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**QUALITATIVE ANALYSIS OF LEARNER RESPONSES AND EVALUATION OF QUESTION PAPERS: NSC 2021**

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| **REPORT 1: EVALUATION OF THE QUESTION PAPER AND MARKING GUIDELINE** |

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| **SUBJECT** | **ENGINEERING GRAPHICS AND DESIGN** | |
| **PAPER** | **2** | |
| **DURATION OF PAPER:** | **3 HOURS** | **200 MARKS CONVERTED TO 100 MARKS** |

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

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| The overall performance of the candidates was disappointing. In some centres, certain questions were poorly answered or just left out. Simple copy work was poorly done and even left out. The amount of “0” marks for a question has increased quite substantially. In some cases, candidates even score “0” marks in two or more of the questions, because they did not even attempt the questions. The drawing quality is also very concerning, as some candidates clearly did not have proper drawing equipment. In some centres, freehand drawings were done, and candidates forfeited marks as freehand drawings are not assessed.  The poor performance of candidates 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-existing LTSM * Lack of support and/or intervention for under-performing centres and districts.   If we look at the performance over the past few years, we must realise that our candidates or not performing well:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **LEVEL** | **2021** | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | | **1** | **68.1%** | 66.8% | 53.4% | 62.4% | 49.9% | 47.2% | 33.7% | | **2** | **15.7%** | 16.4% | 21.1% | 16.2% | 19.5% | 21.4% | 24.8% | | **3** | **7.2%** | 7.8% | 11.3% | 9.1% | 12.6% | 14.3% | 18.4% | | **4** | **4.2%** | 4.8% | 6.9% | 5.3% | 8.4% | 7.8% | 10.8% | | **5** | **2.4%** | 2.4% | 3.9% | 3.2% | 5.6% | 4.5% | 5.9% | | **6** | **1.3%** | 1.2% | 1.8% | 2% | 2.1% | 2.5% | 3.5% | | **7** | **1.1%** | 0.6% | 1.5% | 1.8% | 1.9% | 2.2% | 2.9% | |
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**SECTION 2: Comment on candidates’ performance in individual questions**

**(It is expected that a comment will be provided for each question on a separate sheet).**

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| **QUESTION 1** |
| (a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered? |
| * The analytical questions were poorly answered, with very few candidates scoring any marks in the middle to higher order questions. * Average mark attained was 27,1%. |
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| 1. Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions. |
| This question is poorly answered because candidates do not want to study for EGD. This question relies on the candidate learning the terminology of the subject. They need to practice the skill of reading a drawing and working out distances. They need to understand TOP. The following is a list of the questions where candidates did not show any insight or knowledge:   * Some candidates did not even attempt the question. * Q1.5 – Candidates do not know TOP. Some candidates talk of a Side View instead of the correct view, e.g., Left or Right view. * Q1.6 – Candidates do not read the question correctly and answered 2 instead of 2000. * Q1.8 – Candidates do not know the meaning of the SANS symbol for a “Flat surface”. * Q1.9 – Very few candidates know the difference between the different types of sectioning. E.g. revolved, removed, part, etc. * Q1.10 & 1.12 – Candidates still cannot read or determine distances(dimensions) on a drawing. * Q1.14 – Candidates do not know how to insert the cutting plane correctly. * Q1.17 – Candidates struggle with terminology of the subject. * Q1.19 – Candidates do not know the welding symbol. * Q1.20 – Very few candidates know the SANS convention for a interrupted view of a pipe. |

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| 1. Provide suggestions for improvement in relation to Teaching and Learning |
| * Teachers must make use of the SANS 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. when 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. * 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. |

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

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| **QUESTION 2** |
| (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 was 28%. |

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| 1. Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions. |
| * Candidates did not copy the given information correctly. * Candidates do not insert the centrelines correctly. * Candidates did not obtain the correct length for the X-axis of the graph (8x12=96). * Candidates did not divide the X-axis into 12 equal parts. * Candidates did not use the minimum distance to obtain the correct height for the graph. * Most candidates could not construct the deferent movements. * Many candidates did not divide the 90° into 15° segments to obtain 6 equal parts for the Simple Harmonic movement. * Some candidates could do the simple harmonic movement but used the incorrect size for the construction of the semi-circle. * Candidates also divided the circle into 4 parts (45°) instead of 6 parts (30°/60°) * Candidates did not know the construction for the Acceleration and Retardation movement. * Candidates turn the whole graph up-side Down. * Most of the candidates that attempted the construction of the profile did so with some success. * Candidates changed the roller follower to a wedge-shaped follower when plotting the curve. * Candidates do not know the difference between clockwise and anti-clockwise. * Candidates also did not divide the sectors into 15° for the plotting of the Simple Harmonic movement. |

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| 1. 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, Retardation and Acceleration & Simple Harmonic. * Teachers must emphasise the importance of drawing the correct line types. * CAMS are not drawings that take a long time to do and can easily be practiced in class time. |

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| (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 drawing the wrong movements. * Candidates must not change the given views to look like something that they have done before. * Candidates draw their own Displacement Graph and they forfeit their marks. |

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| **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 was 24,7%. |

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| 1. Why was the question 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: * Drawing the isometric circle was very poorly done and even in well answered questions the learners left out the centre line. * The candidates still struggle to draw the hexagon in isometric. * The dimensional accuracy of the drawing was poorly done. * Many learners still cannot convert a 2D drawing into a 3D drawing. * Candidates only copy the three different Orthographic views onto the three sides of the Isometric box. They show no knowledge of depth perception. * Candidates erase their construction lines for the circle, and it clearly states that “all constructions must be shown”. * Most candidates forget to insert the centrelines for the circle. Even the top candidates forget this. |

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| 1. Provide suggestions for improvement in relation to Teaching and Learning |
| * Learners need to practice how to convert from 2D to 3D. Make use of models that you can make out of modelling clay, polystyrene, wood, cardboard or even use a 3d printer if you have access to one. When a learner can “see” what he needs to draw then it will make it easier for him to practice the “reading” of the object. * More attention should be given to the following aspects: * Visibility of the lines (line quality is poor) * Auxiliary view construction (60°) mostly not drawn. * Candidates are battling to master the method of constructing a circle. Compass work is poor. * Centre lines must be practiced. |

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| (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. * Proper instruments should be used and checked regularly. Emphasis to all grades. |

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| **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. * In some centres the candidates showed no ability on how to assembly the different parts. * Average mark attained was 30,4%. |

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| 1. Why was the question 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 (3rd angle). * Many candidates did not draw the Right View. * 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. * Candidates use the incorrect angle to end off the Hook Anchor(thread) or they do it freehand. * Arcs on the Hook Anchor was also done badly or freehand. * Candidates do not know how to assemble the Collar and Pin. * Candidates hatch the Pin. * Candidates hatched both sides of the Retention Clip. * Nut with 3 faces drawn on both sides of the assembly. They did not read the instructions. * The three faces of the nut are drawn with no auxiliary/right view drawn. * The arcs of the nut are drawn freehand. * Candidates used civil hatching, hatched at the wrong angle, and did not differentiate between parts (spacing and direction). * Many learners did not hatch the front view or hatched the entire Front view. * Candidates in most cases could not assemble more than 3 or 4 parts. No insight as to how parts are interconnected. * Parts of the assembly were drawn as unassembled. |

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| 1. 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. * Candidates left out the center lines or drew them incorrectly. * PARTS MUST BE ASSEMBLED. |

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| (d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc. |
| * Time management per question is critical. 1.1 marks should be completed per minute. Roughly 83 minutes should be spent on 92 marks. * Planning of drawing layout needs attention. * Line quality must improve. * Learners do not practice the assembly drawings enough. * While preparing learners, to answer assemblies, 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. |