EXAMINATIONS COUNCIL OF ESWATINI

Eswatini General Certificate of Secondary Education

Design and Technology (6902)

Examination Report for 2023

Table of Contents

EGCSE DESIGN AND TECHNOLOGY

Paper 6902/01

Design Core

Introduction

The Design and Technology syllabus consists of four components, namely: **Paper 1 (Design Core), Paper 2 (Graphic Products)** which is an option, **Paper 3 (Resistant Materials)** which is an option and **Paper 4 (Coursework).**

Number of centres and candidates from 2019 to 2023: The table below represents statistics of number of centres and candidates that have sat for the Design and Technology external examination for the past five years.

Year	2019	2020	2021	2022	2023
Centres	100	103	103	97	103
Candidates	814	858	1340	740	1005

Comment on number of centres: The statistical data presented in the table above indicates that the number of centres offering Design and Technology increased by three (3) between 2019 and 2023. There has been a steady increase in the number of centres offering the Design strand of the school curriculum from the year 2019 to 2023, although there was a sharp decline by six centres between 2021 and 2022. This statistics reflects that there are centres who do not register any candidate for the subject although they offer it, this is evident by the fluctuating manner the statistic shows even though there are two new girls' schools that introduced Design and Technology.

Comments on number of candidates: Even though the figures in the table above indicates that the number of candidates sitting for Design and Technology was increasing by the past years, in 2022 we have seen a sharp fall that was never experienced in the past 10 years and the 740 was far below the expectations. Statistically the number of candidates that had registered for the subject in 2023 was 1 005 which shows an increase of 265 candidates who registered for the subject and it is highly commendable. However, the number of candidates that sat for the exam increased to **993**. Attendance registers revealed that some candidates who registered were absent during the examination period.

In 2023 there were 06 centres which registered only 1 candidate, which was an improvement compared to the previous year as there were 10 centres. 58 centres had registered between 2 and 10 candidates collectively, compared to the 71 centres in 2022; whilst a total of 26 centres registered a range of 11 to 20 candidates, an increase of 3 from the previous year. There were 9 centres who registered a range of 21 to 30 compared to 2022 which had 0nly 4. The highest number of candidates were 23, 24, 25 and 26 registered in three centres.

As noted in previous reports, there are areas in the syllabus that need improvements. Such areas are: dimensioning, rendering techniques, line quality, proportions, detailed construction, graphic communication, graphical materials, working in card, card joints, lettering style, evaluation of ideas, types and usage of mechanisms including mechanical movements.

Key messages

- Full solutions to the design problem in response to part **(e)**, should include constructional details rather than manufacturing methods that might be used in the workshop or design studio.
- Candidates should remember that simple drawings are often better than words when describing manufacturing methods that are suggesting response to part **(g)**.

General Comments:

Candidates responded as intended to all three optional questions and there was an increase in the number of candidates opting for **Questions 2,** there was a further decline in those opting for **Question 3** than in previous years. **Question 1** was, by far, the most popular choice question for candidates. Statistically nine hundred and ninety-three (993) candidates wrote this Paper. Of these candidates eight hundred and twenty-two (822) opted for **Question 1,** whilst one hundred and fifty-two (152) chose **Question 2** and nineteen (19) answered **question 3**.

Quite a number of candidates responded very well to the design question of their choice and very few could not engage competently in the design problems set in the context of small picnic table, transportable hand washing promotional artifact for young children and the liquid soap dispenser devices. Candidates were to show a high level of originality in their design work.

The A3 answer sheets are intended to help candidates follow the required design process and those candidates who responded as required were able to effectively demonstrate their design and thinking skills.

Comments on Specific Questions

Question 1

This was the most popular question compared to the other two and the majority of candidates understood the requirements of the small p0rtable picnic table.

(a) Very few candidates were able to list correctly **four** additional about the functions of such a table that they consider to be important.

Expected responses: four suitable points include; easy to clean, waterproof, carries reasonable load of food, folds flat, has appropriate height, non-toxic, stable in use, protect food, safe to use, etc. no repeats of question and design brief.

Comments: However, there were responses that had nothing to do with the functions of the bin such as the aesthetics side of the product whilst some were not justifying their responses which led them to lose marks.

Very few candidates repeated the given function points instead of adding four additional points as the question required

(b) Candidates were to use sketches and notes to show **two** types of construction methods that might be suitable for making such table.

Expected responses: two of the following constructions; wooden frame construction, joints, welding, bolts and nuts, screws, nails, folding carcasses, push together frames etc.

Comments: Very few candidates were able to sketch two different types of constructions but instead they were only sketching two joints instead of the joint and another construction method.

(c) Candidates were expected to develop and sketch **three** ideas for the table.

Expected response: sketch three different ideas for maximum marks showing high quality drawings using wide range of techniques with clear annotation and details.

Comments: The majority of candidates presented three ideas and they were fairly creative in their response to the design problem. Very few came out with less than the three required concepts which were marked on pro-rata basis. However, most of the candidates lost marks for failing to properly represent their ideas with colour or enhance their ideas.

Successful candidates enhanced their drawings with colour or other forms of highlighting and added annotations to provide information on the nature and detail of each design idea, including some dimensions to show the sizes and the suitability of their ideas meeting the design brief and the specifications listed in (a).

(d) Candidates were required to evaluate their ideas and justify why they have chosen one idea to develop it more fully.

Expected response: evaluate all three ideas giving one advantage and one disadvantage for each and every idea. Select the chosen idea and justify why it has been chosen.

Comments: Candidates who repeated evaluations on the different ideas lost some marks. The most capable candidates included comments which showed valid judgments rather than just simple descriptions of each design idea.

The majority of candidates were able to select their preferred idea and gave a clear justification for their choices. Very few candidates used the justification which say they chose a particular idea because it meets all specifications, which led to a loss of a valuable mark. Those who got the mark gave reasons such as it is easy to manufacture the idea in a school workshop, cheaper to make, uses fewer materials. Repeating some of the advantages stated on the evaluations led some to loose valuable mark.

(e) Candidates were to draw a full solution of the chosen idea, include construction details and major dimensions.

Expected response: a high standard of drawing preferable a 3d drawing showing a range of techniques that show clearly all details. Show at least three overall dimensions and add more additional dimensions that may show thicknesses, diameters and depths. Also show all constructional details with good annotation and additional drawings as necessary.

Comments; Candidates were at liberty to use any drawing method to produce a full solution to the given problem as long as they provided the required constructional details and dimensions.

Very few candidates were able to produce high standard of drawings with wide range of enhancing techniques some did not add the constructional details in the form of sketches or in written annotations, some only showed the three overall dimensions only with no detail dimensions, in that way they lost valuable marks.

(f) Candidates were to suggest two suitable materials for their solutions and give reasons for their choices.

Expected response: give a suitable materials and reasons for the choice. Reasons given for choice should indicate that candidate had considered the structure of his/her design and are familiar with the strengths and weaknesses of a range of specific materials in that context.

Comments: Many candidates appropriately selected specific materials for their design presented in the previous section, although some were just naming irrelevant materials to their designs. Very few candidates gave generic responses such as wood/metal/plastic, such responses were not awarded marks.

(g) Candidates were to outline a method that could be used to manufacture one part of their solution in a school workshop.

Expected response; a detailed/step by step description of manufacturing one part including appropriate method and tools used. Responses to this part needed to include details beyond general marking out and preparation methods done to any product part. Other details such as shaping, marking and cutting of joints to the selected part till it is ready to be assembled to the other parts is very much needed, also showing the tools used. The use of simple drawings in addition to written text was generally successful.

Comments; However, there were those that gave scanty description of the processes through annotated sketches. Most candidates show that they cannot make the part of their product in a school workshop, some went for construction methods that cannot be done in a school workshop and they lost valuable marks. Lastly most candidates lost marks for not stating the name of the method of manufacture used.

Question 2

Design a freestanding, transportable promotional artifact to be placed in school toilets to remind young children to wash their hands for hygiene purposes.

This question was attempted by 152 out of 993 candidates. It was intended for those who are following the Graphic Products option. Candidates appeared familiar with the requirements of a promotional display to be placed in the school toilets to remind children to wash their hands.

(a) Candidates were required to list four additional points about the function of such an artifact that can be considered to be important.

Expected responses; Successful responses included attract attention, compact, colorful, bright appearance, interesting, exciting, gives information about washing hands, stable in use, safe in use, water/weather resistant, can be folded for easy storage, easy to read, easily assembled etc.

Comments; Quite a number of candidates were able to list two of the four functional points of the freestanding promotional display of the new kitchen bins to be placed at the entrance of the hardware.

(b) Candidates were required to use sketches and notes to show two flexible joints that could be used on card and other lightweight materials.

Expected responses: sketches and name of; ring binders, string, hinges, tape etc.

Comments: Most candidates were able to show **two** flexible joints on card. There were few candidates who were showing traditional wood joints which do not allow movements.

There were variations though in the quality of sketches with some candidates were producing sketches with little or no annotations and proper representation of the idea as required by the question.

(c) Candidates were expected to develop and sketch **three** ideas for the table.

Expected response: sketch three different ideas for maximum marks showing high quality drawings using wide range of techniques with clear annotation and details.

Comments: The majority of candidates presented three ideas and they were fairly creative in their response to the design problem. Very few came out with less than the three required concepts which were marked on pro-rata basis. However, most of the candidates lost marks for failing to properly represent their ideas with colour or enhance their ideas.

Successful candidates enhanced their drawings with colour or other forms of highlighting and added annotations to provide information on the nature and detail of each design idea, including some dimensions to show the sizes and the suitability of their ideas meeting the design brief and the specifications listed in (a).

(d) Candidates were required to evaluate their ideas and justify why they have chosen one idea to develop it more fully.

Expected response: evaluate all three ideas giving one advantage and one disadvantage for each and every idea. Select the chosen idea and justify why it has been chosen.

Comments: Candidates who repeated evaluations on the different ideas lost some marks. The most capable candidates included comments which showed valid judgments rather than just simple descriptions of each design idea.

The majority of candidates were able to select their preferred idea and gave a clear justification for their choices. Very few candidates used the justification which say they chose a particular idea because it meets all specifications, which led to a loss of a valuable mark. Those who got the mark gave reasons such as it is easy to manufacture the idea in a school workshop, cheaper to make, uses fewer materials. Repeating some of the advantages stated on the evaluations led some to loose valuable mark.

(e) Candidates were to draw a full solution of the chosen idea, include construction details and major dimensions.

Expected response: a high standard of drawing preferable a 3d drawing showing a range of techniques that show clearly all details. Show at least three overall dimensions and add more additional dimensions that may show thicknesses, diameters and depths. Also show all constructional details with good annotation and additional drawings as necessary.

Comments; Candidates were at liberty to use any drawing method to produce a full solution to the given problem as long as they provided the required constructional details and dimensions.

Very few candidates were able to produce high standard of drawings with wide range of enhancing techniques some did not add the constructional details in the form of sketches or in written annotations, some only showed the three overall dimensions only with no detail dimensions, in that way they lost valuable marks.

(f) Candidates were to suggest two suitable materials for their solutions and give reasons for their choices.

Expected response: give a suitable materials and reasons for the choice. Reasons given for choice should indicate that candidate had considered the structure of his/her design and are familiar with the strengths and weaknesses of a range of specific materials in that context.

Comments: Many candidates appropriately selected specific materials for their design presented in the previous section, although some were just naming irrelevant materials to their designs. Very few candidates gave generic responses such as wood/metal/plastic, such responses were not awarded marks.

(g) Candidates were to outline a method that could be used to manufacture one part of their solution I a school workshop.

Expected response; a detailed/step by step description of manufacturing the **whole prototype** including appropriate method and tools used. Responses to this part needed to include details beyond general marking out and preparation methods done to any product. Other details such as shaping, marking and cutting of joints to the prototype and show knowledge of putting all the details in the display including writing of the words, coloring and including all the information on the display also showing how to join the parts together. Lastly showing the tools and equipment used. The use of simple drawings in addition to written text was generally successful.

Comments; However, there were those that gave scanty description of the processes through annotated sketches. Most candidates show that they cannot make the prototype of their product in a school graphics studio and most candidates were only producing one part instead of the whole prototype. Lastly most candidates lost marks for not stating the name of the method of manufacture used.

Question 3

Design a soap dispense device that will be used by children so that they cannot tough the device by hand.

Only 19 out of 993 candidates answered this question. In this, question candidates were required to the use their knowledge and experience of systems and control and the use of mechanisms and electronics in the context.

(a) Candidates were to list four additional points about the function of such a device that can be considered to be important.

Expected response: dispense enough soap, convenient height, easy to operate/use, stable in use, safe to use, secure the dispenser, durable, corrosion resistant, hygienic etc.

Comments; Very few candidates were able to list four additional functions of such a unit correctly. Some candidates were not justifying their responses which led to a loss of valuable marks.

(b) Candidates were required to use sketches and notes to show **two** methods that could be used to dispense a liquid soap without touching by hand.

Expected responses; use force of gravity with a stopper, linkages, sensors, string with foot pedal with spring, cam and followers, gears etc.

Comments; Quite a number of candidates were able to sketch two different mechanisms that could be used to operate the soap dispenser device, although some lack a proper representation of the mechanism and loose some marks.

(c) Candidates were expected to develop and sketch **three** ideas for the table.

Expected response: sketch three different ideas for maximum marks showing high quality drawings using wide range of techniques with clear annotation and details.

Comments: The majority of candidates presented three ideas and they were fairly creative in their response to the design problem. Very few came out with less than the three

required concepts which were marked on pro-rata basis. However, most of the candidates lost marks for failing to properly represent their ideas with colour or enhance their ideas.

Successful candidates enhanced their drawings with colour or other forms of highlighting and added annotations to provide information on the nature and detail of each design idea, including some dimensions to show the sizes and the suitability of their ideas meeting the design brief and the specifications listed in (a).

(d) Candidates were required to evaluate their ideas and justify why they have chosen one idea to develop it more fully.

Expected response: evaluate all three ideas giving one advantage and one disadvantage for each and every idea. Select the chosen idea and justify why it has been chosen.

Comments: Candidates who repeated evaluations on the different ideas lost some marks. The most capable candidates included comments which showed valid judgments rather than just simple descriptions of each design idea.

The majority of candidates were able to select their preferred idea and gave a clear justification for their choices. Very few candidates used the justification which say they chose a particular idea because it meets all specifications, which led to a loss of a valuable mark. Those who got the mark gave reasons such as it is easy to manufacture the idea in a school workshop, cheaper to make, uses fewer materials. Repeating some of the advantages stated on the evaluations led some to loose valuable mark.

(e) Candidates were to draw a full solution of the chosen idea, include construction details and major dimensions.

Expected response: a high standard of drawing preferable a 3d drawing showing a range of techniques that show clearly all details. Show at least three overall dimensions and add more additional dimensions that may show thicknesses, diameters and depths. Also show all constructional details with good annotation and additional drawings as necessary.

Comments; Candidates were at liberty to use any drawing method to produce a full solution to the given problem as long as they provided the required constructional details and dimensions.

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(f) Candidates were to suggest two suitable materials for their solutions and give reasons for their choices.

Expected response: give a suitable materials and reasons for the choice. Reasons given for choice should indicate that candidate had considered the structure of his/her design and are familiar with the strengths and weaknesses of a range of specific materials in that context.

EGCSE DESIGN AND TECHNOLOGY

Paper 6902/02

Graphic Products

Key messages

▪ The focus of this assessment is Graphic Products. Impending candidates would benefit from the practical activities based on the questions contained in this paper.

General Comments

In this component, candidates were required to answer all three questions in Section A (A1, A2, and A3) and then proceed to answer either **B4** or **B5** from Section B. there were 226 candidates who opted **question B4** and also 226 who answered **question B5**.

As noted in previous reports, there are areas in the syllabus that teachers need to pay special attention to such areas are proper application of geometric construction, drawing of center lines, projection lines, and use of the thick and thin lines, correct orientation of drawings in pictorial drawings and the correct method of projection views in orthographic projection.

Comments on Specific Questions

Section A

Question A1 compulsory question

Car company **FIREFLY** logo**.**

Candidates were required to complete the full size of the stop sign started on the answer sheet to include;

Adding letters; **R, F** and **Y**.

Expected responses: draw the missing letters as they are shown using same font style, spacing and height as the given letters.

Comments: most candidates had a problem with letter R and Y then the spacing.

Question A2

Second compulsory question.

Headlights design for the car.

Candidates were required to complete the full size headlights design started for them.

Expected responses:

(a) The center of the R 30 mm arc touching the straight line and the Ø 85 mm using geometric construction by adding the R 42, 5 and the R 30 and drawing the parallel line 30 mm above the given one. Then find the R 15 circle center by add the R 42, 5 and R 15 then strike an arc also add the R 30 and R 15 then strike an arc to cross the first arc which will give the center. Then draw the circles.

Comments: most candidates were failing to find the center of the R 30 mm circle and the R 15 mm circle which were to make these circles touching each other as required.

First subtract the R42.5 from R 80 then strike an arc placing the compass point at the Ø 85 mm center then subtract R 30 from R 80 then strike an arc placing the compass point at the Ø 60 mm center to cross the other arc then use it as a center to draw the R 80 mm arc tangential to the two circles.

Comments: candidates were a little bit confused and they could not find the center of the R 80 mm arc so they could not draw an accurate arc as required.

Question A3

Last compulsory question.

Car dashboard display with geometrical shapes

Candidates were required to complete the drawing of the dashboard display by using geometrical construction of the hexagonal Rev-count, octagonal Speedometer the semi-elliptical shape bottom.

Expected responses: construct the 35 mm side hexagon at the given line A-A, also construct an octagon in the 60 mm square then use concentric circle/rectangular/trammel method to construct the bottom half of the ellipse but first find the minor axis.

Comments; Quite a number of candidates were able to construct the hexagonal rev-count although some used the 60˚ set-square instead of geometrically construct it. A lot of candidates lost marks for failing to construct the octagonal speedometer while most candidate were able to construct the bottom half of the ellipse although some could not locate the minor axis.

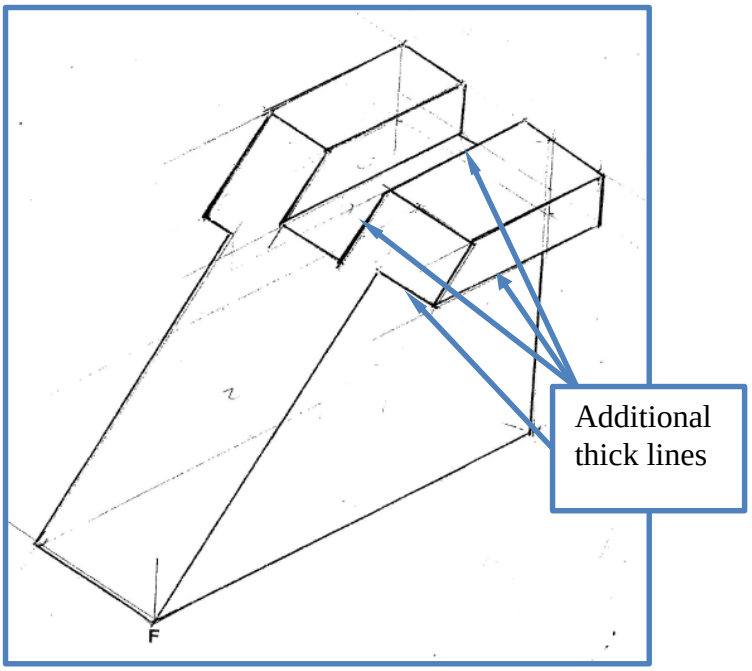
Section B - two optional questions

Question B4

Monument of car producing company.

This question was from an actual 'Graphic Product' was attempted by half of the graphics candidates.

Candidates were required to draw full size isometric projection of the monument with the foreground named 'F'.



Expected response:

Convert the orthographic projection drawing into isometric projection drawing starting from the given foreground 'F'**.** Orient it correctly as shown on the right, have an isometric box with correct length, height and width. Correctly draw the 45˚ slope and draw all the faces correctly.

Comments: some candidates failed to interpret the orthographic views which made them to come up win incorrect isometric monument, while others were losing marks for incorrect measurements which makes the faces of the block not to correspond with the examiner's layover or transparent.

Candidates were required to apply the thick and thin lines.

Expected response; make the outer boundary of the block thick and all the inner edges which has one face showing to be thick then all the edges that has two faces showing should be drawn with thin lines.

Comments; Most candidates were able draw the boundary with thick lines but failed to show the other edges who are to be thick which are not on the boundary led them to lose some marks.

Candidates were required to add texture to the monument showing that it is made of wood.

Expected response; use orange/brown colored pencil to color the wooden monument showing the wood grains and end grains.

Question B5

Water bottle parts to be assembled

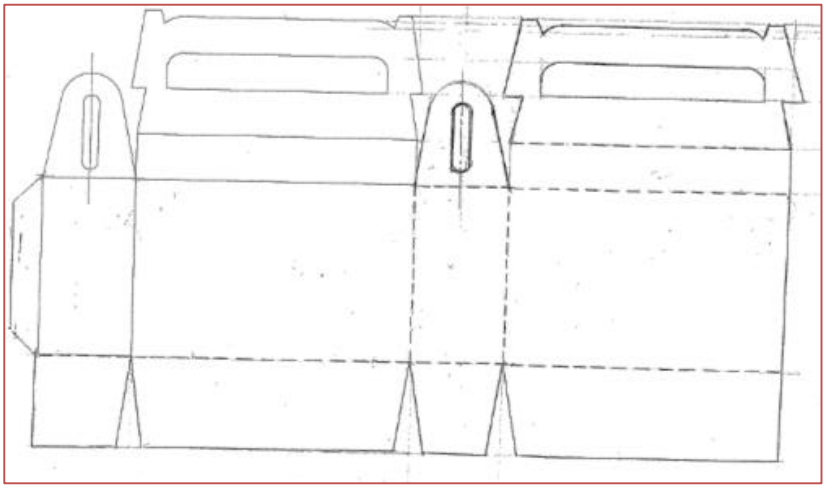
This question was also derived from a real 'Graphic Product' and it was equally popular question as **Question B4**, as they were also 226 candidates who opted for this question.

Front view

Candidates were required to draw a development (net) of the gable box in the space provided using scale 1:2.

Expected response;

Draw the development showing all the missing panels as shown on the right, include the folding flaps also the glue tap with all the slopes and the folding lines. Then draw the circular flap with it slot accurately. Showing the handle shape and correct size handle slot.



full development/net example

Comments; Most candidates who tempted this question managed to raw anels of the lunch box although most candidates were failing to come up with folding flaps that will close the whole bottom of the box when folded some did not draw the flue tab or leave out the sloping edges which made their box to be difficult to fold and form it shape.**Candidates were required to design a method of locking the base without using an adhesive**.

Expected responses; clear communication/sketch of a suitable self-locking box base design with relevant annotation.

Comments; Most candidates who attempted this question were able to design a self-locking mechanism for the base although others came out with designs that were not suitable some did not add notes on their designs which led to lose of marks.

EGCSE DESIGN AND TECHNOLOGY

Paper 6902/03
Resistant Materials

Key massages

- Candidates need to read questions very careful and have a clear understanding of what the question requires of them before attempting an answer.
- For candidates to achieve good marks for Section A, they need to develop a wide knowledge and understanding of materials, tools and processes used when working with wood, metal and plastic.
- Candidates need to improve their communication skills especially in section B. They must try to provide clear sketches when answering questions that start with the statement: ***Use sketches and notes to***… In addition, notes should enrich and make clearer what they have been drawn and not just to simply state the obvious. It is vital that candidates **do provide sketches** with notes otherwise they deny themselves access to maximum marks.

General Comments

This paper consists of two sections, Section A and Section B. Candidates were required to answer all questions in Section A and then proceed to answer Questions**11, 12 or 13**. Most candidates in all centres followed the instructions. Candidates still showed challenges in understanding and execution of basic skills and technique in working with materials. When showing processes using sketches and notes, they should show the correct tools used to carry out the tasks including the holding and supporting tools.

Section A

This section testing knowledge and understanding is concerned with materials, tools and processes used when working with plastic, metal and wood. The syllabus requires that candidates should have an all-round knowledge and understanding of the three content areas named herein to perform well in this Paper.

Comments on Specific Questions

Question 1

This question showed a plastic bucket.

(a) ***Candidates were required to describe a workshop process where gloves must be worn in a workshop.***

Expected response: any heat or chemical related processes, handling of sharp, rough/dirty materials.

Comments: well answered question.

Question 2

This question showed an edge of a piece of wood being planed. Candidates were required to:

(a) Name the tool and state its use.

Expected response: smoothing plane (not jackplane)

Comments: some candidate called that plane a jackplane which were marked wrong.

(b) Candidates were required to show by arrow the direction of the grain on the piece of wood being planed.

Expected response: an arrow pointing the left direction drawn on the planed wood.

Comments: candidates who were marked wrong were drawing the arrow against the plane where as one has to plane along the grains.

Question 3

This question required candidates to name one a temporal and one permanent suitable joining method that can be used to join the two parts of a Tee-Square made of acrylic.

Expected responses: for temporal joints include - screws, bolts and nuts, dovetail slot. Permanent methods include – acrylic/tensol cement, plastic welding, riveting.

Comments: most candidates used the permanent joining methods on the part which required temporal joining methods and they were marked wrong.

Question 4

This question required candidates to

(a) Name the two given thread cutting tools.

Correct response: tool "**A**" – circular split die, tool "**B**" – plug tap/bottoming tap.

Comments: well answered question.

(b) State the use of each tool.

Correct response: tool "**A**" – for cutting screw thread on rod/bar, tool "**B**" – for cutting internal threads.

Comments: well answered question

Question 5

Candidates were told that paint can be applied by using brush or spray

(a) They were asked to give one advantage of using a spray to apply paint.

Expected response: fast, give smoother finish.

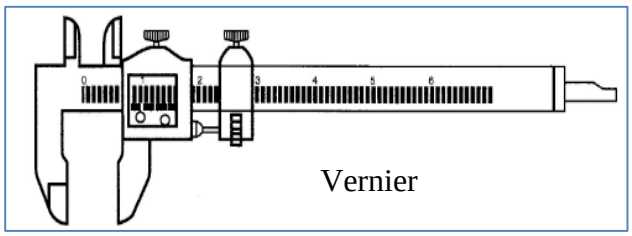
Comment: Majority of candidates were able to state that one should keep all parts of the body behind the cutting edge of the chisel, hold your work firmly in the vice or hand the chisel to someone by the handle

(b) They were also asked to describe one safety precaution to be observed when spray painting.

Correct response: paint in a well-ventilated room, wear face mask/goggles/safety clothing.

Question 6

Candidates were shown a measuring tool for engineers.



Vernier

(a) They were asked to give a correct name of that measuring tool.

Expected response: vernier callipers, vernier gauge.

Comment: common mistake by most candidate called it a micrometer which was marked wrong.

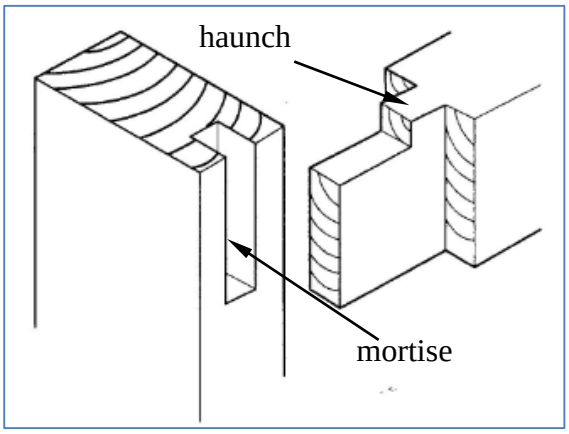
(b) Give one specific use for the tool.

Expected response: accurate measuring of internal/external diameters, depths, and thickness.

Question 7

Candidates were to label a mortise and tenon joint showing the haunch and the mortise.

Expected response: add arrows to show the haunch (part with Small Square on the rail) and the mortise which is the hole on the leg.



Comments: Very few candidates had no idea of the fixing hacksaw blade perpendicular to its frame, most were saying it is for cutting in confined spaces. But the examiner was expecting a response that will include; cutting a long cut on a metal or the frame does not restrict depth of cut.

Question 8

Candidates were to give two uses of;

(a) Nylon

Expected response: any **two** of-making mallets, clothes, tooth brush bristles, gears, bearing, ropes, hinges, combs, telecommunication parts, power tools castings, curtain rails and fitting.

Comments:

(b) Expanded polystyrene

Expected response: any **two** of-egg boxes, packaging, ceiling tiles, insulation.

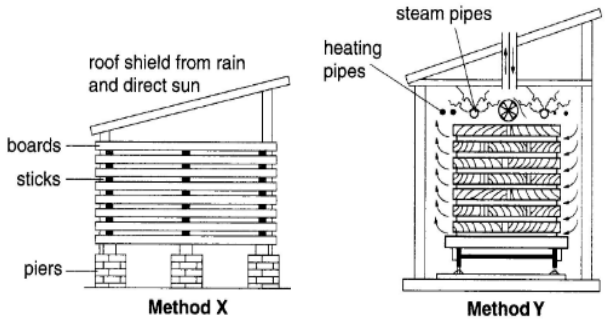
Question 9

Candidates were to tick the most suitable material property for the saucepan parts.

Expected response: handle – heat resistant, saucepan body – heat conductor.

Question 10

(a) Candidates were required to name the two methods of seasoning shown in figure 7:



Expected response. Method **X** - air/natural seasoning. Method **Y** - kiln seasoning.

Comments: well answered question, although there were some candidates who forgot method **Y** and left a blank space.

(b) Candidates were to give one advantage of method X (air seasoning)

Expected response: even drying of timber, produce high quality wood, and does not use energy, cheap, no skilled labor needed and any valid advantage.

Comments Most candidates were able to give one correct advantage.

(c) Candidates were required to give one advantage of the method Y(kiln seasoning)

Expected response: faster method of drying wood, dying can be controlled, moisture content can be controlled/ascertained.

Section B

Question 11

This question was the most popular question as there were 380 candidates who answered it out of 541 candidates.

A child's toy.

(a) Candidates were required to state three considerations that a designer would include in a design specification for the child's toy.

Expected response: size of toy, attractive appearance, easy to use, no sharp edges, durable, non-toxic and hygienic.

Comments: well answered question.

(b) Candidates were required to give two properties of teak that makes it suitable for toy frame.

Expected response: strong, high resistant to moisture, attractive grain, works fairly.

Comments: Quite a good number of candidates managed to give at least one correct property.

(c) Candidates given a joint used in the child's toy frame.

(i) Candidates were to name the joint given in figure 9.

Expected response: through housing joint or housing joint.

Comments: well answered question.

(ii) Candidates were to give an appropriate adhesive to use when gluing the joint.

Expected response: polyvinyl acetate/PVA or synthetic resin.

Comments: quite a number of candidate were naming PVA as cold glue and they were marked wrong.

(d) Candidates were to use sketches and notes to show how the housing joint shown at (c) can be:

(i) Marked out.

Expected response: show how to mark the two parallel line for the shelf with a try-square and pencil on the side and down the edges. Then gauge on the side edges half the thickness of the edge using a marking gauge. Lastly show the waste and have relevant notes.

Comments: Most candidates did perform very well in this question. Although some had no idea on how to mark the through housing joint others lost marks for not showing the waste.

(ii) Cutting out the housing joint.

Expected response: clear sketches showing securing of work with an appropriate holding tool, cut to depth using a back saw then remove the waste with firmer chisel.

(e) (i) Give two properties of PVC that make it suitable for the shaped blocks

Expected response:

PROPERTY	JUSTIFICATION
Durable, strong	They can be left outside and will not be easily damaged
Waterproof	Cannot absorb water children can put in their mouth and be easily wiped clean.
Plasticity, self-finishing	Can be easily moulded/blown into shape.
Tough/impact resistant, stiff, hard	Can withstand nocks and bumps when used
Lightweight	Not heavy for children to play with/will not hurt them if they drop it.
Different colors	To attract children attention.

Comments: most candidates were giving the justification as the property others were giving properties such as malleable which made them to lose some marks.

(ii) Candidates were required to name a suitable process that could be used to make the hallowed shaped blocks.

Expected response: blow moulding or rotational moulding.

Comments: a lot of candidates did not consider the hollowed part and gave injection moulding as an answer and were marked wrong.

(e) Candidates were required to use sketches and notes to show a modification that can be done to the child's toy rack to prevent the shaped blocks from falling when transporting the rack.

Expected response: any practical modification that can stop the blocks from falling when the rack is picked up, quality sketch and relevant annotation stating the additional material and fixings and joints used to join the additional part.

Comments: most candidates managed to modify the rack but some completely change the design which made them to lose some valuable marks in that process.

Question 12

This question was the second popular question as there were 109 candidates opted for it.

A wind chime that hangs from a garden tree was shown in figure 10, made out of pine frame and sail made of copper tube.

(a) (i) Candidates were to give two properties of copper that makes it suitable for the sail.

Expected response: non-magnetic, resist corrosion/rust, durable

Comments: Most candidates were able to give relevant properties while those who did not get the marks were giving irrelevant properties such as good conductor of heat and electricity which has nothing to do with the sails.

(ii) Candidates were required to name two other non-ferrous or alloys that can be used for the sails which can make deep sound.

Expected response: aluminum, brass, zinc, bronzes and silver.

Comments: well answered question.

(b) (i) Candidates were to name three tools that could be used to mark the given cross-halving joint of the wooden frame of the wind chime.

Expected response: try-square, marking gauge, marking knife, ruler, and pencil.

Comments: some candidates made a mistake of including cutting tools when asked of marking out tools.

(ii) Candidates were asked to give two advantages of using pine to make the wind chime frame than using MDF.

Expected response: durable, tough, better resistant to water/moisture than MDF.

Comments: those who were marked wrong are those who gave advantages that has nothing to do with the materials put in the condition which the chime are exposed to like the changing weather patterns.

(c) (i) Candidates were asked to use sketches and notes to show how the centre can be marked on one face end of the sail using surface gauge, vee blocks and clamps.

Expected response: sketches showing rod end covered with marking compound, work clamped on vee-blocks, marking to parallel lines then work turned to mark the other two parallel lines with the surface block on the surface plate to come up with a quadrilateral, join the diagonals to find the center then have relevant notes.

Comments: most candidates were using other means of finding the centre like centre square instead of the surface gauge and the lost valuable marks.

(ii) Candidates were required to name a tool that can be used to cut the length of the copper sal.

Expected response: hack saw/junior hack saw.

Comments: well answered question.

(d) (i) Candidates were to name a suitable finish other than painting the copper sail.

Expected response: polishing/buffing, lacquering, electroplating.

Comments: majority of candidates could not think of any other way of finishing the copper sails other than painting they were giving irrelevant responses.

(ii) Candidates were required describe two stages preparing the copper sails before applying any finish.

Expected response: degreasing, use wet and dry paper or emery cloth of various grades and finish with fine grade.

Comments: fairly good number of candidates were aware of the cleaning of the copper before applying any finish but most of them were not concerned about following the steps as required that led them to lose marks.

(e) (i) Candidates were asked to give one reason why soft soldering is a suitable method for joining the copper tube and the copper cap together.

Expected response: soft solder melts at lower temperature than copper while hard soldering has high melting point than copper.

Comments: Most candidates had no idea of soft soldering which made them to lose that mark.

(ii) Candidates were required to show by means of sketches and notes how one copper cap can be joined with soft soldering.

Expected response: clean the joint first, also sketch how the flux applied, heat the joint the melt the solder lastly have relevant notes or label the equipment used.

Comments: most candidates had no idea about soft soldering, this question was poorly done.

Question 13

This question was the least popular as there were 52 candidates who answered this question.

A TV game controller holder made from 3 mm thick acrylic was shown in figure 11:

(a) Candidates were required to add to the incomplete development (net) of holder body (part A) showing all bend lines to be proportional to the given shape.

Expected response: complete net add the base and the other side of the holder showing the two bend lines.

Comments: well attempted question although some candidates were forgetting to include the bend lines or do not consider the proportion and they lost marks.

(b) (i) Candidates were required name two marking out tools to draw the development (net) on acrylic sheet.

Expected response: china graph pencil, felt tip marker, crayon, ruler and try-square.

Comments: Majority of candidates were able name the marking tools but some candidates were naming cutting tools such as hacksaw and coping saw which made them to lose marks.

(ii) Candidates were required to give two acrylic properties that makes it suitable for the game holder.

Expected response: comes in different colours, attractive, light in weight, durable, easy to form.

comments: well answered question.

(iii) Candidates were to name another thermoplastic that could be used to make the game holder.

Expected response: Acrylonitrile Butadiene styrene**/**ABS, polystyrene.

Comments: well answered questions although some were naming glues instead of thermoplastic.

(c) Candidates were to use sketches and notes to show how the pattern could be cut and the edges made smooth.

Expected response: sketches showing work held securely, cut out the waste with smooth toothed saw then show the edges filed to smooth, use wet and dry paper to smooth the edges lastly have relevant notes.

(d) Candidates were to show by sketches and notes how to bend at 'C' could be produced.

Expected response: heat the plastic at the bend line with strip heater/heat gun show plastic being bent using an appropriate former retain the plastic to shape till it cools. Lastly have relevant notes.

Comments: candidates lost marks for not showing the appropriate former some did not show work retained to position till it cools which made them to lose some marks.

(e) (i) Candidates were required to describe four important stages to be followed when finishing mild steel sheet using bluing.

Expected response: 1. clean/degreasing 2. Heat mild steel to red hot 3. Deep it into oil 4. Remove excess oil.

Comments: Most candidates were could not list the four steps of bluing but they knew something about cleaning the mild steel before bluing it.

(ii) Candidates were to name a suitable adhesive to the mild steel part to the acrylic holder body.

Expected response: contact glue, epoxy resin, hot glue melt/glue gun.

Comments: well answered question.

(f) Candidates were to show by sketches and notes how the shelf bracket could be fixed on the wall, include details of materials, constructions and fittings used.

Expected response: sketches showing marking out position of hole, drill holes to correct depth, insert wall plugs or dowels into the holes, fix the bracket with screws. Then have relevant annotation.

Comments: most candidates did not have any idea of fixing something on a wall, others used their experience of fixing decoder dishes which they saw at home and that experience made them to get good marks.

EGCSE DESIGN AND TECHNOLOGY

Paper 6902/04

Project

Introduction

Coursework

Design and Technology Paper 4 is a coursework paper and a school-based component of the syllabus that is compulsory to all candidates registered for Design and Technology. Each candidate undertakes a personally identified project centred on the theme. The project will be worked over the final two terms of the course, then submitted for marking. Teachers carried out the assessment of work as markers and as internal moderators for only one criterion (Product Realisation). This time around more students (1006) were registered compared to (730) from the previous year.

Candidate's folders were presented for marking. An increase of one hundred and three (103) centres compared to ninety-seven (97) centres who were registered in 2022. Of the centres, one thousand and six (1006) candidates were registered, seven hundred and eighty (980) candidates submitted work for this year's examination. However, there was a serious concern of twenty-nine (29) candidates who were registered but could not submit work for 2023 coursework examination.

General Comments

Generally, the 2023 performance indicated an increase when compared to the previous year. The work presentation displayed on the folios did indicate a decline on performance from both teachers and candidate's commitment and in the understanding of the syllabus requirements. Some centres performed poorly due to learners being misguided by the teachers. Moreover, teachers are requested to guide and encourage candidates throughout the design process.

Folios

It was good to note that all centres used the correct folio paper size. Folios were graphically presentable on A3 size paper and easy to read and to follow, except for one (1) centre that submitted folios in A4 size, they were summoned by the Council to answer for such. Candidates must bind their portfolios neatly and if slide binders are used, it is advisable to **staple** the sheets together before binding. However, the use of a spiral binder is recommended to ensure that no sheets are lost. Centres should arrange their candidates' folios numerically before submitting to Examinations Council.

It was very discouraging to realise a high increase in the number of candidates who did not submit their work Teachers are encouraged to collect work of learners as they complete each stage of the design process to reduce candidates who at the completion of the work are indicated as absent candidates.

Comments on specific Assessment Objectives.

Theme analysis

This section was well done by most candidates. Most candidates defined the theme,

Protection but advised to refer to **at least three sources** for their definitions. It was encouraging to note that most candidates indicated clear understanding of the theme. Few candidates did not indicate the area of interest in the theme analysis. In some centres candidates provided theme analysis [bubble charts] with limited links (must have at least three links). It was good to note that most candidates did not only indicate the area of interest but also indicated at least **four** general areas.

Identification of the need

Most candidates formulated personally identified problems that were relevant to the theme and successfully completed this objective. Centre assessment of this objective was reasonably accurate although few were not realistic and indicated limited guidance from the teacher. Some centres tended to follow a certain area of need identification such as toys, agricultural equipment and food trays or trolleys. It is however, vital that the identification of a need may be accompanied with the evidence to prove the need to design. Most candidates used pictures to better explain the situation. The user must be considered and it is important to explain how the user is affected in the situation.

Candidates must clearly indicate if the project will be completed as a model or actual product.

Research into the design brief resulting in a specification.

There was a wide range of responses to this assessment objective. Very good work was seen, that demonstrated an excellent understanding of the objective requirement. Few candidates indicated researches that were not relevant to the design brief (mostly research on material).

Many candidates had evidence of existing ideas, which were downloaded from internet and others in a form of photographs. However, candidates should note that research should have a wide range of existing ideas (**with a minimum of six**). The ideas must not be on a single concept and also include relevant identified and collected data. Most candidates indicated little

understanding about the difference between ergonomics and anthropometric data. It was good to note that most candidates included the specification in their research which was clear and concise. It is important that the specification is not only specific but also link with the brief analysis and is a conclusion of the research based on the design brief. On the specifications, teachers should assist learners to align their specification items with the analysis. Candidates are encouraged to include the **function** on their specifications. Some candidates seemed not to understand the meaning of researching on existing ideas, as a result they did not analyse and evaluate their existing ideas. **Candidates must be encouraged to collect relevant data as they research which must align with the design brief.** It was noted that there was an improvement in the summarising of findings of the research.

Generation of ideas.

The standard in attempting this objective was fair. Most candidates produced a wide range of possible ideas, however some ideas were not developed and evaluated against the design specification. Some candidates work demonstrated that they were lacking drawing skills such as enhancement techniques as a result, candidates downloaded ideas straight from the internet. Few candidates displayed good graphic skills and used pens. Generally, the ideas were well rendered and drawn.

On another note, candidates should be discouraged from drawing ideas that tend to focus on a single concept which also resulted in ideas that are similar to existing products, they must also be discouraged from downloading (cutting and pasting) drawings from internet and use them as possible ideas. They must neatly draw ideas either with a pencil, pen or
using CAD. Candidates are encouraged to use free-hand sketching when producing ideas, rather than formal drawings, which limits their creativity. In the form of scanning, candidates are also encouraged to produce clear scanned ideas. It is also good to note that almost all candidates were indicating the chosen idea although some were without the selection matrix and justification based on the specification points of the intended product.

Development of the proposed solution

In as much as there was an improvement in attempting this criterion but it was still a challenging criterion to some candidates. Candidates must be encouraged to show **at least three changes** for an improvement within the development which should be accompanied by notes that explains reasons for improvements. It was good to note that some candidates were able to produce appropriate evidence of testing and or trailing resulting in reasoned decision about material, form and construction details. Candidates who did not make mock-ups and tested them, lost marks. It

is advised that candidates make mock-ups, test them and clearly state reasoned decisions about form, materials, construction/production methods etc.

What was also of note is that some centres misguided the students in the assumption that a model is a mock up, thus most students who didn't make the model lost marks. Even a model has a mock up, all it is a trimmed version of the actual full-size product.

Planning for production

This objective was strength to most candidates. Most candidates performed well, in the sense that they had working drawings, cutting list and part list, Isometric or exploded views and production plans. However, some candidates only came up with the flow chart which did not indicate the sequence of operation. It was observed that most candidates used orthographic projection, although some views had no dimensions. Candidates should be encouraged to include dimensions, symbol of projection and the scale in their working drawings for this objective. Some candidates were pasting pictures of the realisation stage on the planning for production stage, which is strongly discouraged.

Product Realisation.

For this objective centres are requested to ensure that there is the evidence of the complete

product. The examiners depend on the pictures in awarding the candidates a mark. The pictures

should be taken from different views and at least a few to show details of features like joints,

links and special details.

The instruction to candidates that they should make models instead of actual products/projects was only issued during the pandemic and the unrest. This year we expected normal size products, unless a candidate does state they will be making a model. There was confusion with some centres, where most ended on the mock-up stage or considering it to be the final model while others skipped the mock-up stage and went straight for the model. This objective resulted in a number of candidates losing marks on the stages (testing and trialing the mock-up and making models as a final product). It is worth noting that there is a difference between the Mock-up and a Model as a final product, it is therefore important that all stages be done.

Testing and evaluation

Most candidates tested and evaluated their work, although to some candidates the evaluation was not against the design brief and specification, instead they stated general factors about what was done to the product and remarks about problems encountered during manufacture. Few candidates' testing was superficial in that it did not consider the views of the users or show the product in the environment for which it was designed. It is encouraged that testing should be done based on the functionality or intended use of the project, not on measurements of the product; which some centres did. Centres are also advised to encourage candidates to test and evaluate their products against the specification and include modifications and also limitations.

Reminder to centres:

- Unlike 2020 and 2021 where products were required to be models, this year, just like 2022 the products were required to be full size. Teachers are advised not to confuse a model with a mock up or prototype.
- centres are reminded to ensure that marks are added correctly on the Realisation Summary Form.
- Some centres are not doing well, because some lack resources e.g. Camera, computers and printers.
- All centres should have products marked and moderated and clearly show the distribution of the teachers mark and the internally moderated mark.

Markers and internal moderators should also consider the following:

- Internal moderators should show mark distribution, not just the total. - The teacher teaching the group should **not** mark and do the internal moderation. That is malpractice rather seek help from teachers of neighbouring schools if you are alone in the department.
- Teachers must check if all the documents, (summary sheet and attendance register) are appropriately completed and enclosed inside the provided (ECESWA) envelop before submission.
- Please make a note if a candidate is absent for the exam but does write the other papers.

All centres must adhere to the deadline for submission of folios at ECESWA.