



EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE

Home of Examinations and Assessment, Zone 6, Zwelitsha, 5600

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2023 NSC CHIEF MARKER'S REPORT

SUBJECT	ENGINEERING GRAPHICS AND DESIGN		
QUESTION PAPER	1	2	3
DURATION OF QUESTION PAPER	3HRS		
PROVINCE	EASTERN CAPE		
DATES OF MARKING	4 – 18 DECEMBER 2023		

SECTION 1: (General overview of Learners Performance in the question paper as a whole)

In general, the learners performed better in this question paper than 2022. There were a 7,9% improvement in the pass rate for this year in this paper. In all the questions the average percentage went up by between 1,6% and 10,4%.

There is still a lot of improvement to be made. There are still many learners that could not do the basic work in the paper. Learners forfeited a lot of marks because of bad linework and accuracy.

SECTION 2: Comment on candidates' performance in individual questions

QUESTION 1
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?
This question is an Analytical question and many of the answers are found on the given drawing and in the Mechanical Title panel. Although there was a slight improvement on the average mark this question was still answered poorly. 21 learners did not attempt this question. The average mark for this question was 30,6%.
(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.
There is a variety of reasons why learners could have performed poorly in these questions, e.g. <ul style="list-style-type: none"> • Lack of commitment to studies • Language barrier

- No resource material to study from
- No educator to guide learners in how to answer Analytical questions.
- Not enough practice in answering Analytical questions.
- Not working through past Exam papers

Examples:

- Question 1.1, 1.2, 1.3 1.5, 1.10, 1.12 and 1.15 all relate to finding the answer on the page.
- Question 1.4, 1.6, 1.7, 1.11, 1.13, 1.14, 1.17 and 1.18 are all questions that learners must learn(terminology). Most of these questions were asked in previous papers.
- Question 1.8, 1.9 and 1.16 are all related to dimensioning. Learners must determine the dimensions by either finding them (adding or subtracting), measuring(angles) or understanding the way they are given(tolerance) on the drawing. All these questions were asked in past papers.
- Question 1.19 and 1.20 are related to graphical symbols that learners must learn to draw in freehand.

Learners that work through past papers should be able to obtain between 80% and 90% for Question 1.

(c) Provide suggestions for improvement in relation to Teaching and Learning

Teachers must create their own learning material from past papers and learners must study these notes, e.g., different types of sections, machining symbols, welding symbols, mechanical graphical symbols, etc. Teachers must make use of past papers to give learners some practice in answering the questions on dimensioning and tolerances.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

Learners do not study for EGD and Question 1 has to do with the learner's ability to regurgitate knowledge. Write a class test (Max 20 minutes) every Friday on Question 1.

QUESTION 2

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

This questions also showed a slight improvement on the average mark from last year. Many learners attempted the question. Reading with understanding is a big stumbling Block for many learners. 285 learners did not attempt this question. The average mark for this question was 31,6%.

The question is split into 2 sub questions:

2.1: Mechanism

Although there was an improvement on the average for this question it was still poorly answered, with most learners only obtaining the marks for copying the given view and dividing the circle into 12 parts. There were a few candidates that obtained full marks for this question.

2.2: CAM

In this question there was also an improvement on last year, but overall, it was poorly answered. Many learners did not have any idea of how to answer this question. This question has been asked many times in the past. There were a few candidates that obtained full marks for this question.

(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

Question 2.1: Mechanism

Historically this question has always been problematic. Learners must understand the different terminology that is used to describe the movement of the mechanism. Although the same terminology is used in this type of question, it can be that learners that take English as a second or third language, might have difficulty in following the explanation of the movement of the mechanism. Many teachers do not spend enough time on explaining and practicing Mechanisms. Learners tried to recreate the answers from previous question papers instead of what has been asked. They lack the understanding of how each part functions, connects, and influences other parts. Inaccuracy and lack of attention to line types is a big factor that led to forfeiting marks. Many learners forfeited marks because they divided the circle into 8 parts instead of 12 parts.

Question 2.2: CAM

This question was asked slightly different than in the past. Some learners found the question quite easy, but many learners still struggled to distinguish between the different motions. The learners do not do enough exercises in the different motions. Learners do not have proper drawing instruments, and that can be seen where they had to draw arcs on the cam profile. They also did not divide the profile into 15° angles between 210° and 330° . Learners use the wrong construction (SHM) to try and obtain the curve on the graph for acceleration and retardation.

(c) Provide suggestions for improvement in relation to Teaching and Learning

Both these questions are very practical in its application, and teachers can make cheap models of the different movements to show the learners how the mechanism or CAM moves. This will help the learners to understand the terminologies better, e.g., slider, crank, pivot, etc. Teachers need to familiarize themselves with the terminology that is needed to answer these questions. Focus needs to be put on the copying and use of line types as given in the question. There are only 3 different types of motions that is done at school level, uniform motion, simple harmonic and acceleration and retardation.

There are many videos available on the internet that teachers can use to better explain the different movements of a Mechanism and a CAM. Learners need to be taught the difference between Simple Harmonic Movement and Acceleration and Retardation. Learners need to practice the basics of dividing a circle, indicate direction and projecting from the displacement graph.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

Many more learners attempted these questions. By splitting the CAM in 2 parts, the graph and the profile, teachers can do quick tests on the two different parts. Teachers must make use of the proper terminology when teaching these questions. Make posters with a description of the terminology and display them in the class during teaching, e.g., oscillate = swing back and forth, pivot = revolve around, etc.

QUESTION 3

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Although the feedback from learners was that the Isometric drawing was easy, the learners still performed poorly. The question was fairly answered, and most learners attempted the question, but there is a lack of knowledge on how to answer certain parts of the question, e.g., angled slopes and circles. 491 learners did not attempt this question. The average mark for this question was 22,6%.

(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

Many of the learners did not orientate the drawing correctly and lost marks for the mistake. Very few learners sectioned the drawing. There were also many mistakes made when sectioning the drawing. The rules for mechanical sectioning also applies to isometric drawings, e.g., opposite hatching and non-hatching of webs. The isometric circle was answered poorly, and many learners did not put in the centerlines. Although many learners showed the auxiliary view for the half a hexagon, very few used the construction to complete the isometric view. Many learners did not draw any auxiliary views. Many learners are unable to use their instruments properly and that lead to wrong alignment and angles draw, which may be the cause of learners not having proper drawing instruments. Many learners do not know how to change an orthographic drawing into a isometric drawing. They struggle with the depth perception on the isometric view.

(c) Provide suggestions for improvement in relation to Teaching and Learning

Learners need to do more exercises with isometric circles and angled (polygons) surfaces. Learners must practice sectioning of isometric views. Learners must get more practice on the basics of isometric drawings. Try to make models of the isometric drawings that the learners practice so that they can physically see the object they are drawing.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

Learners must practice using a compass to join arcs together. Working with a set square and T-square must also be practice. The learners are drawing inaccurate because they don't practice enough. Create smaller simpler drawings for homework and do more complex exercises (past exam questions) in class where the teacher can help the learners to understand the concept of changing orthographic views into isometric views. The basics of drawing angled surfaces (polygons) and circles should be practiced extensively in lower grades.

QUESTION 4

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Most learners attempted this question. The learners still performed poorly in this question. There are still many learners who do not assemble the drawing and draw all the parts separately. These learners lose a lot of marks. The preparation by the learners was not up to standard. 130 learners did not attempt this question. The average mark for this question was 29,9%.

(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

Learners would answer the question by just copying the given views and not sectioning or assembling the parts. Lack of practice made learners draw very inaccurate. Construction of the bolt and nut was inaccurate. Many learners do not know the rules around non-sectioning and sectioning of different parts. Many learners did not attempt the Left view. The learners could obtain 20 marks with only assembling the given parts of the Left view. Many learners do not understand assembly of parts when they fit inside each other, e.g., bush, seals, bearings, etc. Learners only draw the parts touching each other and do not insert the seal and bush. Learners combined the Front view and Left view of certain parts which then makes it difficult for them to understand how the other parts must fit.

(c) Provide suggestions for improvement in relation to Teaching and Learning

Teachers must make use of technology to show learners how parts must be assembled. Learners must be drilled around the rules around non sectioning of shafts, keys, webs, etc. Learners must practice the accurate copying of parts. Teach concepts such as auxiliary views for the nut and basic nut construction in the early grades already. If started as early as grade 10 it could bridge this gap.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

Learners need to practice using their instruments accurately. The understanding of orthographic projection remains a point of confusion to many learners. They need to extensively practice this in the lower grades. Learners need to understand the layout for third angle orthographic views in order not to forfeit marks for wrongly placed or draw views. Learners must apply the rules of sectioning and non-sectioning of different parts and this they can only do if they practice. Teachers must try to get examples of common parts that they can physically show to the learners. It would be a great idea if they can have two of the same part to show learners how they look before and after sectioning.