



**EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE**

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

REPUBLIC OF SOUTH AFRICA, Website: [www.ecdoe.gov.za](http://www.ecdoe.gov.za)

## **2018 NSC CHIEF MARKER'S REPORT**

<b>SUBJECT:</b>	<b>ENGINEERING GRAPHICS &amp; DESIGN</b>
<b>PAPER:</b>	<b>PAPER 2</b>
<b>DURATION OF PAPER:</b>	<b>3 HRS</b>
<b>DATES OF MARKING:</b>	<b>3 – 12 DECEMBER 2018</b>

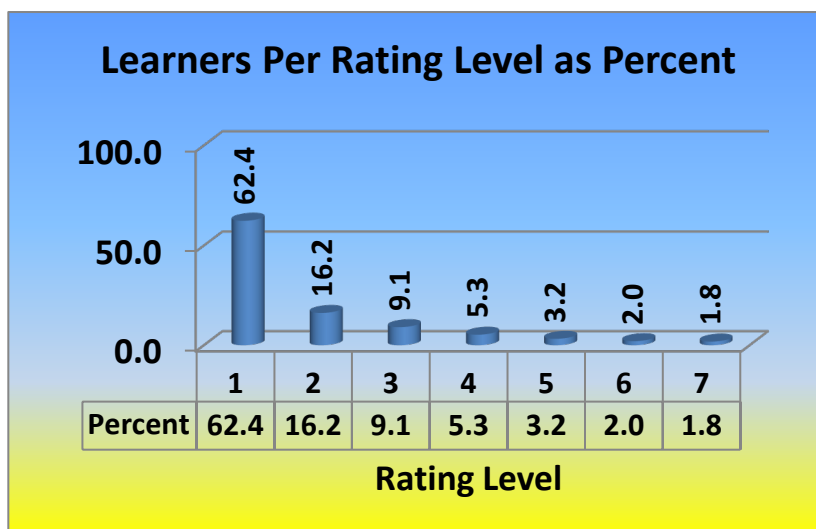
**SECTION 1: (General overview of Learner Performance in the question paper as a whole)**

To answer this question, you must look at the province in districts. Some districts performed well while other districts under performed. Some centres within districts were the exception to the rule. These centres must be used to uplift the standards in the rest of the district. It appears that more candidates are attempting the different questions, but the results do not show it. This can be attributed to a few factors, namely:

- Inadequately trained or unqualified educators
- Learners that did not meet progression requirements in Grade 11 yet were promoted to Grade 12 on age cohort in some instances
- Disinterested learners
- Poor school attendance of learners
- Learners and schools that do not have the correct drawing equipment and/or facilities
- Inadequate or non-existent LTSM
- Lack of support and/or intervention for under-performing centres and districts.

If we must look at the performance of the candidates, then the province performed much worse than 2015, 2016 and 2017:

LEVEL	2018	2017	2016	2015
1	62.4%	49.9%	47.2%	33.7%
2	16.2%	19.5%	21.4%	24.8%
3	9.1%	12.6%	14.3%	18.4%
4	5.3%	8.4%	7.8%	10.8%
5	3.2%	5.6%	4.5%	5.9%
6	2%	2.1%	2.5%	3.5%
7	1.8%	1.9%	2.2%	2.9%



**SECTION 2: Comment on candidates' performance in individual questions**

(It is expected that a comment will be provided for each question ).


## QUESTION 1

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



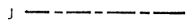
- Sections of the question were well answered by the majority of the candidates, but overall this question was poorly answered.
- The majority of the candidates could at least answer the first 8 questions. These questions are normal “find the answer on the paper” questions.
- Average mark attained for question 1 was 42%.

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





- Question 1.1 - 1.8: These questions were lower order cognitive questions and had to be read off the given drawing or title block. Learners does not understand the terminology that is used in the Mechanical world. This is in many cases a language barrier problem.
- Question 1.9: Very few candidates knew the use of a phantom line.

	Chain thin double-dashed	K1 Outlines of adjacent components K2 Alternative and extreme positions of movable components K3 Centroidal lines K4 Initial outlines prior to forming K5 Parts situated in front of the cutting plane
---	--------------------------	--

- Question 1.10: This question was asked in several previous question papers and some candidates could give the correct answer. (The shaft continues)
- Question 1.11: Very few candidates could give 2 uses of a chain line on mechanical drawings.

G 	Chain thin	G1 Centre lines G2 Lines of symmetry G3 Trajectories
H 	Chain thin, thick at ends and changes of direction	H1 Cutting planes
J 	Chain thick	J1 Indication of lines or surfaces to which a special requirement applies

- Question 1.12: Candidates do not know the different terminology and symbols used in mechanical drawing and thus does not know what knurling means and how it is indicated on a mechanical drawing.

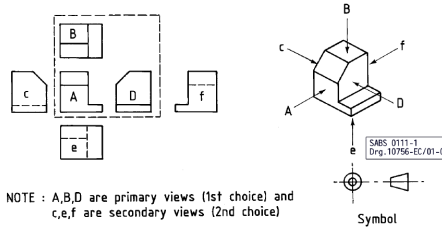
Feature	Detailed representation	Conventional representation
Straight knurling		
Diamond knurling		

- Question 1.13: The candidates does not understand ortoghraphic projection and could not figure out which view was asked. This question is related to question 1.20 and the information that is given. It is clearly stated that the two views shown is a Front and Top view, if the candidate knows his grade 10 work he should be able to work out the correct answer.

### 6.2.2 Third angle projection

In third angle projection, with reference to the front view, A, the other views should be arranged as follows (see figure 12):

- top view, B, is placed above;
- left view, c, is placed on the left;
- right view, D, is placed on the right;
- bottom view, e, is placed below; and
- rear view, f, is placed on either the left or the right, as convenient.



- Question 1.14(C): Candidates had to add four dimensions together. Many candidates could not get the correct answer. Some candidates measured the distance on the drawing that was not drawn to scale. It was a simple addition exercise.
- Question 1.14(D): Candidates could not work out what the correct size of the phantom shaft is. This could be seen as a unfair question, as candidates that have never seen or worked with a micrometer would not know how to work out the answer.
- Question 1.14(E): Candidates still do not know how to write down a dimension.

20 °C C: 139 ✓ D: Ø15,85 ✓ E: Ø18 ✓ 84°

- Question 1.15: Very few candidates could get this question right. They had to use a protractor to measure the angle between two lines. The lines had to be extended to get an accurate answer. I guess many candidates did not have a protractor to measure the angle.
- Question 1.16 – 1.18: These three questions were all related to different types of sectioning that a candidate had to identify.

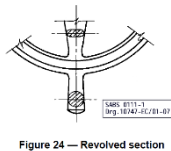


Figure 24 — Revolved section

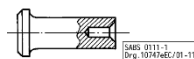


Figure 23 — Part section

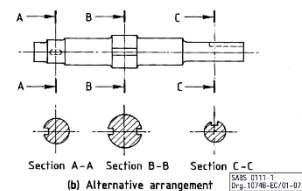
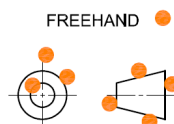


Figure 27 — Successive sections

- Question 1.19: Although this question has been asked in previous papers very few candidates knew how to calculate the lower tolerance for the dimension given.
- Question 1.20: This question asked for a freehand drawing of the projection symbol. The candidates still get this wrong, although it has been asked in nearly every examination. Some candidates also do not draw in freehand.



- The lack of knowledge of technical terminology was a big factor in the inability of the candidates to answer questions.
- The inability to read/understand a drawing was evident in the wrong answers/dimensions that were given in some questions.

With the exception of a few questions the majority of questions have been asked in previous papers. This shows that teachers do not consult previous papers when planning their lessons.

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

- Teachers must make use of the SABS and DBE approved textbooks to obtain the

correct terminology for the subject.

- Exercises in the reading of drawings must be done to improve the candidate's ability to find and calculate dimensions.
- Teachers must make use of old examination papers to guide the candidates in how to answer the analytical question.
- Candidates must answer questions correctly, e.g. if the question states that the symbol must be drawn in freehand, then it must be freehand. The opposite is also true; if instruments are required then freehand drawings will not be accepted.
- Time management is essential to complete all the questions.
- The responses from candidates indicate that many of them do not understand the terminology and language that is used in the paper. The answers would reflect that they did not understand what was asked, e.g. dimensions become names of parts, etc.
- It seems to be that candidates leave question 1 for the end of the session which means that they sometimes run out of time and have to rush through the questions and then make mistakes. Time management is very important when completing the question paper.

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

- The responses from candidates indicate that many of them do not understand the terminology and language that is used in the paper. The answers would reflect that they did not understand what was asked, e.g. dimensions become names of parts, etc.
- It seems to be that candidates leave question 1 for the end of the session which means that they sometimes run out of time and have to rush through the questions and then make mistakes. Time management is very important when completing the question paper.
- This is the type of question that you should give to your pupils and they take it home and research the answers. Let the class then decide which answer is the correct one and why.
- To get candidates to learn where the different views must be placed in third angle orthographic projection, let them print the names of the views below the drawings that they do for CASS.
- This type of question should be asked in grade 10 to start developing their skills in reading drawings.

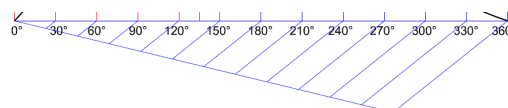
### QUESTION 2.1

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

- Many candidates attempted this question with relatively good results, but there are still some centres where the candidates do not know what to do.
- Average mark attained for question 2.1 was 28%.

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

- Candidates did not show the construction for line division on the X-axis of the graph.



DISPLACEMENT GRAPH  
SCALE: 114 mm = 360° ROTATION

- Candidates did not obtain the correct height of the graph.

- Candidates did not label the graph.

DISPLACEMENT GRAPH  
SCALE: 114 mm = 360° ROTATION

- Most candidates could not construct the deferent movements.

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

- Teachers must teach according to the CAPS document. Work that was done in Grade 10 & 11 must be revised in Grade 12.
- Dividing lines into equal parts must be practised more extensively.
- The different variations of movement must be practised.
- Teachers must emphasise the importance of drawing the correct line types. More practises in the different movements of Cams must be done.
- Practice dividing line into equal parts using the construction.
- They are not drawings that take a long time to do and can easily be practice in class time.

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

- Candidates must read the questions carefully to avoid doing the wrong movements.

### QUESTION 2.2

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

- Question 2.2 (Mechanism) was extremely poorly answered.
- Most learners only copied the given schematic view.
- Some candidates did obtain good marks for determining the loci of point C, but failed to understand how the mechanism works and could not determine the loci for point D.
- Average mark attained for question 2.2 was 23%.

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

The following common errors were made:

- No proper centre lines were drawn; instead learners drew construction or hidden detail lines.
- Candidates did not divide the circles into 12 equal parts and in some cases, they did not divide them in equal parts.
- Learners did not draw the construction lines, but only obtained the points on the line and that cost them marks.
- Learners did not understand the movement of the rod CD through swivel guide E and thus could not determine the loci for point D.
- Learners did not understand what the “use” of the horizontal line FG was.
- The construction of the curve was poorly done.

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

- Teachers must teach according to the CAPS document. Work that was done in Grade

10 & 11 must be revised in Grade 12.

- Dividing circles into equal parts must be practised more extensively.
- The different variations of movement must be practised.
- Learners must be exposed to the terminology needed to understand this question.

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

- Candidates must read the questions carefully to avoid doing the wrong drawings.
- The fact that so many learners only copied the given schematic drawing and did not attempt to answer the question give the suspicion that learners were not taught how to answer the mechanism.
- More practises in Mechanisms must be done. They are not drawings that take a long time to do and can easily be practice in class time.

### QUESTION 3

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

- Some centres answered the isometric drawing well.
- There are many centres where there is a lack of understanding the concept of converting from 2D to 3D and learner responses was very poor.
- Average mark attained for question 3 was 35%.

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

Many candidates still have a problem mastering the following:

- Constructing auxiliary views. Most learners ignored the  $60^\circ$  angle.
- Drawing the isometric circle was very poorly done and even in well answered questions the learners left out the centre line.
- The accuracy of the measurements was poorly done.
- The errors on the question paper made this already time consuming drawing even more difficult to complete in the allocated time, because the candidates had to try and “figure out” what it looked like.

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

More attention should be given to the following aspects:

- Visibility of the lines (line quality is poor)
- Auxiliary view construction ( $60^\circ$ ) mostly not drawn.
- Candidates are battling to master the method of constructing a circle. Compass work is poor. Centre lines must be practice.

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

- Most learners fail to apply the correct line type, visible outlines compared to construction lines.
- Educators should guide candidates on how to draw precise 90- and 30-degree lines of isometric drawings, using correct scale and given dimensions.
- Emphasis to all 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 the question. The question was not answered well. The question took a long time to answer.
- Average mark attained for question 4 was 25%.

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

- Planning of the placement of views is critical (3<sup>rd</sup> angle).
- Learners did not measure properly and drew inaccurately.
- Improper or incorrect placement of parts of the assembly.
- Some learners did not use proper instruments.
- Center lines were very poorly drawn or omitted.
- Very few learners were able to construct the nut properly.
- Very few learners inserted the cutting plane and did not label it.
- Candidates used civil hatching, hatched at the wrong angle and did not differentiate between parts (spacing & direction).
- Many learners did not hatch the view.
- Parts of the assembly were drawn as unassembled.

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

- Pay attention to drawing TAP.
- Although line quality is not evaluated neat drawings are easier to read and clarify the drawing. Learners must practice drawing neatly, because only correctly used linework is marked, e.g. outlines must stand out above construction lines and hidden detail lines. Centre lines must be correctly drawn.
- Pay attention to basic knowledge such as the manual construction of nuts and bolts.
- The part section on the worm screw was left out or incorrectly done.
- Candidates left out the center lines or drew them incorrectly.
- PARTS MUST BE ASSEMBLED.

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

- Planning of time per question is critical. 1.1 marks should be completed per minute. Roughly 87 minutes should be spent on 96 marks.
- Planning of drawing layout needs attention.
- Line quality must improve.
- Learners do not practice the assembly drawings enough.
- While preparing learners to answer assembly's special attention must be given to hatching of different components and hatching rules.
- Also revise construction of nuts, washers and bolts again.
- Line types and their use must be stressed.
- Take note of use of centre lines and cutting planes.