education

Department:
Education
REPUBLIC OF SOUTH AFRICA

# ENGINEERING GRAPHICS AND DESIGN

## GUIDELINES FOR

## PRACTICAL ASSESSMENT TASKS

## 2008

**This guideline consists of 22 pages.**

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## INTRODUCTION

The seventeen National Curriculum Statement subjects which contain a practical component all include a Practical Assessment Task (PAT), i.e. a Practical or Performance Assessment Task. These subjects are:

- AGRICULTURE: Agricultural Management Sciences, Agricultural Technology
- ARTS: Dance Studies, Design, Dramatic Arts, Music, Visual Arts
- HSS: Life Orientation
- SCIENCES: Computer Applications Technology, Information Technology
- SERVICES: Consumer Studies, Hospitality Studies, Tourism
- TECHNOLOGY: Civil Technology, Electrical Technology, Engineering Graphics and Design, Mechanical Technology

A PAT allows the teacher to directly and systematically observe applied competence. The PAT comprises the application/performance of the knowledge, skills and values particular to that subject and counts 25% (i.e. 100 marks) of the total promotion/certification mark out of 400 for the subject. In the two Art subjects Design and Visual Arts, the PAT counts 37, 5% (i.e. 150 marks) of the total promotion/certification mark out of 400 for the subject.

The Grade 12 PAT is implemented across the first three terms of the school year and should be undertaken as one extended task, which is broken down into different phases or a series of smaller activities that make up the PAT. The planning and execution of the PAT differ from subject to subject.

SECTION A is guidelines to teachers and SECTION B should be given to learners at the beginning of the year.

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# **SECTION A** (Teacher Guidelines)

## 1. The structure of the Practical Assessment Task (PAT)

A Practical Assessment Task is designed to develop a learner's ability to integrate and apply a variety of knowledge and values to demonstrate acquired levels of skills and competency.

With the inclusion of the PAT into Engineering Graphics and Design, the learner is given an opportunity to apply acquired knowledge, skills and values in a creative way through the design process as outlined in LO2 in the National Curriculum Statement. The learner is given an opportunity to complete the PAT in an environment which is more relaxed than a formal examination setting and which is more conducive to the creative processes. This environment will provide the learner with easier access to, and a wider variety of, resource material than in a formal examination. It is an environment that reflects conditions that could be experienced in a real life situation.

The *Engineering Graphics and Design* PAT gives the learner an opportunity to demonstrate that a high level of drawing skill has been attained in all the required drawing methods through the presentation of the task.

The Practical Assessment Task consists of two parts:
Part I: Design Process
Part II: Drawing method and presentation

Part I of PAT 1 and PAT 2 focuses on LO 2 and requires that the learner demonstrates a clear understanding of, and is able to apply, the design process. As part of the design process the learner must:

- Identify the problem and formulate a design brief
- Investigate and research a number of possible solutions
- Develop the preferred solution that meets the specifications and constraints of the design brief
- Provide evidence that each stage of the design process was evaluated

Part II of PAT 1 and PAT 2 focuses on LO 3 and LO 4 and require that the learner demonstrates and provides evidence that a high level of competency and skill have been attained in all the required drawing methods:

- Freehand drawing during the design process
- Instrument drawing
- Using a Computer-Aided Design system (CAD) to resent a comprehensive set of working drawings of the solution
- Instrument drawing to present an artistic pictorial drawing of the whole or part(s) of the solution
- If time and facilities permit, make a model of the solution

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**NOTE:**

**As CAD is a compulsory component of Engineering Graphics and Design, all schools that offer the subject must ensure that they acquire the necessary computer hardware and software as soon as possible. Where schools do not have CAD facilities, a period of grace has been extended to those schools, in the interim all CAD work must be completed using instruments, and a second Design Task has to be completed.**

Three Performance Assessment Tasks are included in this document.

- PAT 1 is a design task focusing on LO2 (The Design Process) in the context of a civil drawing containing electrical features.
- PAT 2 is a design task focusing on LO2 (The Design Process) in the context of mechanical drawing in a civil environment.
- PAT 3 is a CAD task focussing on CAD application skills in the context of mechanical drawing.

The learner, with the guidance of the teacher, should select which tasks to complete. The learner may, however complete all the tasks but only TWO must be submitted for final assessment and promotion purposes.

A PAT allows the teacher to directly and systematically observe applied competence. The PAT comprises the application/performance of the knowledge, skills and values particular to that subject and counts 25% (i.e. 100 marks) of the total promotion/certification mark out of 400.

**Elements that make up the PAT mark**

1. The **design process** mark will contribute **15%** to the final PAT mark.
2. The **correctness** of the presentation drawings will contribute **25%** to the final PAT mark.
3. The drawing **presentation, drawing methods,** quality of **line work** and **printing** and meeting **deadlines** will contribute **10%** to the final PAT mark.
4. The **CAD** task**,** PAT 3, will contribute **50%** to the final PAT mark**.**

| ELEMENTS OF THE **DESIGN PROCESS** PAT MARK | |
|---|---|
| The **design process**. | **15** |
| The **correctness** of the presentation drawings. | **25** |
| The **presentation** of the work, **drawing methods**, quality of **line work** and **printing** and meeting **deadlines**. | **10** |
| **TOTAL** | **50%** |

| ELEMENTS OF THE **CAD** PAT MARK | |
|---|---|
| The application of **CAD knowledge** and CAD **drawing competency.** | **50** |
| **TOTAL** | **50%** |

**NOTE: Where schools do not have CAD facilities, the second Design Task must be completed. The two Design Tasks will then make up 100% of the PAT mark.**

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## 2. Administration of the PAT

At the beginning of the year teachers must ensure that every Grade 12 learner receives a copy of SECTION B of the PAT together with a copy of the assessment criteria.

The Grade 12 PAT should be completed during the first three terms and handed in at the end of the third term for final formative assessment. The PAT must be completed under controlled conditions.

Teachers are expected to draw up a pace setter for the learners at the beginning of the year and attach target dates for the completion of the different stages of the PAT according to the instructions. In this manner learners can assess their progress and set up an intervention programme should they see that they are falling behind with their work.

The PAT must be completed at school under controlled conditions with guidance and supervision from the teacher who must observe the learner's progress at all times.

## 3. Assessment and moderation of the PAT

The Practical Assessment Task for Grade 12 is externally set, internally assessed and externally moderated.

It is the responsibility of the teacher to administer assessment and record progress in instances where formal assessment is required. (Refer to the SAG of Jan 2007.)

### 3.1 Assessment

Frequent developmental feedback is needed to guide and give support to the learner to ensure that the learner is on the right track.

Both formal and informal assessment should be conducted throughout the development of the PAT. Informal assessment can be conducted by the learner, a peer, a group or by the teacher. Formal assessment should always be conducted by the teacher and the results must be recorded for promotion and moderation purposes.

The completed PAT must be submitted for final formative assessment before the end of the third term. Once the PAT has been marked the teacher must retain the PAT until it has been externally moderated.

### 3.2 Moderation

During the external moderation process of the PAT the learner may be called upon by the moderator to explain the functions, and principles of operating a CAD system and to demonstrate drawing skills through performing capability tasks.

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### 3.3 Declaration of authenticity

Prior to the final submission of the PAT for assessment, the learners must complete a Declaration of Authenticity as laid out on the next page.

## DECLARATION OF AUTHENTICITY

NAME OF THE SCHOOL: ……

NAME OF LEARNER: ……
(SURNAME AND INITIALS)

EXAMINATION NUMBER: ……

NAME OF TEACHER: ……
(SURNAME AND INITIALS)

**I hereby declare that the PAT submitted for assessment is my own, original work and has not been previously submitted for moderation.**

_____ ___ / ___ / 20 ___
**SIGNATURE OF CANDIDATE** **DATE** (D / M / Y)

**As far as I know, the above declaration by the candidate is true and I accept that the PAT offered is his/her own work.**

_____ ___ / ___ / 20 ___
**SIGNATURE OF TEACHER** **DATE** (D / M / Y)

SCHOOL STAMP

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## **SECTION B** (The Learner Tasks)

**Practical Assessment Task 1**
***Design Project 1***
***Civil and Electrical***

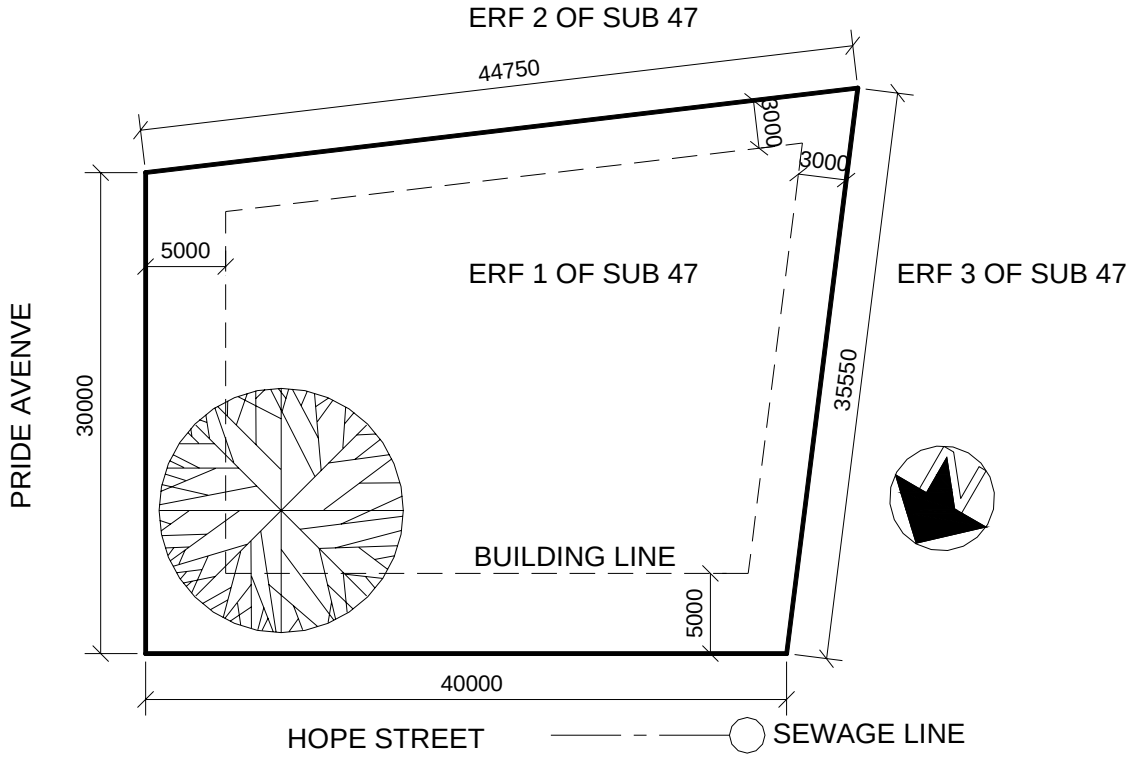
**This PAT covers LO1, LO2, LO3 and LO4.**

**Scenario**
You are presented with the site plan of a corner property in a housing estate where all the houses are built using red face brick and have green corrugated iron roofs. The sight plan shows the boundary lengths, building lines and the north point. Refer to figure below.

The plot is level and in the north eastern-corner of the stand is a very old indigenous tree that may not be removed.

The two roads that border the property are Pride Avenue and Hope Street; however, owning a house that has access from Hope Street is far more prestigious.

You are required to design a single-storey dwelling with a total floor area not exceeding more than ½ the total area of the stand. The proposed new dwelling must fit in with the finish of the other houses on the estate and comply with the specifications.




SITE PLAN
SCALE 1:200

## Specifications

The proposed new dwelling must have the following rooms. The sizes and positions of the rooms need to be researched/investigated:

- Rooms:
  1 lounge
  1 dining room
  1 kitchen
  1 bathroom
  2 bedrooms
- All window frames and door frames must be timber.
- Internal doors must be hollow core and the external doors must be solid timber.
- Fixtures:
  Kitchen: 1 double-bowl sink and kitchen units
  Bathroom: 1 bath, 1 wash basin, 1 WC
  Bedrooms: Built-in cupboards in both rooms
- Roof:
  500 mm roof overhang
  PVC gutters and down pipes

## Presentation requirements of the PAT

1. A design brief outlining the needs and specifications
2. Evidence of each stage of the design process
3. Detailed freehand sketches used during the design process
4. The minimum drawing requirements as stipulated below
5. A list of all the reference material used in the task (Bibliography)
6. Evidence of evaluation. This could be in the form of reports or sample drawings
7. A scale model of the dwelling may be included (Time and facilities permitting)

## Drawing requirements of the PAT

1. A set of working drawings showing a **minimum** of **three** orthographic views, drawn to a suitable scale. The following three views must be drawn:
   - A ***floor plan*** clearly showing: the positions of all the windows and the doors, room designations and floor finishes, all fixtures and all electrical components and wiring.
   - An ***elevation*** showing the front door, windows, roof and other relevant detail.
   - A ***sectional elevation*** showing the foundation to the roof.
2. An enlarged **detailed working drawing** of either:
   a) The foundation to ceiling; or
   b) The roofing detail.
3. The **site plan** with the proposed new dwelling sited with all drainage details.
4. A scale **perspective** drawing of the proposed new dwelling as seen from Hope Street.
   The horizon line must be positioned 1, 6 metres above the ground.
5. All the drawings must be presented on appropriately sized drawing sheets, correctly set up with borders, name blocks and title strips.
6. Penalties will be accrued for untidy and messy work as well as for the late submission of the task.

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**The following features should be included on the drawings**

- Dimensions
- Labels, scales, notes and fixture codes
- Cutting plane(s)
- All hatching detail (colour may be used in accordance with the drawing codes and regulations)
- Roof lines and pitch, gutters and down pipes
- Total floor area

NOTE: All drawing must comply with the guidelines as contained in the *SANS 0143 Code of Practice for Building Drawing* and the *National Building Regulations.*

**Drawing methods**

The PAT must provide clear evidence that a high level of competency has been attained by the learners in all the required drawing methods namely:

- Freehand drawing (This should include all the preliminary sketch drawings and diagrams produced during the design process)
- Instrument drawing (Pictorial drawing of the dwelling)
- Computer-Aided Design system (CAD). (All the working drawings of the dwelling)

***NOTE: A period of grace has been extended to those schools that do not have CAD facilities. These schools may complete all drawings using instruments.***

**Assessment Criteria**

The following assessment tools will be used to assess the PAT:

1. The rubric displayed in annexure A for assessing the **design process**. This mark will contribute **15%** to the final PAT mark.
2. The rubric displayed in annexure B for assessing the **correctness** of the presentation drawings. This mark will contribute **25%** to the final PAT mark.
3. The rubric displayed in annexure C for assessing drawing **presentation, drawing methods,** quality of **line work** and **printing** and meeting **deadlines**. This mark will contribute **10%** to the final PAT mark.

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**Practical Assessment Task 2**
***Design Project 2***
***Mechanical***

**This PAT covers LO1, LO2, LO3 and LO4.**

## Scenario

A motor vehicle company has approached you to design a wind tunnel that will be used for testing the aerodynamic properties of their new passenger vehicles in order to try and improve their fuel efficiency. The wind tunnel will be housed in a warehouse at the assembly plant where the floor area measures 40 metres x 30 metres.

## Wind tunnel specifications

The tunnel should be constructed from sheet metal. An industrial fan of 1, 5 metres in diameter will be used to generate the wind. The fan housing must be joined to the test area with an appropriately designed transition piece. As the speed of the wind supplied by the fan will not be sufficient, a non-mechanical feature that can accelerate the wind speed needs to be researched and designed into the wind tunnel.

In order to create the necessary parallel airflow inside the test area, a set of deflectors will also need to be designed and positioned so that accurate measurements can be taken. Also include an access door large enough for a motor vehicle to pass through and an observation window(s) to observe the test area. Another feature in the design must include the immediate outlet at the rear of the test area.

Time and facilities permitting, a scale model of all the components of the wind tunnel may be constructed.

## Presentation requirements of the PAT

1. A design brief outlining the needs and specifications
2. Evidence of each stage the design process
3. Detailed freehand sketches used during the design process
4. The minimum drawing requirements as stipulated below
5. A list of all the reference material used in the task (Bibliography)
6. Evidence of evaluation. This could be in the form of reports or sample drawings and
7. A scale model of the wind tunnel may be included (Time and facilities permitting).

## Drawing requirements of the PAT

1. A working drawing, with a **minimum** of **three** appropriately scaled **orthographic views**, clearly indicating the positions of all the features making up the wind tunnel. At least **one** of the views must be a **sectional** view.
2. **Detailed working drawings** of the wind speed accelerator and the deflectors for the parallel air flow.

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3. **Scale developments** of the housings of the following features:
   - The fan housing
   - The transition pieces
   - The test area
4. An **exploded 3-dimensional pictorial** drawing of the components of the wind tunnel.
5. All the drawings must be presented on appropriately sized drawing sheets, correctly set up with borders, name blocks and title strips.
6. Penalties will be accrued for untidy and messy work as well as for late submission of the task.

**The following features should be included on the drawings**

- Dimensions
- Labels, scales, notes
- Cutting plane(s)
- All hatching detail
- Projection symbol

NOTE: All drawing must comply with the guidelines contained in the *SANS 0111 Code of practice for Engineering Drawing.*

**Drawing methods**

The PAT must provide clear evidence that a high level of competency has been attained by the learners in all three required drawing methods namely:

- Freehand drawing (This should include all the preliminary sketch drawings and diagrams produced during the design process)
- Instrument drawing (Pictorial drawing of the wind tunnel)
- Computer-Aided Design system (CAD) (All the working drawings of the wind tunnel)

***NOTE: A period of grace has been extended to those schools that do not have CAD facilities. These schools may complete all drawings using instruments.***

**Assessment Criteria**

The following assessment tools will be used to assess the PAT:

1. The rubric displayed in annexure A for assessing the **design process**. This mark will contribute **15%** to the final PAT mark.
2. The rubric displayed in annexure B for assessing the **correctness** of the presentation drawings. This mark will contribute **25%** to the final PAT mark.
3. The rubric displayed in annexure C for assessing drawing **presentation, drawing methods,** quality of **line work** and **printing** and meeting **deadlines**. This mark will contribute **10%** to the final PAT mark.

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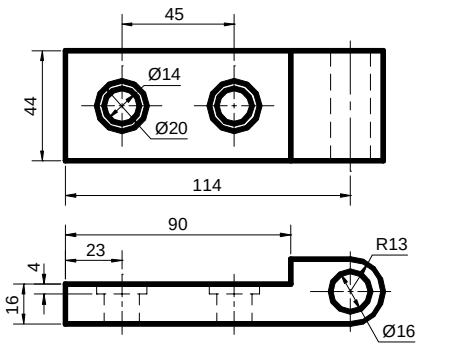
**Practical Assessment Task 3**
***CAD Application***
***Mechanical***

**This PAT covers LO3 and LO4.**

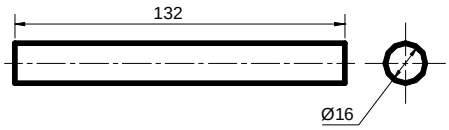
This PAT consists of SECTION A (a 2D component) and SECTION B (an isometric/3D component). In this PAT both SECTION A and SECTION B must be completed.

**SECTION A**

The orthographic views of the individual parts of a hinge assembly in third angle orthographic projection as well as an assembled isometric drawing of the hinge assembly are shown below.

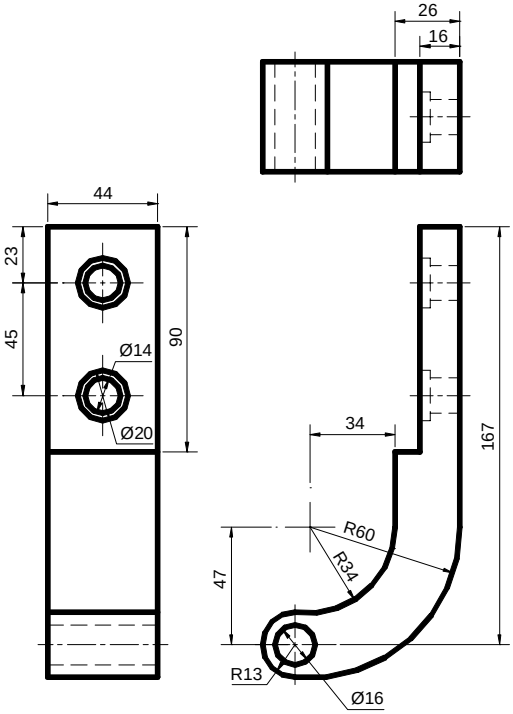



SHORT LEAF

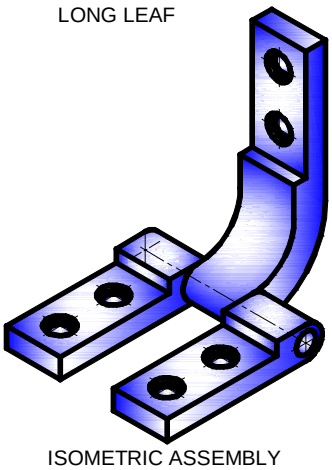



PIN

| LIST OF COMPONENTS | | |
|---|---|---|
| NUMBER | NAME | QUANTITY |
| 1 | SHORT LEAF | 2 |
| 2 | LONG LEAF | 1 |
| 3 | PIN | 1 |




LONG LEAF



ISOMETRIC ASSEMBLY

**Knowledge and competency requirements for section A of the PAT**

1. Set up the drawing interface which must include all the toolbars required to complete the task.
2. Set up a 2D drawing environment which should include:
   - A minimum of 4 layers with properties assigned to each layer
   - An A4 drawing sheet with a border and a title strip.
3. Draw, to scale 1:1, and in third-angle orthographic projection the following views of the assembled parts of the hinge assembly.
   - The front view
   - The top view
   - The right view
4. Once the drawing is complete, scale the views to half the original size and place the completed drawing on the prepared drawing sheet.
5. Save the drawing.
6. Print the drawing.

**The following features must be included on the orthographic drawing**

- The three orthographic views.
- All three views fully dimensioned.
- A title and scale placed in the title strip.
- The projection symbol.

NOTE: All drawing must comply with the guidelines contained in the *SANS 0111 Code of practice for Engineering Drawing.*

**SECTION B**

Refer to the orthographic views of the individual parts of a hinge assembly and the assembled isometric drawing.

**Knowledge and competency requirements for section B of the PAT**

1. Set up the drawing interface which must include all the toolbars required to complete the task.
2. Set up a 3D drawing environment which should include:
   - A minimum of 2 layers with properties assigned to each layer.
   - An A4 drawing sheet with a border and a name block.
3. Draw an isometric drawing of the assembled hinge or create a 3D model of the assembled hinge.
4. Save the drawing.
5. Print the drawing.

**The following features should be included on the isometric/3D drawing**

- The assembled isometric drawing or the 3D model drawing of the hinge.
- The drawing must be orientated the same as shown in the assembled isometric drawing.
- The completed name block.

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**Drawing methods**

The PAT must provide clear evidence that a high level of knowledge and drawing competency has been attained in using a CAD system:

- Section A: 2D drawing with the orthographic drawing.
- Section B: 3D drawing in the form of either an isometric drawing or 3D modelling.

**Assessment Criteria**

The following assessment tools will be used to assess the CAD PAT:

The rubric displayed in annexure D for assessing **CAD** knowledge and drawing competency. This mark will contribute **50%** to the final PAT mark.

# ANNEXURE A

## A RUBRIC FOR ASSESSING THE DESIGN PROCESS

| CRITERIA | LEVELS OF PERFORMANCE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| | 80 –100% | 70 - 79% | 60 - 69% | 50 - 59% | 40 - 49% | 30 - 39% | 0 - 29% |
| Identify the problem showing a clear understanding of the scenario | An in-depth and comprehensive understanding of the scenario is shown. | A thorough understanding of the scenario is shown. | A substantial understanding of the scenario is shown. | A satisfactory understanding of the scenario is shown. | A moderate understanding of the scenario is shown. | An elementary understanding of the scenario is shown. | Shows little to no understanding of the scenario. |
| Formulate a design brief listing the specifications and constraints | An in-depth and comprehensive understanding of writing the design brief is shown. | A thorough understanding of writing the design brief is shown. | A substantial understanding of writing the design brief is shown. | A satisfactory understanding of writing the design brief is shown. | A moderate understanding of writing the design brief is shown. | An elementary understanding of writing the design brief is shown. | Shows little to no understanding of writing the design brief. |
| Research and record possible solutions | Shows evidence of in-depth research resulting in a wide range of possible solutions, which are clearly, logically and comprehensively recorded. | Shows evidence of thorough research resulting in a range of possible solutions, which are logically and comprehensively recorded. | Shows evidence of sound research resulting in a substantial number of possible solutions, which are clearly recorded. | Shows evidence of adequate research resulting in a number of possible solutions, which are clearly recorded. | Shows evidence of moderate research resulting in a limited number of possible solutions, which are recorded. | Shows evidence of limited research resulting in a possible solution, which is not fully recorded | Shows little to no evidence of any research, or research is irrelevant to the solution. |
| Select a final solution demonstrating understanding of the design brief | The final solution shows in depth understanding and complies fully with the design brief. | The final solution shows thorough understanding and complies fully with the design brief. | The final solution shows substantial understanding of the design brief. | The final solution shows satisfactory understanding of the design brief. | The final solution shows some understanding of the design brief. | The final solution shows limited understanding of the design brief. | The final solution shows no understanding of the design brief. |
| Show evidence that the researched information was used | Comprehensive and detailed evidence of the use of the researched information. | Thorough evidence of the use of the researched information. | Substantial evidence of the use of the researched information. | Satisfactory evidence of the use of the researched information. | Some evidence of the use of the researched information. | Limited evidence of the use of the researched information. | No evidence of the use of the researched information. |
| Present a complete set of drawings of the selected solution | All the presentation drawings go beyond the minimum requirements and the drawings are all of outstanding quality. | All the presentation drawings go beyond the minimum requirements and the drawings are all of exceptional quality. | All the presentation drawing requirements are met and the drawings are all of a very high quality. | All the presentation drawing requirements are met and the drawings are all of a satisfactory quality. | Some of the presentation drawing requirements are met and the drawings are of a satisfactory quality. | Some of the presentation drawing requirements are met and the drawings are all of a poor quality. | The final solution is incomplete and the drawings are of a poor quality or no drawings are submitted. |
| Evaluation | Evidence of comprehensive evaluation at all stages of the design process is shown. | Evidence of thorough evaluation at all stages of the design process is shown. | Evidence of substantial evaluation at most stages of the design process is shown. | Evidence of adequate evaluation of most stages of the design process is shown. | Evidence of moderate evaluation at some stages of the design process is shown. | Evidence of limited evaluation at some stages of the design process is shown. | Little or no evidence of any evaluation. |

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# ANNEXURE B

## RUBRIC FOR ASSESSING THE CORRECTNESS OF THE DRAWING

| LEVELS OF PERFORMANCE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CRITERIA | | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| | | More than minimum requirements | | Meets minimum requirements | | Less than minimum requirements | | No drawing presented |
| | | 80 –100% | 70 - 79% | 60 - 69% | 50 - 59% | 40 - 49% | 30 - 39% | 0 - 29% |
| Orthographic drawing | The presentation contains a top view/ plan | The top view/plan meets more than minimum requirements and is totally correct | | The front view meets the minimum requirements and is correct. | | The front view meets less than minimum requirements and has errors. | | Little or no work is presented |
| | The presentation contains a front view / side view | The front view/side view meets more than minimum requirements and is totally correct | | The top view meets the minimum requirements and is correct. | | The top view meets less than minimum requirements and has errors. | | Little or no work is presented |
| | The presentation contains a sectional view | The sectional view meets more than minimum requirements and is totally correct | | The sectional view meets the minimum requirements and is correct. | | The sectional view meets less than minimum requirements and has errors. | | Little or no work is presented |
| | The presentation contains a detailed drawing | The detailed drawing meets more than minimum requirements and is totally correct | | The detailed drawing meets the minimum requirements and is correct. | | The detailed drawing meets more than minimum requirements and has errors. | | Little or no work is presented |
| Correctness of the drawing as a mark* | | | | | | | | |
| Pictorial drawing | The correct pictorial drawing method has been used | The drawing contains more than minimum method requirements | | The drawing contains the minimum method requirements. | | The drawing contains less than minimum method requirements. | | Little or no work is presented |
| | The drawing reflects the correct size of the features | The drawing contains more than minimum dimensional requirements. | | The drawing contains the minimum dimensional requirements. | | The drawing contains less than minimum dimensional requirement. | | Little or no work is presented |
| | The drawing is correctly orientated | The drawing is correctly orientated. | | | The drawing is not correctly orientated. | | | Little or no work is presented |
| Correctness of the drawing as a mark* | | | | | | | | |
| The drawings are correctly and completely dimensioned | | The drawing contains more than minimum dimensional requirements. | | The drawing contains the minimum dimensional requirements. | | The drawing contains less than minimum dimensional requirement. | | Dimensioning is unacceptable |
| The drawings are well labelled and show all necessary notes | | The drawing contains more than minimum label and note requirements | | The drawing contains the minimum label and note requirements. | | The drawing contains less than minimum label and note requirements. | | Labels and notes are unacceptable |
| The drawings display the correct cutting plane(s) | | The drawing contains more than minimum cutting plane requirements. | | The drawing contains the minimum cutting plane requirements. | | The drawing contains less than the minimum cutting plane requirements. | | No cutting planes evident. |

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| LEVELS OF PERFORMANCE | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CRITERIA** | **7** | **6** | **5** | **4** | **3** | **2** | **1** |
| | More than minimum requirements | | Meets minimum requirements | | Less than minimum requirements | | No drawing presented |
| | **80 –100%** | **70 - 79%** | **60 - 69%** | **50 - 59%** | **40 - 49%** | **30 - 39%** | **0 - 29%** |
| The drawings reflect that elements in the SABS codes of practice have been used correctly | The drawing reflects more than minimum requirements. | | The drawing reflects the minimum requirements. | | The drawing reflects less than minimum requirements. | | Little or no evidence of the use of the codes of practice. |

* The correctness mark is a percentage mark obtained through marking to a memorandum.

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# ANNEXURE C

## RUBRIC FOR ASSESSING DRAWING METHOD SKILLS AND PRESENTATION

| LEVELS OF PERFORMANCE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CRITERIA | | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| | | 80 –100% | 70 - 79% | 60 - 69% | 50 - 59% | 40 - 49% | 30 - 39% | 0 - 29% |
| The page is setup with a border, complete name block and title strip | | The page is setup contains more than minimum requirements. | | The page is setup contains the minimum requirements. | | The page is setup contains less than minimum requirements. | | Little or no page setup is evident. |
| Freehand drawing | The proportion of the features in the drawing | The features show outstanding proportion | The features show meritorious proportion | The features show substantial proportion | The features show adequate proportion | The features show moderate proportion | The features show elementary proportion | The features show very little or no proportion |
| | The relative size of the features in the drawing | The features show outstanding relative size | The features show meritorious relative size | The features show substantial relative size | The features show adequate relative size | The features show moderate relative size | The features show elementary relative size | The features show very little or no relative size |
| | The consistency of line work in the drawing | All line work is outstanding and consistent | All line work is very good and consistent | All line work is good and consistent | Line work is satisfactory and consistent | Line work is satisfactory but inconsistent | Line work is poor and inconsistent | Line work is unacceptable |
| Drawing presentation as a mark * | | | | | | | | |
| Instrument drawing | The level of competency displayed in using instruments in the drawing | An outstanding display of competence in using instruments is shown | A very good display of competence in using instruments is shown | A good display of competence in using instruments is shown | A satisfactory display of competence in using instruments is shown | A moderate display of competence in using instruments is shown | A poor display of competence in using instruments is shown | Very little or no display of competence in using instruments is shown |
| | The use of correct line types in the drawing | Line types are outstanding and consistent | Line types are very good and consistent | Line types are good and consistent | Line types are satisfactory and consistent | Line types are satisfactory but inconsistent | Line types are poor and inconsistent | Line types are unacceptable |
| | The consistency of line work in the drawing | Line work is outstanding and consistent | Line work is very good and consistent | Line work is good and consistent | Line work is satisfactory and consistent | Line work is satisfactory but inconsistent | Line work is poor and inconsistent | Line work is unacceptable |
| Drawing presentation as a mark* | | | | | | | | |
| CAD drawing | The level of competence displayed in drawing with CAD system | An outstanding display of competence in using CAD is shown | A very good display of competence in using CAD is shown | A good display of competence in using CAD is shown | A satisfactory display of competence in using CAD is shown | A moderate display of competence in using CAD is shown | A poor display of competence in using CAD is shown | Very little or no display of competence in using CAD is shown |
| | Knowledge of the plotting procedure is shown | An outstanding knowledge of plotting procedure is shown | A very good knowledge of plotting procedure is shown | A good knowledge of plotting procedure is shown | A satisfactory knowledge of plotting procedure is shown | A moderate knowledge of plotting procedure is shown | A poor knowledge of plotting procedure is shown | Very little or no knowledge of plotting procedure is shown |
| | Level of file management shown | An outstanding display of file management is shown | A very good display of file management is shown | A good display of file management is shown | A satisfactory display of file management is shown | A moderate display of file management is shown | A poor display of file management is shown | Very little or no file management is shown |
| Drawing presentation as a mark* | | | | | | | | |
| All deadlines have been met | | All drawings handed in before due date | All drawings handed in on due date | Most of the drawings handed in on due date | Some drawings handed in on due date | A few drawings handed in on due date | A drawings handed in on due date | Drawing not handed in on due date |

* The drawing presentation mark is a percentage mark obtained through formative assessment

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# ANNEXURE D

## A RUBRIC FOR ASSESSING CAD DRAWING SKILLS

| CRITERIA | LEVELS OF PERFORMANCE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| | 80 –100% | 70 - 79% | 60 - 69% | 50 - 59% | 40 - 49% | 30 - 39% | 0 - 29% |
| Set up a drawing interface | Shows an in-depth and comprehensive understanding of setting up a drawing interface | Shows a thorough understanding of setting up a drawing interface | Shows a substantial understanding of setting up a drawing interface | Shows a satisfactory understanding of setting up a drawing interface | Shows a moderate understanding of setting up a drawing interface. | Shows an elementary understanding of setting up a drawing interface | Shows little to no understanding of setting up a drawing interface |
| Set up a 2D /3D drawing environment | Shows an in-depth and comprehensive understanding of setting up a 2D /3D drawing environment | Shows a thorough understanding of setting up a 2D /3D drawing environment | Shows a substantial understanding of setting up a 2D /3D drawing environment | Shows a satisfactory understanding of setting up a 2D /3D drawing environment. | Shows a moderate understanding of setting up a 2D /3D drawing environment. | Shows an elementary understanding of setting up a 2D /3D drawing environment | Shows little to no understanding of setting up a 2D /3D drawing environment |
| Set up layers with properties assigned to each layer | Shows evidence of in-depth ability to set up layers and assign properties to each layer | Shows evidence of thorough ability to set up layers and assign properties to each layer | Shows evidence of sound ability to set up layers and assign properties to each layer | Shows evidence of adequate ability to set up layers and assign properties to each layer. | Shows evidence of moderate ability to set up layers and assign properties to each layer. | Shows evidence of limited ability to set up layers and assign properties to each layer | Shows little to no ability to set up layers and assign properties to each layer |
| Set up an A4 drawing sheet with a border and a title strip | Shows evidence of in-depth ability to set up an A4 drawing sheet with a border and a title strip | Shows evidence of thorough ability to set up an A4 drawing sheet with a border and a title strip | Shows evidence of sound ability to set up an A4 drawing sheet with a border and a title strip | Shows evidence of adequate ability to set up an A4 drawing sheet with a border and a title strip. | Shows evidence of moderate ability to set up an A4 drawing sheet with a border and a title strip. | Shows evidence of limited ability to set up an A4 drawing sheet with a border and a title strip | Shows little to no ability to set up an A4 drawing sheet with a border and a title strip |
| Show evidence of the correct use of the drawing tools | Comprehensive and detailed evidence is shown of using the drawing tools correctly | Thorough evidence is shown of using the drawing tools correctly | Substantial evidence is shown of using the drawing tools correctly | Satisfactory evidence is shown of using the drawing tools correctly. | Some evidence is shown of using the drawing tools correctly. | Limited evidence is shown of using the drawing tools correctly | No evidence is shown of using the drawing tools correctly |
| Show ability to save and retrieve work | Shows evidence of in-depth ability to save/retrieve work | Shows evidence of thorough ability to save/retrieve work | Shows evidence of sound ability to save/retrieve work | Shows evidence of adequate ability to save/retrieve work. | Shows evidence of moderate ability to save/retrieve work. | Shows evidence of limited ability to save/retrieve work | Shows little to no ability to save/retrieve work |
| Show ability to print | Shows evidence of in-depth ability to ability to print | Shows evidence of thorough ability to ability to print | Shows evidence of sound ability to ability to print | Shows evidence of adequate ability to ability to print. | Shows evidence of moderate ability to ability to print. | Shows evidence of limited ability to ability to print | Shows little to no ability to ability to print |
| The correctness of the 2D/3D drawing as a mark* | **80 –100%** | **70 - 79%** | **60 - 69%** | **50 - 59%** | **40 - 49%** | **30 - 39%** | **0 - 29%** |

* The drawing presentation mark is a percentage mark obtained through formative assessment

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# 2008 PAT FORMATIVE ASSESSMENT
# PAT 1 and PAT 2

NAME OF LEARNER: ……..
(SURNAME AND INITIALS)

EXAMINATION NUMBER: ……

| CRITERIA | MARKS | CRITERIA | | MARKS | CRITERIA | | MARKS |
|---|---|---|---|---|---|---|---|
| Identify the problem showing a clear understanding of the scenario | | Orthographic drawing | The presentation contains a front view | | The page is set up with a border, complete name block and title strip | | |
| | | | The presentation contains a top view | | Freehand drawing | The proportion of the features in the drawing | |
| Formulate a design brief listing the specifications and constraints | | | The presentation contains a sectional view | | | The relative size of the features in the drawing | |
| Research and record possible solutions | | | The presentation contains a detailed drawing | | | The consistency of line work in the drawing | |
| Select a final solution demonstrating understanding of the design brief | | Correctness of the drawing as a mark* | | | Drawing presentation as a mark * | | |
| | | Pictorial drawing | The correct pictorial drawing method has been used | | Instrument drawing | The level of competency displayed in using instruments in the drawing | |
| Show evidence that the researched information was used | | | The drawing reflects the correct size of the features | | | The use of correct line types in the drawing | |
| Present a complete set of drawings of the selected solution | | | The drawing is correctly orientated | | | The consistency of line work in the drawing | |
| | | Correctness of the drawing as a mark* | | | Drawing presentation as a mark* | | |
| Evaluation | | The drawings are correctly and well dimensioned | | | CAD drawing | The level of competence displayed in using a CAD system. | |
| | | The drawings are well labelled and show all necessary notes | | | | Knowledge of the plotting procedure is shown. | |
| | | The drawings display the correct cutting plane/s | | | | Level of file management shown. | |
| | | The drawings reflect that elements in the *SABS codes of Practice* have been used correctly | | | Drawing presentation as a mark* | | |
| | | | | | All deadlines have been met. | | |
| **TOTAL** | **/15** | **TOTAL** | | **/25** | **TOTAL** | | **/10** |

**MODERATED TOTALS**

| TOTAL | /15 | TOTAL | /25 | TOTAL | /10 |
|---|---|---|---|---|---|

| FINAL MARK | FINAL MODERATED MARK | MODERATED BY |
|---|---|---|
| /50 | /50 | |

# 2008 PAT FORMATIVE ASSESSMENT
# PAT 3

NAME OF LEARNER: ……
(SURNAME AND INITIALS)

EXAMINATION NUMBER: ……

| CRITERIA | MARKS |
|---|---|
| Set up a drawing interface | |
| Set up a 2D /3D drawing environment | |
| Set up layers with properties assigned to each layer | |
| Set up an A4 drawing sheet with a border and a title strip | |
| Show evidence of the correct use of the drawing tools | |
| Shows ability to save and retrieve work | |
| Shows ability to print | |
| The correctness of the 2D/3D drawing as a mark* | |
| **TOTAL** | **/50** |

| MODERATED TOTALS | | |
|---|---|---|
| **FINAL MARK** **/50** | **FINAL MODERATED MARK** **/50** | **MODERATED BY** |