



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.

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 present 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

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.

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.

SECTION B (The Learner Tasks)

Practical Assessment Task 1
Design Project 1
Civil and Electrical

This PAT covers LO1, LO2, LO3 and LO4.

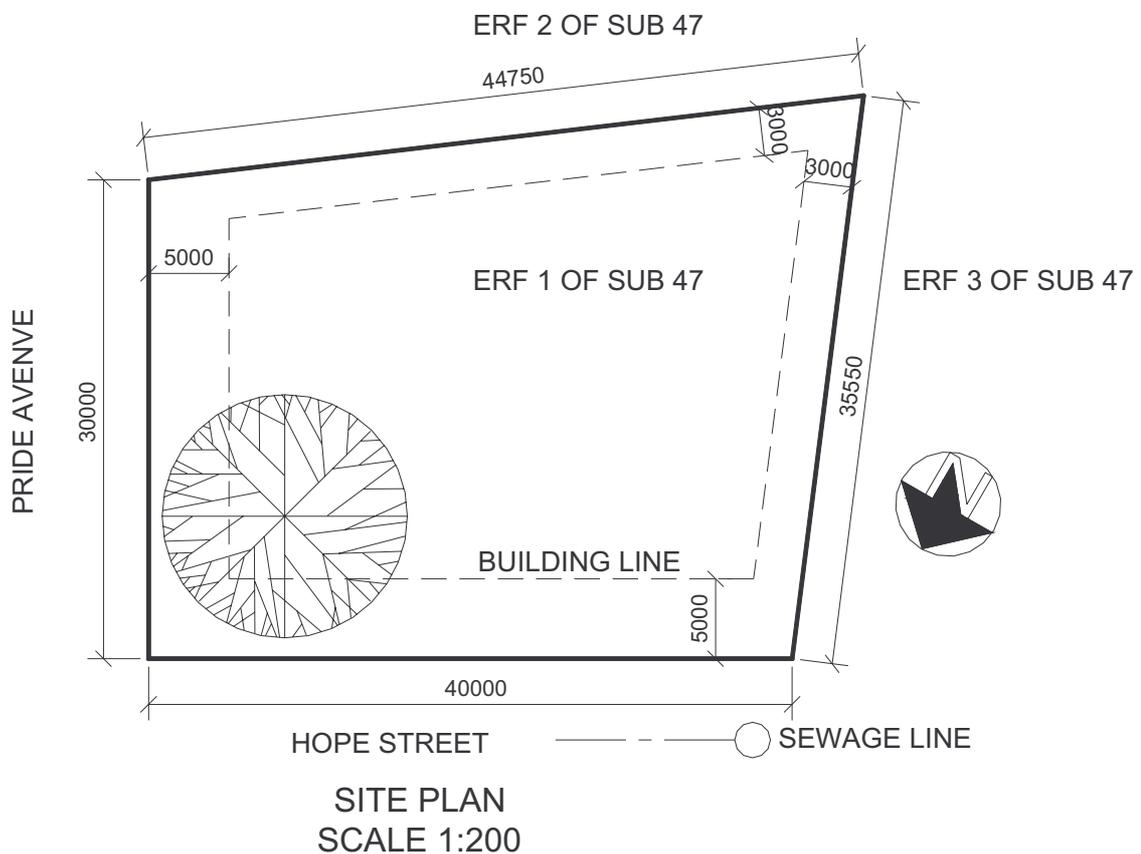
Scenario

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.



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.

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.

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.

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.

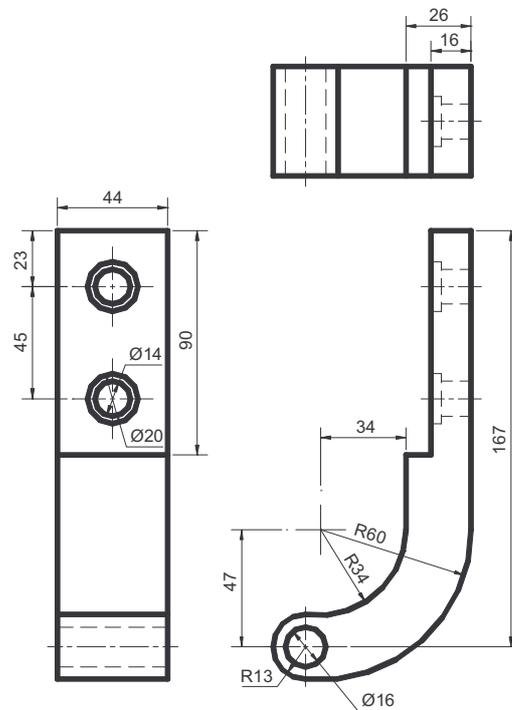
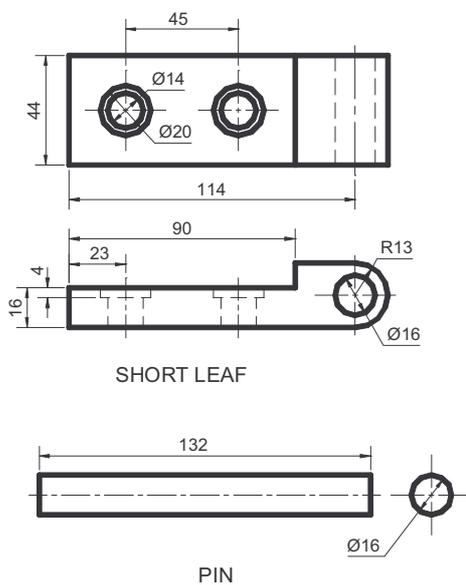
Practical Assessment Task 3
CAD Application
Mechanical

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.

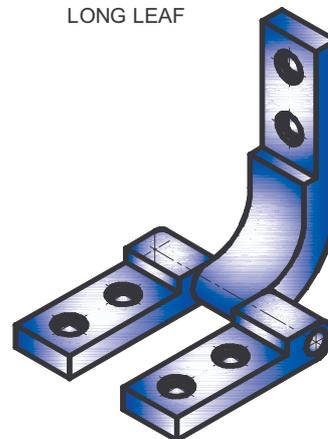
SECTION A

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.



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.

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**

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%
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.

ANNEXURE B

RUBRIC FOR ASSESSING THE CORRECTNESS OF THE DRAWING

CRITERIA		LEVELS OF PERFORMANCE						
		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.

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.

ANNEXURE C

RUBRIC FOR ASSESSING DRAWING METHOD SKILLS AND PRESENTATION

CRITERIA		LEVELS OF PERFORMANCE						
		7 80 –100%	6 70 - 79%	5 60 - 69%	4 50 - 59%	3 40 - 49%	2 30 - 39%	1 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

ANNEXURE D

A RUBRIC FOR ASSESSING CAD DRAWING SKILLS

CRITERIA	LEVELS OF PERFORMANCE						
	7 80 –100%	6 70 - 79%	5 60 - 69%	4 50 - 59%	3 40 - 49%	2 30 - 39%	1 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

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		Freehand drawing	The page is set up with a border, complete name block and title strip	
			The presentation contains a top view			The proportion of the features in the drawing	
			The presentation contains a sectional view			The relative size of the features in the drawing	
			The presentation contains a detailed drawing			The consistency of line work in the drawing	
Formulate a design brief listing the specifications and constraints		Correctness of the drawing as a mark*		Drawing presentation as a mark*			
Research and record possible solutions		Pictorial drawing	The correct pictorial drawing method has been used		Instrument drawing	The level of competency displayed in using instruments in the drawing	
			The drawing reflects the correct size of the features			The use of correct line types in the drawing	
			The drawing is correctly orientated			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*			
Show evidence that the researched information was used							
Present a complete set of drawings of the selected solution							
		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 <i>SABS codes of Practice</i> 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	FINAL MODERATED MARK	MODERATED BY
/50	/50	