

PRINCIPAL EXAMINER'S REPORT



BOTSWANA
EXAMINATIONS
COUNCIL

BGCSE DESIGN & TECHNOLOGY 2023



Paper 1: Written Paper

Section 1: General Comments

This report presents observations made during the assessment of candidates for component 0595/01- Design and Technology theory paper. The report shall also present conclusions drawn on the two aspects, that is, the quality of questions and general quality of candidate responses as observed throughout the assessment procedure. This year, a total of 3322 candidates sat for the Design and Technology theory paper (0595/01).

A good number of candidates still lack graphical communication skills. This hinders them in questions requiring graphical expression to demonstrate the Design and Technology processes. This type of questions normally carries more marks therefore the said candidates stand to lose as they cannot access total allocated marks.

INSTRUCTIONS

Most candidates followed instructions well by answering all questions in Section A and B. In section C where only one question was to be chosen from three, only a minute number of candidates failed to follow the instruction and answered more than one question. This is commendable as it shows an improvement from the previous academic year.

Candidates should be advised to use the prescribed **HB** pencil when sketching.

Candidates should also be advised **not** to temper with the barcode on the E- Scripts

Section 2: Comments on Individual Items

Section A

- 1 Question was answered well. Most candidates gave correct safety precautions to be observed during the process of pouring molten aluminium into a mould. However, there only a few who described the casting process instead of listing safety precautions.
- 2 Majority of candidates gave the correct precaution needed when treating an open wound.
- 3 Most candidates were able to give correct examples of ferrous metals with alloy steels being the most common. A small number confused ferrous with non-ferrous metals. A limited number of candidates gave examples of timber as their response.
- 4 This question was not well responded to. Most candidates failed to relate materials with their adhesives. They just wrote random adhesives they know.
- 5 Most candidates struggled to graphically express themselves when distinguishing between a carpenters' vice and an engineers' vice. However, some were able to explain in note form, the difference in function of the two vices. They therefore accessed one out of the total three allocated marks.
- 6 Not well responded to. Candidates had a problem with the third colour band or the multiplier. Most of them interpreted it as a digit rather than the number of zeros to be added.



- 7 Well responded to. Most candidates were able to mention relevant finishes for protecting a gate made from wood.
- 8 (a) Well responded to. Most candidates gave acrylic as the correct plastic for forming the bulb shade.
(b) Not well answered. Some candidates mistook surface development for 'improvement' and therefore gave a completely irrelevant response. Some though, made a correct outline but failed to show bending lines therefore only managed to access one out of the two allocated marks.
(c) Not well answered. Most candidates gave just random plastic forming processes which were not relevant to the shape given on the stem.
- 9 (a) (i) Well answered. Most candidates were able to identify the tool.
(ii) Most candidates were able to identify the tool.
(iii) Not well answered. Most candidates could not correctly identify the odd-leg callipers
(b) (i) Most candidates were able to state correct tool function but failed to include the correct materials the tool is used on as demanded by the question.
(ii) Most candidates correctly stated the function of the odd leg callipers but failed to mention the correct material it is used on. They therefore accessed one out of a total of two marks allocated to the question.
(iii) Question was well responded to. Most candidates easily stated its function and material it is used on.
- 10 (a) Candidates responded well to this question by labelling fulcrum and effort, only a few confuse the position of the two.
(b) Most candidates gave relevant examples. Tweezer, shovel and digging fork were common responses.
- 11 (a) Positively responded to. Coal, firewood and sun were common responses.
(b) A good number of learners gave uses instead of explaining how one form of energy is converted to another.
- 12 (a) Most candidates responded well by identifying a pop rivet gun.
(b) Most candidates responded well, demonstrating an understanding of the pop riveting process.

Section B

- 13 (a) Most candidates responded well to this question by giving appropriate materials for the board and reasons for their choice of material.
(b) Well responded to. Mild steel and aluminium were common responses. Candidates gave appropriate reasons for their choice of material.
(c) Most candidates responded well by articulating the marking and cutting stages of production. Some however produced unclear sketches with no annotations therefore uncommunicative.



- (d) Candidates were able to show appropriate metal fabrication processes. Welding and brazing were common responses. On the brazing process, some candidates omitted chemical cleaning of the joint and holding, stages that are crucial to the process.
 - (e) Candidates gave a variety of finishes for the artefact. Oil paint was a common response and water repellence as reason for such choice.
 - (f) Most candidates responded well to this question. Pop riveting and brazing were common responses.
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- (a) (i) Candidates correctly suggested a variety of timber for the computer stand. SAP and Meranti were common responses.
 - (ii) Well responded to. Mild steel and aluminium were common examples.
 - (b) Not well responded to. Most candidates omitted marking out of pieces and correct adhesive to be used.
 - (c) Most candidates were able to clearly articulate only one joining method but failed to suggest an alternative.
 - (d) Most candidates suggested wood joining methods that were visible from the top, contrary to the demands of the question.

Section C

15 Electronics- *a few candidates attempted this question.*

- (a) (i) Well responded to. Moisture sensor and probes were common responses.
 - (ii) Well responded to. Buzzer and speaker were common responses.
- (b) A good number of candidates sketched a circuit diagram instead of a 3D solution. Some candidates did provide labels, resulting in unclear interpretation of their solutions.
- (c) Most candidates drew functional circuit diagrams but a few produced long circuits with the wrong component symbols.
- (d) Most responses given by the learners only mentioned activation and output but omitted control.
- (e) Well answered question. Electrocutation and component damage (short circuit) were the most common responses.
- (f) Correct responses were given. Wire insulation and protective fuse were common responses.

16 Structures- *majority of candidates attempted this question.*

- (a) Well answered. Most candidates gave correct structural design factors.
- (b) (i) Well responded to. Mild steel and were the most common responses.
 - (ii) Well answered. Strength and corrosion resistant were common responses.
- (c) Some ideas given by candidates addressed the problem while others just regrouped the bicycles. There were also no annotations in some of the given ideas.



- (d) Well answered. The key was to support individual bicycles.
- (e) Well answered. Compression, tension and torsion were common responses.
- (f) In most responses, candidates labelled where forces were acting rather than showing counter measures to these forces.
- (g) Most responses were correct, even though some lacked details of how the locking would be done i.e. a detailed sketch showing its application on both the structure and the bicycle.

17 Mechanisms- *Only a few candidates attempted this question.*

- (a) Well done. Most candidates correctly mentioned Size of bottle and Safety to user as factors for consideration.
- (b) Well responded to. Linkages and levers were common responses.
- (c) Candidates responded well to this question. Mild steel and aluminium were common responses.
- (d) Fairly done. Poor sketches that could not clearly show the mechanism used. Some candidates still omit to use labels/notes in their idea.
- (e) Fairly done. Candidates clearly indicated Activation and Output, while leaving out Control.
- (f) Well done. Mechanical malfunction and uncontrolled sanitizer dispensation were common responses.
- (g) Candidates responded well to this question. Variety of lubricating methods and proper adjustment to control dispensation, were common responses.



Paper 2: Course Work

SECTION 1: General Comments

The theme for 2023 was PROTECTION. Candidates were to design and make an artefact that aids in protecting. Just like the previous year, this theme allowed candidates to display their creativeness in the projects they did. Only few centres managed to display this creativity by producing a variety of artefacts i.e. trays, glass holders, test tube holders, hot pot stands, picture frames, fire alarms e.t.c.

The work was sampled and marked in 34 centres. Only one centre i.e. Maun Senior Secondary was not moderated, as the candidates did not do projects.

SECTION 2: Comments on Quality of Projects

THEME ANALYSIS

Candidates who scored high marks were able to:

1. Clearly define the theme and state the source.
2. Brainstorm on products.
3. Show colourful paste-ups and descriptions of three products which were related to the theme.

Most candidates who scored on average and below average failed to:

1. State the source of the definitions.
2. Clearly explain how each illustration related to the theme.

There was also confusion in the brainstorm chart, where some candidates named items protected, instead of the product used for protection.

It was evident that these candidates lacked enough guidance in this area.

SITUATION

Some candidates formulated situations that were not clear. These were general statements that lacked a concern.

PROBLEM

Most candidates clearly provided a design problem that linked to the situation. There were however still few candidates who had multiple problems or repetition of their situation.

DESIGN BRIEF

It was well done across the country. Candidates formulated clear statements of intent that linked with the problem.

SPECIFICATIONS

This area was generally well done in most Centres. Candidates were able to formulate at least four relevant specifications that would guide them when coming up with possible solutions. Some candidates failed to state the properties of materials and finish as required by the assessment guide. Candidates were still using **construction** as one of their specifications, which is not included in the assessment guide.



EXPLORATION OF IDEAS

In this stage candidates have to analyse one existing idea and sketch two initial ideas that solve the identified problem.

Existing ideas – These were well done in all centres, however there were few candidates who are still failing to make comparisons against the design brief as expected by the assessment mark scheme.

Initial ideas – These were well done by candidates in most centres. Sketches used were clear, however they failed to explain how each idea functioned.

DEVELOPMENT

This stage was poorly done by most candidates. It lacked the following which are a requirement in the assessment guide:

1. Constructional details
2. Justification on choice of shape, form, and constructional details
3. Lacked working principal.
4. Presentation drawing not correctly rendered.

It was evident that candidates were not guided.

WORKING DRAWING

Most centres did not do well in this area as compared to the previous year. Some candidates did not attempt this stage. Candidates were expected to produce the developed solution in orthographic projection using third or first angle projection. Areas that need to be looked into in order to improve are as follows:

- Construction of views with all important details
- Correct use of scale
- quality lines
- correct dimensioning
- symbol of projection constructed with drawing instruments.

Very few Centres that used software to produce their drawings did very well as there were minimal mistakes.

PRODUCTION PLAN

Material list – This was generally done well by some Centres.

Schedule of manufacture – unrealistic schedules are still recurring in estimation of time e.g. 2 minutes, 4 minutes etc. for measuring and marking-out, when compared to the process to be done. There were instances where the schedule was limited as some tools or equipment were missing.

Sequential processes – There were still some candidates who failed to include the final assembling of all parts. Others skipped important steps of making in their plans hence making them incomplete e.g. production of mould before vacuum forming.

COMMUNICATION

Most centres did well in this area. They displayed a variety of presentation techniques and good graphical skills. Few candidates' folios did not flow well due to the omission of some design stages, e.g. working drawing, evaluation etc.



MANUFACTURING SKILLS

Standard of making skills - This stage has dropped as compared to the previous year. The standard of making was low for some candidates. There were some artefacts that were incomplete. Other candidates failed to produce their artefacts.

Finish – This was poorly done in most centres. Candidates failed to do surface preparation before application of the final finish.

Safety consideration – Most products were not safe as they were incomplete.

EVALUATION

Some centres did not do well in this area. It was evident that candidates were not guided or that they rushed stage. Most candidates were failing to evaluate their products against the brief and specifications. They were only repeating what they stated in the specifications without explaining how each specification was met. Modifications made during making and future improvements were well done by most candidates. Some Candidates failed to evaluate their artefacts completely hence being disadvantaged in gaining marks in this stage.

CONCLUSION

Display and labelling of products was poorly done in some centres. This made it difficult for moderators to sample projects. Centres are advised to ensure that both product and folio to be clearly labelled showing candidate number and candidate name. Centres are advised to refer to the coursework assessment criteria when assisting candidates with their coursework. It was observed that some centres were inconsistent in their marking. There was a lot of over marking as compared to the previous years. Centres are advised to standardise and do team marking so as to minimise these differences between the Centres and the moderators.

More Centres have adopted the style of generating folios using the computer. All candidates were able to access the internet through smart board and use of tablets, this made the folios to:

- (a) be easy to read unlike when handwritten
- (b) be presentable
- (c) have minimal spelling mistakes