Province of the
EASTERN CAPE
EDUCATION

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EXAMINER'S REPORT

SUBJECT:	ENGINEERING GRAPHICS AND DESIGN P1

1. ANALYSIS OF QUESTION BY QUESTION PERFORMANCE

QUESTION 1 (ANALYTICAL CIVIL) 30 marks

7.1 **Aim and objective:**

This is an analytical question consisting of lower medium and higher level questions. The question counted 30 marks.
The aim of the question was to test by means of short questions, knowledge applicable to civil engineering and architecture. Learners were given the plan view of a public toilet as well as part section drawings of a foundation a wall and a roof. From this information learners were required to label, section, sketch conventions, analyse information and calculate area.

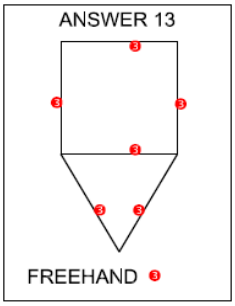
7.2 Relevant to LO 3 AS 1, 7

7.3.1 **Candidates performance in this question:**

Q1 NGL is a concept taught from grade 10 yet many learners could not locate it correctly on the given diagram.
Q2 DPC under the window sill was left out by many.
Q3,4 Labelling the roof was poorly answered even though both English and Afrikaans terms were accepted. Learners must be taught the specific names of all components of the roof.
Q5,6 The term beam cannot be accepted. Lintel or concrete beam is acceptable. The function of the lintel was incorrectly described by many. The primary function of the lintel is to support the load above the window.
Q7,8 The emphasis is on the function of this line and not the line type .G in question 7 refers to the cavity in the wall and not the wall itself. Candidates must read the questions carefully to know what is expected.
Q9 Most learners knew the answer to this question although some very peculiar answers were offered in between.
Q10,11 These two questions were lower order questions and did not pose any problems to the candidates.
Q12 This was the most poorly answered question. Calculation of area and perimeter is fundamental and should be taught from Grade 10. Most candidates either did not attempt this question or got it wrong completely, resulting in a loss of 4 marks.

12	5.766 x 5.036 = 29.0376 m² 2.124 x 2.124 = 4.5114 m² 4.5114 / 2 = 2.2557 m² 29.0376 - 2.2557 = 26.7819 m²

Q13 It is evident that most learners are not familiar with Architectural conventions. Graphic illustrations of fixtures were given instead. Most candidates lost the entire 3 ½ marks because of lack of knowledge of conventions.



Teachers are encouraged to use *SABS 0143* as reference.
Q14 Sectioning of foundation to roof is standard practice from Gr 10 onward it is unnecessary for candidates to lose marks here.
Q15 Very few learners obtained full marks here although this is a lower order question requiring only memory and recall.

7.4 Suggestions for improving marks in this questions.

- Learners should read the question before attempting to answer. Learners tend to assume what will be asked based on how the sketch looks.
- Place the answer in the correct position as requested.
- Know all conventions as contained in the *SABS 0143.*
- Place more emphasis on calculation of floor area and perimeter.
- Know all hatching detail for substructures and superstructures.
- Know all labels for roof, walls and foundations.
- Know all plumbing and drainage symbols and conventions.

7.3.1 This question had an average score of 31%

QUESTION 2 (Development) 37 Marks

7.1 **Aim and objective:**

This question forms an important part of mechanical engineering in the field of sheet metal working and formwork in Civil Engineering. Learners are required to interpret from one or more orthographic views, the development of the single or assembled components concerned. The important skill of designing a template for manipulation by a sheet metal worker is being taught

.

A good knowledge of how to determine true lengths and developing is essential.

7.2 LO 3 AS 2 and LO 4 AS 3 is mostly covered here. The learner has to apply a variety of drawing skills learned in grade 11 and 12.

7.3.1 **Candidates performance in this question.**

This question was very poorly answered by most candidates

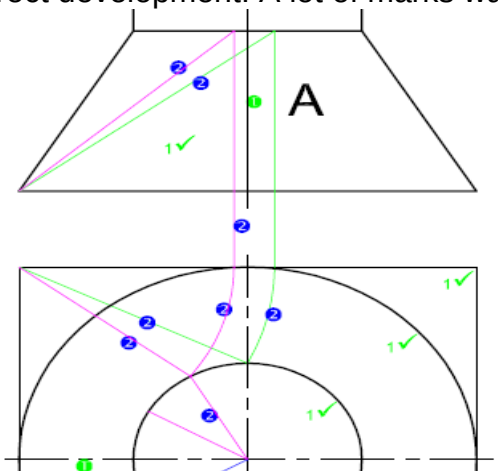
Although the individual components in the assembly was very basic, It was evident that most learners did not recognise the assembled components on the transition piece.

Part A – Square to round transition piece.

Most learners failed to recognise this basic shape on the assembly.

Although this type of work is fairly new, enough examples of this transition piece have been given to the learners in the provincial as well as national papers during the past three years.

Determining the true lengths for the purpose of constructing the development is crucial. In a lot of cases this was guess work by the candidates resulting in an incorrect development. A lot of marks was lost due to this.

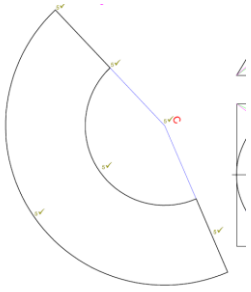


Part B – Cylinder

Although this is a Gr 10 level development, a lot of candidates did not recognize it on the assembly.

The formula for determining the circumference of the cylinder was left out by most pupils resulting in a loss of 1 mark.

Part C – Cone



Once again this is work that is covered from Gr 10. Many learners left this part out completely. Recognising this part as a cone seem to be the problem.

Although the development is straightforward, sadly many learners lost all 7 marks because of not recognising the shape and not knowing how to make the constructions to begin the development.

7.4 Suggestions for improving marks in this section:

- Developments and interpenetration of all hollow bodies have to be covered from Gr 10 to Gr 12.
- Determining of true lengths for creating developments must be consolidated throughout.
- Correct use of compass when transferring distances must be practiced.
- Learners must be taught to recognise individual components on an assembly.

7.3.1 The average score for this question was 21%

QUESTION 3. (Perspective) 36 Marks

7.1 Aim and objective:

To test the ability of the learner to pictorially illustrate how an object will look when viewed from a particular station point, thereby creating a pictorial view that is graphic and vivid. This is an important skill in architecture and is used to give an artist impressions of the product to be manufactured, in this case a house.

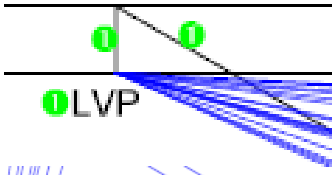
7.2 This question relates to LO 4 AS 4

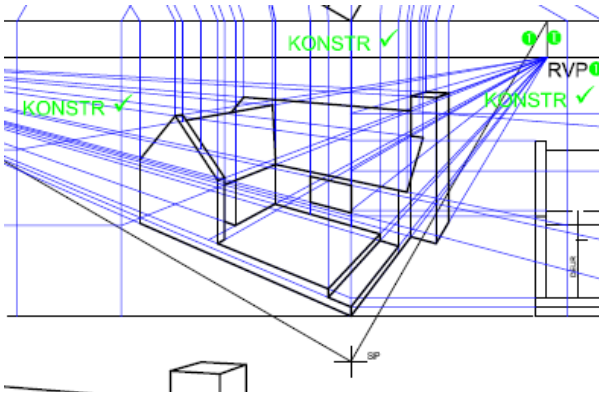
7.3 Candidates performance in this question:

7.3 Most candidates attempted this question with good success. Learners who did not do well inevitably positioned the vanishing points incorrectly. This resulted in an immediate loss of a maximum of 3 marks.

Common mistakes made in this question was:

- Incorrect placing of the VP's
- Not labelling the VP's
- Not able to construct and project the correct roof height
- Assuming notice board on wall is a window with depth
- Not knowing how to obtain the true height of an object by projection.
- Incorrect chimney height and width





7.4 Suggestions for improving marks in this section:

- Start by accurately constructing the correct position of the vanishing points.
- Label the vanishing points RVP and LVP (this is a guaranteed 3 marks)
- Project from the top view to the SP through the PP.
- Obtain true heights and positions of items on the view

Many candidates lose marks due to carelessness in this question.
Learners are encouraged to use different colour pens for construction lines when practising perspective to avoid confusion.

7.3.1 The average score for this question was 44%

QUESTION 4 (CIVIL) 97 Marks

7.1 Aim and objective:

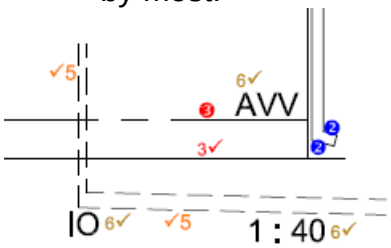
The aim of this question is to test the learners ability to create working drawings from schedules and schematic diagrams given on an information sheet.
The question allows the learner to apply his knowledge of all aspects of civil including electrical, plumbing, drainage, door, window and roof construction.
This question is a culmination of work covered in grade 10, 11, and 12 and carries the most marks.
7.2 LO3 AS 1 and LO4 AS 1,2,3 and was extensively covered in this question.
7.3 Most candidates attempted this question and some achieved quite good marks.

7.3.1 Candidates performance in this question:
This question carries the bulk of the marks, 48%.
Almost all candidates attempted this question with relatively good success.
Candidates who do well in this question stands a good chance of passing this paper.
The biggest reason why learners do not perform well in this question is because of their inability to read with understanding the attached schedule. The ability to do this will drastically improve their marks. Learner know how to draw the individual items but cannot put it together as per instruction on the schedule. Teachers have to ensure that learners get enough practise here as a matter of urgency.
Particular attention has to be paid to drawing to scale as a lot of marks can be lost here.

West Elevation

- Because of insufficient information on the question paper, the position of the roof was not always placed in the correct position. Learners were however awarded full credit for this oversight.
- The front view of the gutter against the facia board was rarely shown by most candidates and the scale of the down pipe was mostly drawn incorrectly.

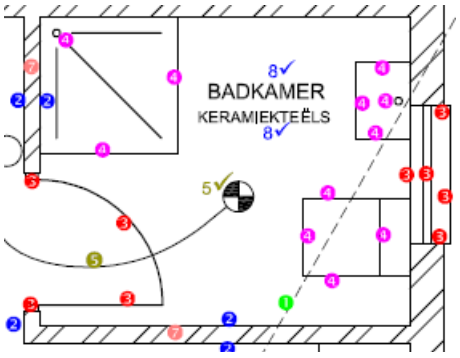
- The door and window was drawn well by most.
- Waste water – very few learners inserted this feature resulting in a 2 mark loss by most.



- Easy 4 marks could have been obtained by labelling the required features. Labelling of Inspection Eye (I.E.) was left out in most cases.
- Using incorrect scale resulted in a loss of 2 marks.

Plan View

- The roof walls and windows were answered well.
- The <u>conventions</u> for the bathroom fixtures were specifically asked for in this question. Most candidates lost marks for showing graphic illustrations of these fixtures. No marks were awarded in these cases.



- Electric symbols were in many cases inserted in the wrong positions and electric wiring omitted.
- Plugs and light switches should be placed against the walls and not floating in the air.
- Outer and inner wall thickness were sometimes not to scale.
- All labelling should be done in appropriate positions.
- Some learners are still in the habit of making use of mechanical instead of civil sectioning.
- Making use of the incorrect scale was also evident

7.3.1 The average score for this question was 56%

7. ANY ADVICE THAT YOU COULD GIVE TO EDUCATORS IN HELPING THE LEARNERS TO REACH THE EXPECTED LEVEL.

To ensure that the recommendations of this report is implemented, it has to be discussed and unpacked by the subject teachers at cluster meetings in the various districts.
These discussions should be placed high on the agenda of the subject advisors as a matter of urgency.
Teachers must be assisted as far as possible with the implementation of these recommendations.
Workshops must arranged to empower novice teachers with material that will assist them in effective teaching.
Examiners and moderators in the subject should be used more effectively in areas where there is a lack of expertise.
Because this is a new subject teachers have to acquire a variety of text books dealing with the changed content.
Cluster meetings must be used by teachers to exchange ideas about areas of concern in the subject.
Competent subject advisors must be appointed to help schools who consistently produce poor results.
Teachers have to stick to the pacesetters to ensure that they complete the syllabus in good time.
Learners must be encouraged to practice at home as much as possible to increase their general speed.
Teachers must guard against slovenly presented work. This is evident when marking some scripts.
Learners must be encouraged to use good quality drawing equipment to ensure accuracy.
The exemplars and provincial papers must be thoroughly worked through as this is an ideal preparation for the final exam.

Summary of areas that need to improve:

ANALYTICAL

- Conventions used in civil
- Calculation of area and perimeter
- Correct labelling of views
- Correct sectioning types for civil
- Substructure and superstructure labelling
- Plumbing and drainage terminology

INTERPENETRATION AND DEVELOPMENT

- Construction of true lengths
- Accurately transferring distances
- Development methods
- neatness

PERSPECTIVE

- Determining and labelling the VP's
- Projection of true heights and positions
- Linework and neatness

CIVIL

- Incorrect scale used
- Not familiar with civil and electrical conventions for fixtures.
- Incorrect gutters and downpipes
- Incorrect sectioning of walls and sub-structure
- Incorrect wall thickness for load and non load bearing walls.
- Incorrect waste water disposal representation

8. ANY OTHER COMMENTS

- The current curriculum is too wide and diversified. Teachers struggle to get through the syllabus, leaving very little time for consolidation.
- Teacher need to be trained in new content and recommended books have to be bought as reference books for teachers
- The quality and standard of the work produced by learners in this subject has declined over the past few years. Line quality must be emphasised
- Teachers are demotivated by the amount of administration required during assessment and recording. Teachers need more contact time for teaching.
- It is evident that poor performance by pupils are sometimes the result of insufficient content knowledge by teachers.
- Very little progress is made in most schools to acquire CAD stations. This forms a vital part of the syllabus and the future success of the subject.

CONGRATULATIONS to all concerned with a well organised exam.