail, including the fascia board and barge board
- The finished floor level

4.2 Using the given break line and incomplete internal wall foundation, draw, to scale 1:20, a detailed section according to 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 internal and external foundation, wall and window detail
- The roof detail, including the fascia board
- All hatching detail. ONLY the substructure hatching may be done in neat hatching

NOTE: None of the features or fixtures above the ellipse needs to be shown on the detailed section.

Label the following:
- The south elevation including the scale
- The detailed section including the scale
- The room designations and floor finishes
- Using the correct abbreviation, the following features in the correct view: ground level, finished floor level and damp-proof course

NOTE: All drawings must comply with the guidelines and graphical symbols contained in the SANS 10143.
PERSPECTIVE

Given:
Two views of a podium and the information needed to draw a two-point perspective drawing.

PP – Picture plane
GL – Ground line
HL – Horizon 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 necessary construction.
- NO hidden detail is required.

PERSPEKTIEF

Gegee:
Twee aansigte van 'n platform en die inligting benodig om 'n tweeypuntperspektief- tekening te teken.

PV – Prentvlak
GL – Grundyn
HL – Horizonlyn
SP – Staapvlak

Instruksies:
Voltooi die perspektieftekening.
- Alleen die tekenplek volgens die grundyn (GL).
- Toon ALLE nodige konstruksies.
- GEEN verbergte besonderhede word verlang nie.
PERSPECTIVE
Given:
Three views of a PATIO and BRAAI and all information needed to draw the 2Point Perspective drawing.
PP - Picture plane        HL - Horizon line
GL - Ground line         SP - Station point

Instruction:
Complete the perspective drawing
- Align the drawing sheet with the horizon line (HL)
- Locate and label the vanishing points
- No hidden detail is required
- Show all necessary constructions
ENGINEERING GRAPHICS AND DESIGN

GIVEN:
Two views of the inside of a built structure 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.

- Locate and label the vanishing points.
- NO hidden detail is required.
- Show ALL necessary construction.
- Align the drawing sheet with the horizon line (HL).

If used as an assessment task it would be marked out of 45.

✔ LOWER ORDER 20
✔ MIDDLE ORDER 27
✔ HIGHER ORDER 17

GRADE 12
COURSE DRAWINGS PERSPECTIVE
QUESTION 3: ISOMETRIC DRAWING

Given:
• The front view, top view and left view of a machine switch
• The position of point P on the drawing sheet

Instructions:
Using scale 1 : 1, convert the orthographic views of the machine switch into a sectional isometric drawing on cutting plane A-A.
• Make P the lowest point of the drawing.
• Show ALL necessary circle and other construction.
• NO hidden detail is required.

ISOMETRIESE TEKENING

Gegee:
• Die voor- en bo-aansig en linkeraansig van 'n masjienskakelaar
• Die posisie van punt P op die tekenvel

Instruksies:
Gebruik skaal 1 : 1 en omskep die ortografiese aansigte van die masjienskakelaar in 'n deursnee- isometriese tekening volgens snyvlak A-A.
• Maak P die laaste punt van die tekening.
• Toon alle nodige sirkel- en ander konstruksies.
Geen verborge besonderhede word verfug nie.
ISOMETRIES
Given:
The front view and top view of a base for a pillar in third orthographic, as well as the position of point A on the drawing sheet.

Instructions:
- Convert the orthographic views of the pillar base into an isometric drawing.
- Make corner A the lowest point of the drawing.
- Show ALL necessary constructions.
- No hidden detail is required.
ENGINEERING GRAPHICS AND DESIGN

Given:
The front view and incomplete top view of a right regular pentagonal prism and a right regular hexagonal pyramid of equal base edge length.
Both solids have been cut by a plane VT

Instructions:
Draw, to scale 1 : 1, and in first angle orthographic projection the following views of both solids:
• The given front view
• The sectional top view
• The sectional right view
• The true shape of the cut surfaces

• Show ALL necessary construction.
• Show ALL hidden detail.

[Diagram of a pentagonal prism and a hexagonal pyramid, each cut by a plane VT]
SOLID GEOMETRY

Given:
The front view and an auxiliary view of a truncated right regular square pyramid with a centrally placed right regular hexagonal pyramidal hole.

Instructions:
Draw, to scale 1 : 1, the following views of the solid:
2.1 The given front view
2.2 The top view and left view
  • Planning is essential.
  • Show ALL hidden details.
  • Show ALL necessary construction.

VASTE LIGGAME

Ggee:
Die vooraansig en ‘n hulpaansig van ’n afgeknotte regte vierkantige piramide met ’n sentraalgeplaaaste regte rechthoekige seskantige piramiedvormige gat.

Instruksies:
Teken, volgens skaal 1 : 1 die volgende aansigte van die vaste liggaam:
2.1 Die gegee vooraansig
2.2 Die hulpaansig EN linkeraansig
  • Beplanning is noodsaaklik.
  • Toon ALLE verborgte besonderhede.
  Toon ALLE nodige konstrukties.
SOLID GEOMETRY

Given:
- The front view and auxiliary view of a socket spanner
- Cutting plane A-A

Instructions:
Draw, to scale 1:1, the following views:
2.1 The given front view and auxiliary view
2.2 The right view of the model
2.3 A sectioned top-view according to cutting plane A-A.
- No hidden detail required.

VASTE LIGGAME

Gegee:
- Die vooraansig en hulpaansig van 'n sokskleuter
- Snyvlak A-A

Instruksies:
Teken, volgens skaal 1:1, die volgende aansigte:
2.1 Die gegewe vooraansig en hulpaansig
2.2 'n Regteraanvissig van die model
2.3 'n Sni aansig volgens snyvlak A-A.
- Geen verborge besonderhede word verlang nie.
Given:
The top view and incomplete front view of a right square branch piece (A), that has been shaped to fit around a right regular hexagonal prism (B). The axes of both pieces lie in a common vertical plane.

Instructions:
Draw to scale 1:1 the following views of the two solids clearly showing the curve of interpenetration that will be formed between them:
- The top view
- The complete front view
- Develop the surface of the branch piece
- Label the development.
- Show ALL necessary construction.
- Show ALL hidden detail.
ENGINEERING GRAPHICS
AND DESIGN

GIVEN:
The incomplete front view, top view and auxiliary view of a right regular pentagonal prism with two right square prisms shaped to fit around it.
The axes of the branch prisms lie in the same plane as the axis of the pentagonal prism.

INSTRUCTIONS:
Draw the following views of the prisms:
• The given top view
• The complete front view showing the curve of intersection
• The left view
• Develop the surfaces of the branch piece marked A'

Show all necessary construction and hidden detail.

GRADE 12
COURSE DRAWINGS
INTERPENETRATION
DEVELOPMENT
Given:
- The incomplete front view and top view of a connecting piece for a ventilation system. The connecting piece consists of a hexagonal pipe (A) and a cylindrical branch pipe (B) that lie in a common vertical plane.
- Centre point D as the reference point on the drawing sheet.

Instruction:
Draw, to scale 1 : 1 the following views of the connecting piece:
- The complete top view using point D as the reference point.
- The complete front view clearly showing the curve of interpenetration.
- Develop the surface of the cylindrical branch pipe (B).
NB: Show ALL necessary construction and calculations.

ONTWIKKELING
Gegee:
- Die onvolledige voorwaardig en boaansig van 'n verbindingsstuk vir 'n ventilasiesetel. Die verbindingsstuk bestaan uit 'n seskantige pyg (A) en 'n sylinderige takpyg (B) wat in 'n gemeenskaplike vertikale vlak lê.
- Middelpunt D as die verwysingspunt op die tekening.

Instruksie:
Teken, volgens skaal 1 : 1 die volgende aansigte van die verbindingsstuk:
- Die volledige boaansig deur punt D as die verwysingspunt te gebruik.
- Die volledige voorwaardig wat die deurdringskuurve duidelik toon.
- Ontwikkel die oppervlak van die sylinderige takpyg (B).
NS. Toon ALLE nodige konstruksies en berekeninge.
Given:
The front view and top view of a rectangle to a square transition piece.

Instructions:
Draw, to scale 1 : 1, the following views of the transition piece:
• The given top view
• The given front view
• The development

Note:
• Make AB the seam.
• Show ALL construction.
ENGINEERING GRAPHICS AND DESIGN

Given:
The front view and top view of a rectangle to a square transition piece

Instructions:
Draw, to scale 1 : 1, the following views of the transition piece:
• The given top view
• The given front view
• The development

NOTE:
• Make AB the seam.
• Show ALL construction.
ONTWIKKELING
Gegee:
Die vooransig en bo-aansig van 'n oordragstuk in
eerstehoekse orthografiese projekse.

Instruksie:
Gebruik die gegee inligting en voltooi die ONTWIKKELING.

DEVELOPMENT
Given:
The front view and the top view of a transfer piece
in first angle orthographic projection.

Instruction:
Using the given information, draw the DEVELOPMENT.
ENGINEERING GRAPHICS AND DESIGN

Given:
The core and the profile of a square spiral chute in the starting position.

Instructions:
Draw, to scale 1 : 1, the square spiral chute around the core to the following specifications:
- Direction = right-hand
- Number of turns = ONE AND A HALF
- Show ALL necessary construction.
- NO hidden detail required.
LOKUS - HELIKS

Gegee:
Die bo-aansig van 'n gedeelte van 'n ronde veer van 'n motor se onderstel.

Instruksie:
Voltooi, volgens skaal 1 : 1, die volgende:
- Die vooraansig van die ronde veer met 'n 60mm steek, wat bloksegwys een en 'n halwe omwenteling voltooi
- Begin by links met die veer
- Toon ALLE nodige konstruksies
- Gee geen verborge besonderhede word verlang nie.

LOCI - HELIX

Given:
The top view of a section of a round spring of a motor arm.

Instruction:
Complete, to scale 1 : 1, the following:
- The front view of a round spring with a 60mm pitch, completing one and a half turn in a clockwise direction
- Start at the top left with the spring
- Show ALL necessary construction
- No hidden detail is required.
LOC1 - HELIX
Given:
The top view and the incomplete front view with the
starting point and shape of a packaging shoot.

Instruction:
Use the given information and complete the shoot
over one and a half turn in an anti-clockwise direction.
- Pitch = 60 mm
- Show all constructions
- No hidden detail is needed.

LOKUS - HELIKS
Gegee:
Die bo-aansig en onvolledige vooraansig wat die
beginpunt en vorm van 'n verpakkiningsglybaan
aandui.

Instruksie:
Gebruik die gegee inligting en voltooi die glybaan
wat een en 'n half draai saak in 'n anti-klokge-
wyse rigting.
- Steek = 60 mm
- Toon alle konstruksies
- Geen verborge besonderhede hoef getoon te
  word nie.
LOC1 (CAM)

Given:
- The detail of a roller-ended follower and the cam shaft for a disc cam

Specifications:
- The minimum distance from the cam profile to the centre of the cam shaft = 10 mm and Rotation = clockwise

Motion:
The cam impart the following motions to the follower:
- Over the first 90° the follower rises 20 mm with constant velocity,
- Over the next 90° the follower rises another 40 mm with single harmonic motion,
- Over the remaining 180° the follower returns to its starting position with uniform acceleration and retardation

Instructions:
- Draw, to scale 1 : 1, the given view of the follower and the camshaft,
- Draw, in the correct position and to a horizontal scale of 1 mm equal to 30° and a displacement scale of 1 : 1, the complete displacement graph for the given motions,
- Label the displacement graph and indicate the scale,
- Project and draw the cam profile from the displacement graph,
- Show the direction of rotation on the cam profile,
- Show all necessary construction.

LOKUS (VOK)

Gegee:
- Die bouwmerkire van ’n rollervormige volger en nokaas vir ’n skyleks

Spesifisaties:
- Die minimum afstand vanaf die nokaapseif na die sentier van die nokaas = 10 mm en die rotsas = luiksepwyks

Beweging:
Die rotsas die volgende bewegings aan die volger oor:
- Oor die eerste 90° stig die volger 20 mm met konstante snelheid,
- Oor die volgende 90° stig die volger nog 40 mm met eenmalige harmoniese beweging,
- Oor die standende 180° leer die volger terug na die beginposisyone met eenmalige vereniging en wriggeling.

Instruksies:
- Teken, volgens skaal 1:1, die gegee aansig van die volger en die nokaas,
- Teken, in die korekte posisie en volgens ’n horisontale skaal van 7 mm gebruik aan 30° en ’n verplaasingskaal van 1 : 1, die volledige verplaasingsgrafiek vir die gegee beweging,
- Sten die verplaasingsgrafiek en stel die skaal in,
- Projecteer en teken die nokaaspief vanaf die verplaasings-grafiek,
- Toon die rigting van rotsas op die nokaas-pief,
Toon ALLE nodige konstruksies:
LOCI - MECHANISM
Given:
AB = 32 mm
DE = 110 mm
CD = 100 mm
DP = 30 mm
CD is a slotted link, fixed at point C with a pivot at D as well as point B, representing a slide on CD.
End E of the connected rod DE moves left and right in a horizontal plane as the crank AB rotates.

Instruction:
Draw the locus of point P for one full revolution of the crank AB.

LOKUSSE - MEGANISMES
Gegewe:
AB = 32 mm
DE = 110 mm
CD = 100 mm
DP = 30 mm
CD is ‘n swaelarm, gesenker aan punt C met ‘n spilpunt by D terwyl B ‘n glystuk op CD voorstel. Punt E op die stang beweeg horisontaal links en regs sodra krukas AB begin roteer.

Instruksie:
Tekn die lokus van punt P vir een volle omwenteling van krukas AB.
LOCI - MECHANISM
A mechanism to open a mechanical gate on an assembly line. Crank OA is attached to a shaft which rotates clock-wise around point O. Rod AB, attached to the crank at A slides freely through a fixed point at C. AB rotates freely about point A.

Given:
A Schematic presentation as well as a drawing showing the assembly and the movement of the parts of the mechanism.

Instruction:
Use point O as reference to redraw the schematic drawing according to scale 1 : 1 and:
- trace the loci generated by point B locate on rod AB,
- trace the loci generated by point B locate on rod AB.
NB: Show the necessary constructions.

LOKUSSE - MEGANIEMES
'n Mechanisme om 'n mecaniese hek op 'n monteertyd oop te maak. Krucas OA is gekoppel aan 'n as wat likoksgewys roteer rondom punt O. Stang AB, verbind aan die kruk by A, gely vryelik deur 'n vaste punt by C. AB roteer vryelik om punt A.

Gegewe:
'n Skematiese voorstelling sowel as 'n tekening wat die samestelling aasook die bewegende dele van die mekanisme toon.

Instruksies:
Gebruik punt O as verwysing om die skematiese tekening volgens skaal 1 : 1 oor te teken en:
- bepaal die fokus van punt B op stang AB,
- bepaal die fokus van punt E op stang AB.
NB: Toon die nodige konstruksies.
1. On what date was the drawing first completed?
2. What scale is indicated for the drawing?
3. Name the feature marked symbol A?
4. Name the symbol, marked C, indicated on the welding symbol.
5. Determine the complete dimension at D.
6. Add the All-round-weld-symbol to the welding symbol.
7. Complete the front view by completing the M28 full threaded bolt, showing three faces of the bolt head.
8. Complete the front view by completing the 35 mm long threaded shaft of M28 Bolt as well as the rest of the threaded hole.
9. Complete the front view by adding the needed hatching.
10. Complete the left to show the tapped hole only.
11. Add the cutting planes and label it B-S.

TOTAL

---

**VRAE**

1. Op watte datum was die tekening die eerste keer geteken?
2. Wat is die skaal wat aangedui word vir die tekening?
3. Bepaal die kenmerk as simbool A genoem is.
4. Bepaal die simbool, genoem C, wat op die swaarstelsel aangedui is.
5. Bepaal die volledige afmeting by D.
6. Voeg die rondom-swaal-simbool by swiss simbool.
7. Voeg die voorasbeeld deur die M28 voldraad bout te toon, deur die aanslag van die boutkop te toon.
8. Voeg die voorasbeeld deur die 35 mm lang gegroefde M28 Bout sowel as die res van die gegroefde gat te toon.
9. Voeg die voorasbeeld deur die modige anseing by te toon.
10. Voeg die linkeraansig deur stegs die getapte gat te toon.
11. Vraag die anysker by en toon dit B-S.

**ANTWOORDE**

1. 2014-02-14
2. SCALE 1 : 1
3. MACHINE SYMBOL
4. V-TYPE BUTT WELD
5. Ø 56
6. VRAAG 8
7. VOORAANSG
8. LINKERAANSG
9. 2014-02-14
10. SKAAL 1 : 1
11. WASJERING SIMBOOL
12. V-TYPE SWELSLAS
### ANALYTICAL (MECHANICAL)

**Given:**
Three views and two detailed enlargements of a tapping valve assembly, a title block and a table of questions. The drawings have not been prepared to the indicated scale.

**Instructions:**
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and the title block.

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>ANSWERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 What is the title of the assembly?</td>
<td>TAPPING VALVE</td>
</tr>
<tr>
<td>2 On what date was the drawing drawn?</td>
<td>2015/01/05</td>
</tr>
<tr>
<td>3 What is the drawing number?</td>
<td>2015 - A - 005</td>
</tr>
<tr>
<td>4 What scale is indicated for the drawing?</td>
<td>SCALE 2 : 1</td>
</tr>
<tr>
<td>5 Which drawing program was used?</td>
<td>AUTOCAD</td>
</tr>
<tr>
<td>6 Who approved the drawing?</td>
<td>ANDREW BRAND</td>
</tr>
<tr>
<td>7 What material is used to manufacture the main base?</td>
<td>PEWTER</td>
</tr>
<tr>
<td>8 What would VIEW 2 be called?</td>
<td>SECTIONAL FRONT VIEW</td>
</tr>
<tr>
<td>9 How many socket head bolts are there in the assembly?</td>
<td>3</td>
</tr>
<tr>
<td>10 Give the complete dimensions at: A : Ø 4 B : 4 C : 26</td>
<td>3</td>
</tr>
<tr>
<td>11 Name the feature at F.</td>
<td>FILLET</td>
</tr>
<tr>
<td>12 Name the type of section at D.</td>
<td>PARTIAL SECTION</td>
</tr>
<tr>
<td>13 Why is the component at E filled in solid?</td>
<td>SPECIFIC PART HATCHING e.g. RUBBER OR THIN PART</td>
</tr>
<tr>
<td>14 What is the total height of the assembly?</td>
<td>29</td>
</tr>
<tr>
<td>15 What is the purpose of the two enlarged detailed views?</td>
<td>TO SHOW DETAIL</td>
</tr>
<tr>
<td>16 What is indicated by the convention at G?</td>
<td>INTERRUPTED VIEW CONTINUES</td>
</tr>
<tr>
<td>17 With reference to the tolerance, determine the minimum dimension at H?</td>
<td>Ø6.35</td>
</tr>
<tr>
<td>18 With reference to the tolerance, determine the maximum dimension at H?</td>
<td>Ø5.47</td>
</tr>
<tr>
<td>19 Insert the cutting plane on VIEW 3 and label it A-A.</td>
<td>3</td>
</tr>
<tr>
<td>20 In the space provided below, draw, in neat freehand, the symbol for the projection system used.</td>
<td>4</td>
</tr>
</tbody>
</table>

**TOTAL** 30

### PARTS LIST

<table>
<thead>
<tr>
<th>PART</th>
<th>QUANTITY</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. VALVE ASSEMBLY</td>
<td>1</td>
<td>TOOL STEEL</td>
</tr>
<tr>
<td>2. SOCKET HEAD BOLT</td>
<td>3</td>
<td>TOOL STEEL</td>
</tr>
<tr>
<td>3. SQUARE BOLT WITH PUNCH</td>
<td>1</td>
<td>TOOL STEEL</td>
</tr>
<tr>
<td>4. MAIN BASE</td>
<td>1</td>
<td>PEWTER</td>
</tr>
<tr>
<td>5. GAP</td>
<td>1</td>
<td>PEWTER</td>
</tr>
<tr>
<td>6. O-RING</td>
<td>1</td>
<td>RUBBER</td>
</tr>
<tr>
<td>7. O-SEAL</td>
<td>1</td>
<td>RUBBER</td>
</tr>
</tbody>
</table>

### TITLE

**TAPPING VALVE**

**DRAWING NO. 2015 - A - 005**

**ALL DIMENSIONS ARE IN MILLIMETRES.**

**MATERIALS: STEEL, PEWTER AND RUBBER**

**APPROVED:** ANDREW BRAND  20/05/2013

**CHECKED:** SOON DENTON  20/05/2013

**DRAWN:** CHRISTI GIFFRE  20/05/2013

**15 EDISON BLVD**

**INDUSTRIAL PARK**

**1931**

**TAP VALVE TO BE USED FOR TAPPING OF 1/4", R11, R22 AND 5/8" REFRIGERANTS IN COPPER PIPE ONLY**

**SCALE 2 : 1**

**GRADE 12 ANALYTICAL (MECHANICAL)**

**ReCO REFRIGERATION**
### Answers

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pipe cutter</td>
</tr>
<tr>
<td>2</td>
<td>Scale 1:1</td>
</tr>
<tr>
<td>3</td>
<td>AutoCAD 2016</td>
</tr>
<tr>
<td>4</td>
<td>M-mill</td>
</tr>
<tr>
<td>5</td>
<td>Millimeter/mm</td>
</tr>
<tr>
<td>6</td>
<td>Tool steel</td>
</tr>
<tr>
<td>7</td>
<td>Nine</td>
</tr>
<tr>
<td>8</td>
<td>Right view</td>
</tr>
<tr>
<td>9</td>
<td>A: M8 B: R2 C: D10 D: D165</td>
</tr>
<tr>
<td>10</td>
<td>B: 63° 64° 65°</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>Knurling</td>
</tr>
<tr>
<td>13</td>
<td>Better grip</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>Worm screw</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>19</td>
<td>See below</td>
</tr>
</tbody>
</table>

**Total**: 4

---

### Answers (free-hand)

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</tr>
<tr>
<td>5</td>
<td>Millimeter/mm</td>
</tr>
<tr>
<td>6</td>
<td>Tool steel</td>
</tr>
<tr>
<td>7</td>
<td>Nine</td>
</tr>
<tr>
<td>8</td>
<td>Right view</td>
</tr>
<tr>
<td>9</td>
<td>A: M8 B: R2 C: D10 D: D165</td>
</tr>
<tr>
<td>10</td>
<td>B: 63° 64° 65°</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>Knurling</td>
</tr>
<tr>
<td>13</td>
<td>Better grip</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>Worm screw</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>19</td>
<td>See below</td>
</tr>
</tbody>
</table>

**Total**: 4

---

### Answer 19: Projection symbol

- **Top and Right view:** Correctly placed for marks that are assumed to be placed on a drawing. No specific positions are shown.
- **Free-hand:** Correctly placed for marks that are implied to be placed on a drawing. No specific positions are shown.

---

### Answer 19: Projection symbol (free-hand)

- **Top and Right view:** Correctly placed for marks that are assumed to be placed on a drawing. No specific positions are shown.
- **Free-hand:** Correctly placed for marks that are implied to be placed on a drawing. No specific positions are shown.
<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>X or ✓</th>
<th>Moderated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 How many windows are shown on the plan?</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2 What is the reason for the revision to the drawing?</td>
<td>ISLAND IN KITCHEN</td>
<td></td>
</tr>
<tr>
<td>3 What is the project number?</td>
<td>2009 - 351</td>
<td></td>
</tr>
<tr>
<td>4 Who is the owner of the proposed new dwelling?</td>
<td>P MSOMI</td>
<td></td>
</tr>
<tr>
<td>5 What scale has been used for the drawing?</td>
<td>1 : 100</td>
<td></td>
</tr>
<tr>
<td>6 Name the feature numbered 1.</td>
<td>GUTTER</td>
<td></td>
</tr>
<tr>
<td>7 What does the line numbered 2 indicate?</td>
<td>FFL / FINISHED FLOOR LEVEL</td>
<td></td>
</tr>
<tr>
<td>8 What does the line numbered 3 indicate?</td>
<td>NGL / GL</td>
<td></td>
</tr>
<tr>
<td>9 Name the feature numbered 4.</td>
<td>BUILD-IN CUPBOARD</td>
<td></td>
</tr>
<tr>
<td>10 What is the abbreviation for the fixture numbered 5?</td>
<td>WC</td>
<td></td>
</tr>
<tr>
<td>11 What does the symbol numbered 6 indicate?</td>
<td>NORTH POINT</td>
<td></td>
</tr>
<tr>
<td>12 What would VIEW 1 be called?</td>
<td>FLOOR PLAN</td>
<td></td>
</tr>
<tr>
<td>13 What would VIEW 2 be called?</td>
<td>SOUTH VIEW</td>
<td></td>
</tr>
<tr>
<td>14 With reference to the detailed drawing of the load-bearing wall, match the letter on the drawing with each of the features listed.</td>
<td>LOAD-BEARING WALL: C; DAMP-PROOF COURSE: B; LINE BREAK: A; SCREED: F; COMPACTED HARD CORE: H</td>
<td></td>
</tr>
<tr>
<td>15 In the space provided in the title block, draw, in neat freehand, the front view and top view of the SABS convention for a bath.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 What is the pitch (angle) of the roof?</td>
<td>18°</td>
<td></td>
</tr>
<tr>
<td>17 What colour must all new window glass be on a presentation drawing?</td>
<td>BLACK</td>
<td></td>
</tr>
<tr>
<td>18 Determine the perimeter of the dwelling in m:</td>
<td>41.2 m</td>
<td></td>
</tr>
<tr>
<td>19 Determine the total area of the dwelling in m²:</td>
<td>62.64 m²</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASSESSERINGSKRITERIA</th>
<th>✓ or X</th>
<th>Gemodereer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hoeveel vensters word op die plan getoon?</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2 Wat is die rede vir die hersiening op die tekening?</td>
<td>KOMBIUS EIiland</td>
<td></td>
</tr>
<tr>
<td>3 Wat is die projeknommer?</td>
<td>2009 - 351</td>
<td></td>
</tr>
<tr>
<td>4 Wie is die eienaar van die voorgestelde nuwe woning?</td>
<td>P MSOMI</td>
<td></td>
</tr>
<tr>
<td>5 Wat skaal is vir die tekening gebruik?</td>
<td>1 : 100</td>
<td></td>
</tr>
<tr>
<td>6 Benoem die kenmerk genummer 1.</td>
<td>GEUT</td>
<td></td>
</tr>
<tr>
<td>7 Wat word deur die lyn genummer 2 aangedui?</td>
<td>AVV / AFGEWERKTE VLOERVLAK</td>
<td></td>
</tr>
<tr>
<td>8 Wat word deur die lyn genummer 3 aangedui?</td>
<td>NGV / GV</td>
<td></td>
</tr>
<tr>
<td>9 Benoem die kenmerk genummer 4.</td>
<td>INGEBOUDE KAS</td>
<td></td>
</tr>
<tr>
<td>10 Wat is die afkorting vir die vaste toebehore genummer 5?</td>
<td>WC</td>
<td></td>
</tr>
<tr>
<td>11 Wat word deur die simbool genummer 6 aangedui?</td>
<td>NOORD AANWySER</td>
<td></td>
</tr>
<tr>
<td>12 Wat sal AANSIG 1 genoem word?</td>
<td>VLOERPLAN</td>
<td></td>
</tr>
<tr>
<td>13 Wat sal AANSIG 2 genoem word?</td>
<td>SUID AANSIG</td>
<td></td>
</tr>
<tr>
<td>14 Met verwysing na die gedetailleerde tekening van die lasdraende muur en fondasie, pas die letter op die tekening by elk van die getypte kenmerke.</td>
<td>LASDRAENDE MUUR: C; VOOGWEERLAAG: B; BREEKLYN: A; BOLAAG/VLOERAFWERKING: F; KOMPakte HARDEPUI: H</td>
<td></td>
</tr>
<tr>
<td>15 Teken in die spase voorsien in die titelblok, in netjese vryhand, die voornaam en bo- aansig van die SABS-konvensie vir ‘n bad.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Wat is die heiling (hoek) van die dak?</td>
<td>18°</td>
<td></td>
</tr>
<tr>
<td>17 Wat kleur moet alle nuwe venstersglas op ‘n voorligtingsstekening wees?</td>
<td>SWART</td>
<td></td>
</tr>
<tr>
<td>18 Bepaal die omtrek van die woning in m.</td>
<td>41.2 m</td>
<td></td>
</tr>
<tr>
<td>19 Bepaal die totale area van die woning in m².</td>
<td>62.64 m²</td>
<td></td>
</tr>
</tbody>
</table>
ANSWER 20
In the space below, draw, in neat freehand, the front view and top view of the SANS 70143 graphical symbol for a BATH.

KEY ARCHITECTS
96 Praset Street
POTCHEFSTROOM
063 138 2201
info@webmat.com

PRINTED BY ILM PRINTERS
DATE OF PRINT
2015-02-13

DRAWING TITLE
SITE PLAN

PROJECT
PROPOSED NEW GARAGE AND TIMBER DECK FOR MRS SCHUTTE ON STAND 21, FREEDOM STREET.

PROJECT NUMBER
AFSP-2015

DRAWING NUMBER
VG 002

DATE (2015-02-10)

CHECKED

REFERENCE CODE
171

ANSWERS

1. What is the project number?  AFSP-2015  1
2. How many signatures are required?  2  1
3. How many revisions have been made to the drawing?  1  1
4. Who is the client?  MRS SCHUTTE  1
5. On what date was the site plan printed?  2015-02-13  1
6. How many new additions are indicated on the site plan?  2  1
7. What does the abbreviation IC stand for?  INSPECTION CHAMBER  1
8. What is indicated by the arrows on the line at 1?  DIRECTION OF FLOW  1
9. Name the feature at 2.  TREE  1
10. In what colour should the feature at 3 be shown?  RED  1
11. What does the line at 4 indicate?  CONTOUR LINE  1
12. What does the broken line at 5 indicate?  DEMOLISH/REMOVE  1
13. What is the length of the boundary line at 6 in metres?  30.25 m  1
14. What is the width of Freedom Street in millimetres?  4 700 mm  1
15. What is the difference in ground level height between corner A and corner B of the buildlings in metres?  3 m  2
16. On which side of the existing house is the new timber deck?  SOUTH-WEST  2
17. Which municipal service is found on the land adjacent to stand 21?  ELECTRICAL SUBSTATION  2
18. In the space below, determine the perimeter of the existing house in metres.  3  3
19. In the space below, determine the combined total area of the existing house and the new garage in square metres.  3  3
20. In the space provided in the title panel, draw, in neat freehand, the front view and top view of the SANS 70143 graphical symbol for a BATH.  4  

TOTAL 30

ANSWER 18
Show ALL calculations.

\[ 13 \times 6 = 78 \]
\[ 9 \times 8 = 72 \]
\[ 8 \times 8 = 64 \]
\[ 243 \text{ m}^2 \]

GRADE 12
COURSE DRAWINGS
CIVIL ANALYTICAL
### Answers

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01-10-2005</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>CHECKING THE DRAWING</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3 M</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Dr AL SATION</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>STAND 34</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>RED</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>BROWN</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>DIRECTION OF FLOW</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>BOUNDARY LINE</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>REMOVE / DEMOLISH</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>ADJACENT BUILDING</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>DEMOLISH</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>4 m</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>15,97 m</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>NORTH WEST ELEVATION</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>102,8 m [calculation 1, answer 2, metre 1]</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>374,91 m² [calculation 1, answer 2, metre² 1]</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>(See below.)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total:** 30

---

### Antwoorde

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01-10-2005</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>NASIEN VAN DIE TEKENING</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3 m</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Dr AL SATION</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>ERF 34</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>ROOI</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>BRUIN</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>VLOEI RIGTING</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>GRENDBLYN</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>VERWYDER / BREEK AF / SLOOP</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>AANGRENSENDE GEBOU</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>SLOOP</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>4 m</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>15,97 m</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>NOORDOOS AANSIG</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>102,6 m [berekening 1, antwoord 2, meter 1]</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>374,91 m² [berekening 1, antwoord 2, meter² 1]</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>(Sien hieronder.)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total:** 30
ENGINEERING GRAPHICS
AND DESIGN

GIVEN:
Two views of the inside of a built structure 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.

- Locate and label the vanishing points.
- NO hidden detail is required.
- Show ALL necessary construction.
- Align the drawing sheet with the horizon line (HL).

If used as an assessment task it would be marked out of 32.

- LOWER ORDER 20 x 0.5
- MIDDLE ORDER 27 x 0.5
- HIGHER ORDER 17 x 0.5

GRADE 12
COURSE DRAWINGS
PERSPECTIVE
ENGINEERING GRAPHICS AND DESIGN

Given:
The front view and incomplete top view of a right regular pentagonal prism and a right regular hexagonal pyramid of equal base edge length.
Both solids have been cut by a plane VT.

Instructions:
Draw, to scale 1:1, and in first angle orthographic projection the following views of both solids:
- The given front view
- The sectional top view
- The sectional right view
- The true shape of the cut surfaces
- Show all necessary construction.
- Show all hidden detail.

TRUE SHAPE
Given:
The front view and top view of a rectangle to a square transition piece.

Instructions:
Draw, to scale 1:1, the following views of the transition piece:
- The given top view
- The given front view
- The development

NOTE:
- Make AB the seam.
- Show ALL construction.
The incomplete front view, top view and auxiliary view of a right regular pentagonal prism with two right square prisms shaped to fit around it. The axes of the branch prisms lie in the same plane as the axis of the pentagonal prism.

INSTRUCTIONS:
- Draw the following views of the prisms:
  - The given top view
  - The complete front view showing the curve of intersection
  - The left view
  - Develop the surfaces of the branch piece marked 'A'

Show all necessary construction and hidden detail.
ENGINEERING GRAPHICS AND DESIGN

Given:
The front view and top view of a rectangle to a square transition piece

Instructions:
Draw, to scale 1:1, the following views of the transition piece:
- The given top view
- The given front view
- The development

NOTE:
- Make AB the seam.
- Show ALL construction.

MARK ALLOCATION
GIVEN  =  4
TRUE LENGTH = (5X2) 10
DEVELOPMENT = 18
TOTAL  = 32

GRADE 12
COURSE DRAWINGS
TRANSITION PIECE
Given:
The front view and top view of a rectangular transition piece.

Instructions:
Draw, to scale, the following views of the transition piece:
- The given front view
- The development
- All construction
- Make all views

NOTE:
- Show all construction.
Given: The core and profile of a square spiral drum in the starting position.

Instructions: Draw to scale: 1:1, the square spiral drum in the core to the following specifications:
- Direction = right-hand
- Number of turns = ONE AND A HALF
- Show ALL necessary construction
- No hidden detail required.