

*EXAMINATIONS COUNCIL OF ESWATINI*

# **EGCSE**

**EXAMINATION REPORT**

**FOR**

**DESIGN AND TECHNOLOGY (6902)**

**YEAR**

**2021**

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## 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 2017 to 2021:** The table below presents statistics of number of centres and candidates that have sat for the Design and Technology external examination for the past five years.

Year	2017	2018	2019	2020	2021
Centres	101	103	100	103	103
Candidates	845	862	814	858	1340

**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 two (2) between 2017 and 2021. There has been a steady increase in the number of centres offering the Design strand of the school curriculum over the past five years. Although there was a decline by three centres between 2018 and 2019, year 2020 and 2021 had the same number of centres offering the subject.

**Comments on number of candidates:** Even though the figures in the table above indicate that the number of candidates sitting for Design and Technology is increasing by the year, the numbers still fall short of expectations. Statistically the number of candidates that had registered for the Paper in 2021 was 1411. However, the number of candidates that sat for the exam plunged to 1340. Attendance registers revealed that some candidates who registered were absent during the examination period.

In 2021 there was One centre which registered only 1 candidate, which was is an improvement compared to the previous year. Some 34 centres had registered between 1 and 10 candidates collectively, compared to the 75 centres in 2020.; whilst a total of 46 centres registered a range of 11 to 20 candidates, an increase of 12 from the previous year. There were 12 centres who registered a range of 21 to 30 which is highly appreciated. The highest number of candidates were 34, 36 and 40 registered in two 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**, but a decline opting for **Question 3** than in previous years. **Question 1** was, by far, the most popular choice question for candidates. Statistically one thousand three hundred and forty (1340) candidates wrote this Paper. Of these candidates one thousand and ten (1010) opted for **Question 1**, whilst one hundred and ninety-eight (198) chose **Question 2** and one hundred and thirty-two (132) selected **question 3**.

Quite a number of candidates responded very well to the design question of their choice and very few showed that they could not engage competently in the design problems set in the context of restaurants, cell phone displays and fruit picking devices equipment. 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 restaurant menu card, salt, paper, tomato and chilli sauce holding unit clearly.

- (a)** Very few candidates were able to list correctly four additional functions of such a unit. However, there were responses that had nothing to do with the functions of the unit. Very few candidates repeated the given function points instead of adding four additional points as the question required. Successful responses included; separate different items, easy to access

items, protect items, easy to carry/move around, organise items, stable in use, easy to clean, hygienic, safe to use, do not take too much space on the table etc.

**(b)** Very few candidates were able to sketch two different methods for holding the menu card on the unit so that it cannot fall off. Many candidates misread the question they were sketching joints for the unit instead of methods to hold the menu card; which resulted to a loss of valuable marks. However, those candidates who scored good marks were able to sketch two of the following methods; slot, clips, recess, hooks, pockets and grooves although some lacked proper representation of the idea others lacked proportions while others had no annotations.

**(c)** 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 valuable marks for failing to properly represent their ideas and to 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.

**(d)** The majority of candidates were able to give precise positives and the negatives aspects of all three ideas and they were able to discriminate between all three of their design ideas in relation to the context of the question. Candidates who repeated evaluations on the different ideas lost some marks. No candidates used the matrix method to evaluate their ideas, they used the given space appropriately. The most capable candidates included comments which showed valid judgements 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 choice. Very few candidates used the justification that they chose a particular idea because it meets all specifications, which led to a loss of a valuable mark.

**(e)** 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. Successful candidates used a pictorial drawing format which was large enough and clearly drawn. 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 sketched or in written annotations, in that way they lost valuable marks.

- (f) Many candidates selected specific materials appropriate to the 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. Reasons given for choice indicated that candidates had considered the structure of their design and were familiar with the strengths and weaknesses of a range of specific materials in that context.
- (g) Quite a number of candidates were able to give a detailed description of manufacturing one part including appropriate processes. However, there were those that gave scanty description of the processes through annotated sketches.

Responses to this part needed to include details beyond general marking out and preparation methods done to any product. Other details such as shaping, cutting of joint to the selected part till it is ready to be assembled to the product was also very much needed. The use of simple drawings in addition to written text was generally successful.

## Question 2

This question, intended for those following the Graphic Products option. Candidates appeared familiar with the requirements of a cell phone display to be placed on top of a counter, which would be made of card.

- (a) Most candidates misread the introductory part of the question they were listing four functional points instead of four that was about the appearance of such a counter cell phone display unit. Successful responses included appeals to pupils, bright appearance, interesting, exciting, reflect phone image, gives information, eye catching, match surrounding etc.
- (b) Most candidates could not show two ways to make stiff card could fold easily. Successful candidates drew scored lines, binders, paper/plastic hinges, strings etc.
- There were variations though in the quality of sketches with some candidates, producing sketches with little or no annotations and proper representation of the idea as required by the question.
- (c) The majority of candidates presented three ideas but creativity was very low in their response to the design problem. A few came out with less than the three required concepts. These were marked on pro-rata basis. Successful candidates were able to produce accurate solutions of high-quality drawings using a wide range of techniques with clear annotation and detail fit for purpose.

(d) The majority of candidates were able to give precise positives and the negatives aspects of all three ideas and they were able to discriminate between all three of their design ideas in relation to the context of the question. Candidates who repeated evaluations on the different ideas lost valuable marks. No candidates used the matrix method to evaluate their ideas they used the given space appropriately. The most capable candidates included comments which showed valid judgements 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 their choice. Few candidates used the justification that they chose a particular idea because it meets all specifications, which led to a loss of a valuable mark.

(e) 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. Successful candidates selected a drawing format appropriate to the task and large enough well-presented working drawing. 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 sketched or in written annotations, in that way they lost valuable marks.

(f) Many candidates selected specific materials appropriate to the design presented in the previous section although some were just naming irrelevant materials to their designs. Very few candidates gave generic responses such as paper/wood/plastic, such responses were not awarded marks. Reasons given for choice indicated that candidates had considered the structure of their design and were familiar with the strengths and weaknesses of a range of specific materials in this context.

(g) Quite a number of candidates gave a description of manufacturing one part instead of designing appropriate logo for the cell phone company this led them to lose valuable marks. However, those who scored good marks drew a suitable logo showing company name, reflecting the function, had contact details, also showed how the logo could be attached to the display unit which could be by rubber stamping, stickers, screen printing and printing.

### Question 3

***Design a mortar lifting device with some form of mechanism to be used around buildings.***

Only 132 out of 1 340 candidates answered this question. In this, question candidates were required to design a fruit picking device that will be used by people standing on the ground to pick fruits from a tall tree. The requirement for the device was such that candidates could make the use of their knowledge and experience of systems and control and the use of mechanisms in interesting context.

- (a)** Very few candidates were able to list four additional functions of such a unit correctly. However, there were responses that had nothing to do with the functions of the unit. Some candidates repeated the given function points instead of adding four additional points as the question required. Some candidates were not justifying their responses which led to a loss of valuable marks. Successful responses included; adjustable, take different sizes and shapes of fruits, protect fruits, lightweight to hold/carry, comfortable to hold, stable in use, simple to operate, hygienic, safe to use, do not take too much space during storage, stable in use, safe to use, etc.
- (b)** Quite a number of candidates were able to sketch two different mechanisms that could be used to operate the fruit picking device. Successful responses included linkages, screws, cams and followers, rake and pinion although some lacked proper representation of the idea. Others lacked proportions while others had no annotations.
- (c)** 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. These were marked on pro-rata basis. However, most of the candidates lost valuable marks for failing to properly represent their ideas and to 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.

- (d)** The majority of candidates were able to give precise positives and the negatives aspects of all three ideas and they were able to discriminate between all three of their design ideas in relation to the context of the question. Candidates who repeated evaluations on the different ideas lost valuable marks. No candidates used the matrix method to evaluate their ideas. They used the given space appropriately. The most capable candidates included comments which showed valid judgements 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 choice. Few candidates used the justification that they chose a particular idea because it meets all specifications, which led to a loss of a valuable mark.

- (e)** Candidates had the liberty to use any drawing method to produce a full solution to the given problem as long as they provide the required constructional details and dimensions. Successful candidates selected an appropriate drawing format appropriate and large enough for the design presentation. 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 sketched or in written annotations, in that way they lost valuable marks.

**(f)** Many candidates selected specific materials appropriate to the 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. Reasons given for choice indicated that candidates had considered the structure of their design and were familiar with the strengths and weaknesses of a range of specific materials in this context.

**(g)** Quite a number of candidates were able to give a detailed description of manufacturing one part including appropriate processes. However, there were those that gave scanty description of the processes through annotated sketches.

Responses to this part need to include details beyond general marking out and preparation methods done to any product. Other details such as shaping, cutting of joint to the selected part till it is ready to be assembled to the product is also very much needed. The use of simple drawings in addition to written text was generally successful.

**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. Very few candidates did not attempt any question in Section B. Such candidates lost valuable marks allocated to this part of the question. By far, **Question B5**, was the most popular optional choice question in Section B for most candidates.

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 centre 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****Darts team logo**

Candidates were given the logo with all the dimensions.

Candidates were required to complete the full size logo started on the answer sheet to include;

- (a) The semi-circle below A-A.
- (b) Semi-octagon inscribed in the circle.
- (c) R30 and R50 tangential to the R10 circle above A-A.

The majority of candidates managed to draw the radius 80 semi-circle quite well. Very few candidates missed the measurement. Limited number of candidates were able to construct the semi-octagon. Also on the part of finding the centres of R30 and R50 tangential most of candidates lost valuable marks as they did not show any geometrical construction to find their centres and their arcs were not tangential to the given circle.

The majority of candidates constructed the semi ellipse using concentric circle method. Only one used a trammel. Successful candidates showed all the constructions and drew a very smooth curve passing through the correct points.

### **Question A2**

#### ***Printing letters R and A***

This question was attempted by all candidates giving them the opportunity to show their lettering skills. The letter 'R' proved to be difficult for candidates compared to the letter 'A'. Some candidates lost a mark for not considering the spacing at the same time as all candidates did consider height alignment.

### **Question A3**

#### ***Darts trophy***

Candidates were required to draw an isometric drawing from a given orthographic views.

Quite a number of candidates were able to understand the given orthographic drawing but the hardship was to draw the isometric circles. Successful candidates correctly positioned (orientation) the drawing with accurate measurements and correctly constructed the isometric semi-circle and the slopping surfaces.

### **Section B - two optional questions**

#### **Question B4**

##### ***Darts container***

This question was from an actual 'Graphic Product' used as darts container made from card. Quite a number of candidates (200 out of 558) attempted this question.

Candidates were required to draw full size, a development (net) of the darts container. They were required to start at seam B-B, include the base and the gluing tap.

- (a)** Many candidates did not have a clue of where to start when attempting this question and that led them to lose very important marks. Very few candidates who started by dividing the plan into 12 parts then projected the divisions up the front and the to the net position. Some candidates calculated the cylinder circumference then divided it into 12 equal parts, while others transferred the divisions from the plan with a compass to mark the 12 sectors along the net then projected those divisions to meet those projected from the front view. In that way they managed to plot the correct points and came with the accurate development not forgetting the seam B-B. Lastly, they attached the base at the bottom and drew the gluing tab.

**(b) Candidates were required to draw a design an insert to support three darts.**

Most candidates were able to come with some designs for the insert, although some inserts could not fit the cylindrical container some could not support the three darts other design could not protect the container from the sharp pointed darts and their sketch quality were very poor which let those candidates to lose valuable marks.

**Question B5**

**Trophy won by darts team.**

This question was also derived from a real 'Graphic Product' and it was a popular question compared to **Question B4**. Candidates obtained a wide range of marks for their answers.

**Front view**

- (a)** Using either first or third angle orthographic projection candidates were required to draw a front view following arrow FE. Most candidates who attempted this question managed to draw the front elevation of the trophy. However, Candidates had a challenge in positioning and constructing the 35mm hexagonal part of the trophy. Measurements were a problem as some candidates were providing incorrect measurements, which cost them valuable marks.

**End view**

- (b)** Candidates were required to draw an end view taken from direction arrow EE. Most candidates who attempted this question were able to the end view looking from direction EE although some had incorrect measurements. Most candidates did follow the principles of orthographic projection the only thing that need to be improved is the quality of lines and measuring accurately.

**EGCSE DESIGN AND TECHNOLOGY****Paper 6902/03****Resistant Materials****Key messages**

- 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. As pointed out in previous year's examination reports, 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.

**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.

**General Comments on Specific Questions****Question 1**

***This question showed a measuring tool. Candidates were required to name the measuring tool.***

Quite a number of candidates were able to name the measuring tool shown in Fig.1. Although majority of candidates had no idea about the tool, successful candidates gave Vernier calliper as the correct response.

**Question 2**

***This question showed a block of wood with a marked mortice. Candidates were required to:***

- (a) Name two tools used to mark out the mortice.**

Quite a significant number of candidates gave marking gauge and marking knife as their responses and there were marked wrong. The answer were expected mortice gauge, try square and steel rule.

- (b) Stating one holding device used to hold the piece of wood in position while the mortice is being chopped.**

A majority of candidates were able to state one the following holding devices; G clamp, bench vice, bench holdfast as the appropriate holding tool. Very few gave irrelevant holding devices such as machine vice or leg vice.

**Question 3**

**This question required candidates to explain how to find a centre at the end of a round bar using an odd-leg callipers.**

A majority of candidates had no idea on how to find a centre at the end of a rod using an odd-leg callipers. Many were bisecting two chords like in graphics which is impossible to apply in this question. Very few candidates were able to explain that four arcs should be scribed then draw two diagonals that will meet at the centre of the rod end.

**Question 4**

***This question required candidates to define plastic memory.***

Most candidates had no idea of the term plastic memory. Successful candidates define plastic memory as the ability of a plastic to return to its original shape when re-heated.

**Question 5**

**This question showed a curtain rail made of plastic.**

- (a) Candidates were required to name a method used to produce the curtain rail.**

Very few candidates were able to give extrusion or die-casting as a correct method to produce the plastic curtain rail. A majority were giving injection moulding or vacuum forming as their responses and they lost that mark.

- (b) Candidates were to give one property which makes nylon the best material for making the curtain rail.**

Few candidates were giving irrelevant properties such as self-finishing, attractive. Successful candidates gave properties such as rigid, self-lubricating, tough, resistant to wear, fatigue resistant and many more.

#### **Question 6**

**Candidates were required to describe how the bowl could be produced by vacuum forming.**

Very few candidates were able to explain how the ABS bowl could be vacuum formed. Quite a number were describing press forming rather than vacuum forming. Successful candidates explained that a mould is made to the shape of the bowl and clamped and the plastic heated the platen reused and vacuum form the soft plastic to take the shape of the former then the waste trimmed once the plastic has cooled down.

#### **Question 7**

**(a) Two reasons for seasoning timber**

A majority of candidates were able to get one correct reason which resulted in the loss of one mark. Very few candidates managed to give the correct responses such as make the timber stable in use, improve workability and prevent decay.

**(b) Candidates were to state one advantage of kiln seasoning over air seasoning.**

Most candidates were able to give one advantage of kiln seasoning and correct responses included quicker/fast, moisture content can be reduced as per requirement/controlled and kills insect eggs, timber less liable to shrinkage.

#### **Question 8**

**Candidates were given three metal cross sections where they were to name the different forms of metals looking at the cross sections.**

The majority of candidates had no idea of an angle iron, some were able to identify the rectangular tube and the square bar.

#### **Question 9**

**Candidates were to list two safety precautions to be observed before a wood turning lathe is switched on when turning.**

The majority of candidates were able to state the two safety precautions to be observed when using the wood turning lathe. Some were stating general rules to be observed such as do not use a machine without teacher's permission or one man one machine and they lost valuable marks.

**The expected responses were:** wear safety clothing, dust mask, goggles/face shield, no loose clothing, no hanging hair, work should be tightly held, work corners not touching tool rest/enough space between work and tool rest.

### Question 10

***A saucepan was shown.***

Candidates were required to:

**(a) Name one material suitable for making the saucepan and a reason for the choice.**

Most candidates managed to name aluminium as the suitable materials reason being it is a good conductor of heat. Some gave stainless steel as it does not corrode while others gave copper as a correct response reason given was it is a good conductor of heat. Cast iron was also marked correctly as its ability to withstand and maintain very high cooking temperatures.

**(b) Name one suitable plastic for making the saucepan handle and a reason for the choice.**

Most candidates were just naming any plastic they remember but successful candidates gave phenol formaldehyde as a correct response as it is a heat resistant material.

### Section B

#### Question 11

***A lamp stool made from hardwood.***

**(a) Candidates were required to name one locally available hard wood.**

A majority of candidates gave hardwood such as beech, oak and mahogany which are not locally available. Successful responses were meranti and saligna or any other suitable local hardwood.

**(b) Candidates were required to complete a suitable joint for the stool lamp and the rail.**

Most candidates provided appropriate joints although some were lost marks for proportion and alignment.

**(c) Candidates were required to give two purposes for the wooden edging on the top of the lamp stool.**

Most candidates who answered this part did fairly well they were able to state that the edging is for concealing the grain, adding strength of the top and for stability purposes.

- (d) (i) Candidates were required to name a suitable plastic that could be used to coat the top of the lamp stool if could be made of chipboard.**

Very few candidates gave melamine formaldehyde as an appropriate plastic to cover a chipboard top. Others were just giving any popular plastic they remember such as acrylic, polypropylene and ABS which led them to lose valuable mark.

- (ii) Candidates were required to state two purposes of coating the chipboard with plastic.**

Most candidates obtained all the two marks, as they were able to give two of the following responses; water proof, aesthetics, scratch resistant, stain resistant.

- (e) Candidates were required to show how the groove can be produced using hand tool.**

Most candidates had no idea of a plough plane as a hand tool to cut the groove, they used chisels to cut the groove. Correct responses showed the setting of the plough plane, securing the work on the bench, observe precautions, have a good sketch and notes.

- (f) Candidates were required to name the method of securing the top under the frame as shown on the given drawing.**

Very few candidates were able to pocket screwing as a correct response. Most candidates were giving screwing which was not marked correct.

- (g) (i) Showed another method of securing the top using a metal plate. Candidates were required to name a suitable metal for making the plate in a school workshop.**

A majority of candidates were able to name mild steel as the correct response but there were some who gave aluminium and copper and they lost the valuable mark.

**(ii) Candidates were to give a reason the selected metal.**

Most candidates were able to give a valid reason although some were stating irrelevant reasons such as metal is resistant to corrosion or it does not need any finish. The examiner was expecting the following responses; mild steel is tough, easy to cut and easily available.

**Question 12**

**A letter rack for use in an office was shown.**

**(a) Candidates were to name a suitable specific plastic that could be used to make the letter rack.**

Most candidates did very well in naming the suitable plastic. Successful candidates gave acrylic or acrylonitrile butadiene styrene responses

**(b) Candidates were required to give a reason for their choice in (a).**

A majority of candidates were able to give reasons for their choice, they gave reasons such as the plastic is stiff, have a good surface finish, comes in different colours and easy to shape/bend.

**(c) Candidates were required to show the marking of the letter rack on a given rectangle.**

Many candidates correctly marked the letter rack on the rectangular piece of plastic. They were able to show the two folding lines, the radiused corners and the circular.

**(d) Candidates were to use sketches and notes to show how one bend of the letter rack could be made.**

A majority of candidates managed to score good marks as they correctly heated the plastic along the bent line using a heat gun or a strip heater then bent it using a former, although some lost some marks as they used a folding bar as if they were bending a sheet metal. Quite a number of candidates did not retain or secure the plastic while it cools and that made them to lose of valuable marks.

- (e) Candidates were required to use sketches and notes to show how to remove waste from one corner to make it round to smooth finish.**

A majority of candidates produced clear sketches showing the cutting of the waste with a smooth teathed saw such as a coping saw or scroll saw then file to the finish line. Very few candidates went further to finish the edges smooth by using wet/dry paper and do buffing or polishing using a polishing compound as expected.

- (f) A wooden base for the letter rack which had chamfered edges was shown.**

- (i) Candidates were to state the purpose of the chamfers.**

The majority of candidates were able to give a valid response for the purpose of the chamfers which is for safety purposes and also to enhance the wooden base appearance.

- (ii) Candidates were required use sketches and notes to show how the chamfers can be produced.**

A fairly good number of candidates managed to show how to mark out the chamfers with pencil gauge or marking gauge then remove the waste with a suitable plane like block plane or smoothing plane. Some candidates were taking a long route to remove the waste by using rasp/Surform then smooth it with a file.

- (g) (i) Candidates were to name a non-ferrous metal that could be used to make the letter rack instead of the plastic.**

Quite a number of candidates managed to state that aluminium or copper is a suitable non-ferrous metal while others were giving mild steel which is a ferrous metal and they lost that mark.

- (ii) Candidates were asked to show how the circular hole could be cut out after marking.**

A majority of candidates were able to show the drilling of the round hole which would be used to insert the blade. They showed the removal of the waste to make the elliptical hole and lastly, they showed the filing of the rough edges to a smooth finish. Some candidates lost valuable marks after not showing drilled round hole which would be used to insert the thin saw blade and they did not show the smoothing of the edges by using a smooth file.

**Question 13****An Illustration of a 2 mm mild steel sheet wall hanging bracket:**

- (a) Candidates were required to state the joining method used to attach the hook to the bracket back plate.**

Quite a number of candidates did not have problems with naming riveting as the joining method. Some candidates opted screwing which was not awarded the mark.

- (b) Candidates were required name the fixing used to join the hook to the back plate.**

A fairly good number of candidates gave round head rivet and they were marked correct. Some candidates had no idea of the fixing they were leaving a blank space while some called it a round head screw, which led them to miss the mark.

- (c) (i) Candidates were required to show how the two holes could be marked on the back plate.**

The majority of candidates did very well on this question. They were able to show how the two hole centres are marked with odd-leg callipers or engineers square and scribe then used a centre punch to witness the centre.

- (d) Candidates were required to list three stages to follow when plastic coating the mild steel hanger.**

Very few candidates had knowledge of plastic coating a metal process. The few who gave successful responses stated that the metal is heated to red heat, then deep it in powdered plastic lastly put it in a hot oven for a smooth finish. Others described fluidisation procedure where the hot metal is suspended inside a tank then air is blown to make the plastic powder to be suspended and then coated on the hot metal. Lastly, a hot metal is placed in an oven for a smooth finish.

- (e) Candidates were required to name the two internal threads cutting tools shown.**

Quite a number of candidates managed to name tap wrench and the tap correctly. There were some candidates who had no idea about threads cutting Centres are advised to make candidates use these metal cutting tools.

- (f) (i) Name the fixing shown to be used to fix the hook to the wooden back.**

Most candidates correctly stated that fixing is a countersunk head screw. Although some did not give a specific name they wrote screw which made them to lose a valuable mark.

**(ii) Candidates were required to outline the process of painting the wooden back.**

Majority of candidates displayed little knowledge of the painting process and a lot of them lost some marks.

**The expected response was:** First key the surface with a glass paper, treat knots with knotting, apply primer then apply undercoat lastly the final coat.

**(g) Candidates were required to show how holes on the hook can be produced to receive the fixing.**

A fairly good number of candidates were able sketch showing the holes being drilled.

Successful candidates started by sketching the marking of centres to be drilled, then drilling of the round holes while the work was held securely, lastly the countersinking of the two holes with countersink bit.

**(h) Candidates were to show by sketches and notes how the hook can be bent at the narrow end.**

Very few candidates scored very good marks in this question. Many just showed the bent part without showing how it was bent. Successful candidates had quality sketches showing work and former securely held in an engineer's vice showing how force is applied with a mallet or with a ball pein hammer but work protect the from being damaged by it using a scrap piece of wood.

**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). Candidate's folders were presented for marking. One hundred and three centres (103) registered candidates for the coursework. Of the centres, one thousand four hundred and eleven (1411) candidates were registered, and one thousand two hundred and eighty-two (1282) candidates submitted work for this year's examination. However, there was a serious concern of candidates (One hundred and twenty-nine (129) candidates) who were registered but could not submit work for 2021 coursework examination.

**General Comments**

Generally, the 2021 performance indicated a slight increase when compared to the previous year. The work presentation displayed on the folios did indicate an improvement from both teachers and candidate's commitment and in the understanding of the syllabus requirements. The quality of work presented by most candidates was discriminatory. This posed a challenge to the centres who did not do well. However, 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 follow. 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 encouraging to realise a slight decrease in the number of candidates who did not submit their work regardless of 2021 challenges. **Teachers are encouraged to collect work of learners as they complete each stage of the design process so as 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 “ENTERTAINMENT” 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 had a tendency to follow a certain area of need identification such as toys, games (draught, chess). 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.

### 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, some were sketched or downloaded from internet and others in a form of photographs. However, candidates should note that research should have a wide range of existing ideas (**at least eight**). 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.**

### **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 evaluated against the design specification. Some candidates work demonstrated that they were lacking drawing skills such as enhancement techniques. Few candidates displayed good graphic skills and used pens. 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. Candidates 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 or using CAD. Candidates are encouraged to use free-hand sketches on ideation rather than formal drawings, which limits the 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 without justification based on the specification.

### **Development of the proposed solution**

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 trialling resulting in reasoned decision about material, form and shape. 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.

### **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 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.**

The instruction to candidates was that they should make models instead of actual products/projects. This resulted in some confusion with some centres, where most ended on the mock-up stage while others skipped the mock-up stage and went straight for the model. This objective resulted in a number of candidates losing marks on either stages (testing and trialling (mock-up); and models).

### **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 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 take into account the views of the users or show the product in the environment for which it was designed. Centres are advised to encourage candidates to test and evaluate their products against the specification and include modifications and also limitations.

### **Reminder to centres:**

- Unlike 2021 where models were making models, centres are reminded to ensure that marks are added correctly on the Realisation Summary Form.
- All centres should have products for realisation internally moderated and clearly show the distribution of 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.
- Teacher must check if all documents (summary sheet form and attendance register) are appropriately completed and enclosed inside the provided (ECESWA) envelop before submission.

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