

PRINCIPAL EXAMINER'S REPORT



BOTSWANA
EXAMINATIONS
COUNCIL

BGCSE DESIGN & TECHNOLOGY 2025



PAPER 1: WRITTEN PAPER

General Comments

The 2025 Design and Technology Paper 1 provided candidates with opportunities to demonstrate technical and technological problem-solving skills through scenarios and illustrations grounded in real-life contexts. Candidates generally exhibited a sound understanding of the properties of a range of materials and demonstrated the ability to apply appropriate processes in solving technological problems.

There was notable improvement in sketching and graphical communication, particularly in process-based questions. However, it remains a concern that candidates continue to demonstrate limited understanding and development of concepts and principles related to systems, including mechanical, electrical, and electronic applications.

In Section C, most candidates opted for Structures, where performance was generally strong. In contrast, Electronics and Mechanisms questions remained less popular, and the few candidates who attempted them performed below expectation.

Comments on Individual Questions

Section A

- 1
 - (a) This question was not well answered, as candidates were unable to correctly identify the woodworker's chisel.
 - (b) Responses were weak, as candidates only identified the material on which the chisel is used rather than stating the specific use of the tool as required by the question.
 - (c) This item was well answered, with most candidates correctly suggesting an appropriate safety precaution to be observed when using the chisel.

- 2
 - (a) This question was well answered; candidates correctly identified a specific use of copper, with electric wires being the most common response.
 - (b) The question was well responded to, with most candidates correctly stating the use of expanded polystyrene.
 - (c) This question was not well answered, as many candidates incorrectly suggested classroom furniture as a use for jelutong instead of model making, carving, or sculpture.

- 3 Performance on this question was generally weak. While most candidates correctly identified the rack and pinion and its application, they were unable to correctly identify the bevel gear and its application.

- 4 This question was not well answered. Candidates demonstrated confusion between metal hardening and other heat treatment processes. Most candidates explained the importance of annealing instead of hardening.



- 5 (a) This item was satisfactorily answered, with most candidates correctly describing brittleness.
- (b) The question was not well answered, as candidates described other metal properties instead of malleability.
- 6 (a) This question was well answered; candidates correctly identified quarter or radial sawing as the illustrated method of wood conversion.
- (b) The response was also strong, with most candidates correctly stating an advantage, commonly the production of stronger boards that are less likely to warp.
- 7 (a) This question was not well answered, as candidates could not correctly identify the ball pein hammer used to shape the rivet head.
- (b) (i–iii) Although some candidates correctly identified drilling as the first stage required before finishing with the snap set or dolly, they were unable to correctly describe the insertion of the snap-head rivet, and the use of the ball pein hammer to shape the rivet during the subsequent stages.
- 8 (a) & (b) Most candidates answered these items correctly by providing appropriate examples of frame structures.
- 9 (a) Most candidates responded well, with oil painting being the common answer for preventing corrosion on a mild steel garden gate.
- (b) Candidates repeated the previous response for preventing corrosion on a steel water tap, which was not appropriate in this instance.
- (c) The question was incorrectly answered, with responses such as painting being given instead of plastic coating.
- 10 (a) Most candidates gave applications of a hexagonal nut instead of stating its advantages.
- (b) Many candidates were unable to correctly answer this question, as they gave general responses such as convenience and ease of use instead of stating that it can easily be tightened by hand.
- 11 (a) Most candidates were able to draw the LED symbol correctly; however, the symbols for the light dependent resistor, transistor, and resistor were incorrectly drawn by some candidates.
- (b) Most candidates failed to correctly describe the function of a fixed resistor.
- 12 (a) A good number of candidates could not identify the cause of the plastic forming fault that occurred during vacuum forming.



(b) Consequently, candidates were unable to suggest appropriate preventative measures for the identified fault.

13 (a) Many candidates failed to apply the correct formula for calculating the gear ratio of a compound gear train.

(b) Consequently, only a few candidates were able to correctly calculate the speed of the driven gear in the compound gear train.

Section B

14 Overall, this question was well answered. Most candidates demonstrated a good understanding of:

(a) (i) Material selection for the axe head, with cast iron and carbon steel being correctly identified.

(ii) Most candidates also gave appropriate reasons for their choice of materials.

(b) (i) Material selection for the axe handle, with Mukwa and Meranti being common correct responses.

(ii) Appropriate reasons for the selected materials were also correctly stated.

(c) Most candidates effectively used notes and sketches to describe the metal casting process used to manufacture the axe head. Candidates correctly illustrated the equipment, materials, and details of mould preparation.

(d) Most candidates were able to use notes and sketches to explain suitable joining methods for attaching the axe head to the handle.

(e) A good number of candidates correctly suggested appropriate finishes for both the axe head and handle, together with valid reasons for their choices.

(f) Most candidates correctly identified possible dangers that may arise during use of the axe.

(g) This question was not well answered, as most candidates suggested adhesives that would not withstand the forces exerted during use of the axe.

15 (a) (i) Most candidates correctly identified suitable manufactured boards for the shoe rack, such as blockboard and plywood.

(ii) Appropriate reasons for the choice of materials were also provided.

(b) Welding and brazing were correctly identified as suitable construction methods for making the metal frame of the shoe rack.

(c) Most candidates effectively used notes and sketches to explain how the metal frame could be fabricated using welding or brazing techniques.



- (d) Most candidates were able to use notes and sketches to explain suitable methods for joining the shelves to the metal frame.
- (e) Most candidates correctly stated suitable finishes for the shelves and gave appropriate reasons for their choices.
- (f) A good number of candidates correctly used notes and sketches to demonstrate how castor wheels could be incorporated to improve mobility of the shoe rack.

Section C

Electronics - (Very few candidates attempted this question.)

- 16
- (a) Most candidates were able to identify relevant design factors when designing the suggested electronic device.
 - (b) Candidates could not correctly identify the required electronic input component.
 - (c) Most candidates displayed incorrect sketches of electronic symbols.
 - (d) Most candidates were unable to use notes and sketches effectively to present design solutions incorporating input, output, and material details.
 - (e) Most candidates produced incomplete circuit diagrams for the device.
 - (f) Candidates provided limited explanations that did not adequately demonstrate how the device would function.
 - (g) Most candidates were able to use notes and sketches to explain how the device could be mounted around the door area using appropriate methods.

Mechanisms

- 17
- (a) Most candidates correctly identified mechanisms such as levers, linkages, crank and slider systems for the given device.
 - (b) Candidates correctly identified suitable materials such as stainless steel and aluminium, and provided appropriate reasons for their choices.
 - (c) Most candidates effectively used notes and sketches to show possible solutions for a potato chip cutting device.
 - (d) Most candidates used notes and sketches appropriately to show how the potato would be held in position during cutting.
 - (e) Most candidates were unable to demonstrate how the device would be controlled or how the holding mechanism would function during operation.
 - (f) Candidates were able to identify relevant problems that could arise during use of the device.



- (g) An average number of candidates were able to suggest suitable solutions to the identified problems.

Structures

18 This question was well answered across most Centres. Candidates demonstrated strong understanding in the following areas:

- (a) Most candidates correctly identified factors such as function, materials, construction, and type of load as important considerations in the design of the carrier.
- (b) Candidates correctly identified appropriate materials suitable for constructing the carrier.
- (c) Most candidates correctly identified frame and shell structures as suitable for supporting the weight of printed materials.
- (d) A good number of candidates effectively used notes and sketches to present possible solutions for the carrier, with appropriate inclusion of materials and construction details.
- (e) Most candidates correctly demonstrated how printed papers would be placed, secured, and transported using the carrier.
- (f) Most candidates correctly identified possible problems that could arise during use of the carrier.
- (g) Most candidates effectively used notes and sketches to demonstrate how the identified problems could be addressed.
- (h) Most candidates correctly identified varnish and paint as suitable finishes for the carrier.

Candidates demonstrated strengths in material knowledge, graphical communication, and practical application, particularly in Sections B and C (Structures and Mechanisms). However, notable weaknesses remain in systems-related concepts, including electronics and mechanisms, as well as in areas requiring precise technical knowledge and accurate application of formulae.



PAPER 2: COURSEWORK

General Comments

The theme for 2025 was DINING. Candidates were required to design and make an artefact that supports dining activities before, during or after dining. The theme provided opportunities for candidates to demonstrate creativity and innovation in both the design and manufacture of their projects. Only a handful of candidates fully exploited this opportunity by producing a variety of artefacts using a range of materials such as plastic, metal, and wood. However, wooden artefacts predominated across most Centres.

The following observations were made: Most centres tended to over-mark, particularly in the assessment of manufacturing skills, Some centres demonstrated inconsistencies in the application of the assessment criteria.

Reception at the Centres: Overall, most Centres demonstrated a high level of cooperation during the moderation exercise and provided a welcoming environment for external moderators.

Display: Most Centres were adequately prepared for external moderation. However, a handful of Centres did not arrange, and number projects as required, making identification during moderation more difficult.

Centre Marking: Internal marking generally met the expected standard, with marks from most Centres reflecting a sound understanding and application of the assessment criteria. Nevertheless, a few Centres displayed discrepancies in their marking, which may be attributed to the following: Individualised marking practices that resulted in inconsistencies in Centre marks and affected the rank order following moderation sampling; Misinterpretation of the assessment criteria; Lack of effective standardisation procedures.

Comments on Individual Questions

Theme Analysis

This stage was generally well done by most centres. Candidates were able to: Clearly define the theme and state the source (although a few candidates failed to correctly reference the sources of their definitions).

Brainstorm a range of possible products. Present colourful paste-ups and descriptions of three products that were relevant to the theme.

Situation

Most candidates developed situations that were clear and appropriately linked to the theme. However, a few candidates focused on storage-related issues rather than dining, resulting in situations that were not aligned with the theme.

Problem

Most candidates were able to formulate a clear design problem that was directly linked to the identified situation. However, a handful of candidates formulated more than one problem statement.

Design Brief

Most candidates formulated relevant and concise statements of intent that were clearly linked to the identified problem.



Specifications

This area was generally well done, with most candidates presenting relevant specification statements. Candidates were able to formulate at least four appropriate specifications that guided the generation of possible solutions to the identified problem. However, a few candidates provided preconceived specifications.

Exploration of Ideas

Existing Ideas – Most candidates presented relevant existing ideas and evaluated them against the design brief. However, some candidates failed to compare the existing ideas against the requirements of the design brief as expected.

Initial Ideas – Most candidates generated clear sketches of possible solutions. However, some candidates failed to adequately describe the functionality of each proposed idea.

Development

This stage was not well done by some candidates for the following reasons: Most candidates failed to provide sufficient alternative construction methods to justify their final choices. Shapes and forms often lacked logical progression from one stage to another. Most candidates did not adequately demonstrate the working principle of the developed solution. Presentation drawings were often poorly rendered.

Working Drawing

An average number of candidates produced correct working drawings using computer software, particularly Rhino. However, most candidates failed to apply scales correctly. The following weaknesses were observed among candidates who used conventional drawing methods: Views were incorrectly positioned and were not consistent with the presentation drawing, Projection symbols were incorrectly constructed, Dimensioning was inaccurately executed, There were also a few Centres where candidates did not attempt the working drawing stage.

Production Plan

Material List – Most candidates produced relevant material lists. However, there were a few instances where dimensions and sizes were incorrectly stated.

Schedule of Manufacture – Most candidates identified appropriate manufacturing processes. However, tools and equipment were often inadequately specified and unrealistic time allocations were evident in some cases.

Sequence – Most candidates presented manufacturing stages in a logical and appropriate sequence.

Communication

Most candidates demonstrated a variety of presentation techniques and good graphical communication skills. However, a few candidates submitted folios with some missing stages of the design process.

Manufacturing Skills

Most candidates demonstrated a satisfactory standard of manufacturing skills and showed appropriate consideration of technical requirements. Candidates generally applied suitable finishes and demonstrated fair consideration of safety aspects during manufacture.



Evaluation

Most candidates were able to evaluate their products against the design brief and specifications. Although evidence of product testing was generally provided, many candidates failed to draw clear conclusions from the results obtained. Most candidates demonstrated an acceptable level of critical analysis of their products. However, a few candidates did not adequately identify the strengths and weaknesses of their artefacts. A good number of candidates acknowledged modifications made during manufacture and proposed future improvements, supported by illustrations, descriptions and justifications.