



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2022**

Technology and Design

Assessment Unit AS 1

assessing

Design and Materials

[STE11]

WEDNESDAY 25 MAY, MORNING

**MARK
SCHEME**

General Marking Instructions

Introduction

The main purpose of the mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCE Technology and Design.

Candidates should be able to:

- AO1** Demonstrate specific knowledge and understanding, be able to apply that knowledge and understanding in combination with appropriate skills in their designing, communicate ideas and outcomes, and demonstrate strategies for evaluation.
- AO2** Apply skills, knowledge and understanding of relevant materials to produce suitable and appropriate outcomes; communicate ideas and outcomes, and demonstrate strategies for evaluation.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 17- or 18-year-old which is the age at which the majority of candidates sit their GCE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17- or 18-year-old GCE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is good.

Level 3: Quality of written communication is excellent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

Level 1 (Basic): The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 (Good): The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

Level 3 (Excellent): The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

COVID-19 Context

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

- 1 (a) Physical properties refers to the chemical or atomic structure of the material, e.g. density, electrical conductivity etc, whereas mechanical properties refers to how a material reacts when subjected to forces, e.g. strength, hardness etc.

Award [2] for a full explanation and [1] for a limited explanation. [2]

Correct alternative responses will be given full credit.

- (b) (i) The strength of a material is directly related to the material's ability to withstand force without breaking or permanently bending. [1]
- (ii) Durability refers to the ability of a material to withstand wear and deterioration. [1]

Correct alternative responses will be given full credit.

- 2 (a) Any **one** main specific property of (LDPE) which would make it suitable for the body of the sauce bottle for example:

- Good impact resistance. [1]
- Good flexibility. [1] [1]

Correct alternative responses will be given full credit.

- (b) The term tolerance refers to the acceptable +/- dimensions of a part whilst allowing the part to fit together or function as it was intended.

Award [2] for a full explanation and [1] for a limited explanation. [2]

Correct alternative responses will be given full credit.

- (c) Any **two** different reasons why it is so important to test and inspect the bottles for example:

- Ensure consistency/quality of product manufacture. [1]
- To avoid bad publicity. [1]
- To ensure the product or components are capable of doing what they were designed to do. [1] [2]

Correct alternative responses will be given full credit.

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5

3 (a) A wood veneer is a thin slice of wood that is typically glued onto a core panel or sheet. [1]

Any **one** main purpose of a wood veneer for example:

- Produce a decorative finish.
- Low cost option compared to using solid wood. [1]

Correct alternative responses will be given full credit.

(b) Enamelling involves fusing a coloured compound (traditionally finely ground glass) to a surface at very high temperatures, often between 1300 to 1600 °F.

Award [2] for a full description and [1] for a limited description. [2]

Correct alternative responses will be given full credit.

4

4 (a) A thermoplastic can be re-heated and re-shaped repeatedly. [1]

Correct alternative responses will be given full credit.

(b) An annotated sketch of the vacuum forming process to include the following: Sheet clamped, heat element, mould introduced, vacuum used to create profile.

Level 3	Detailed annotated sketch with all the main elements of the vacuum forming process included.	[4]
Level 2	Both the sketch and the annotation are good. Most of the main elements of the vacuum forming process included.	[2]–[3]
Level 1	Limited sketch lacking detail and appropriate annotation. Only a few of the main elements of the vacuum forming process included.	[1]
Level 0	The response is not worthy of any credit.	[0]

[4]

Correct alternative responses will be given full credit.

5

5 (a) Any **two** main characteristics associated with a reflective film which would make it suitable for the exterior surface of the helmet for example:

- Available in a range of colours. [1]
- Relative low cost. [1]
- Suitable for outdoor environments. [1] [2]

Correct alternative responses will be given full credit.

(b) Any **two** different benefits to the company of using holograms on the packaging for the helmet for example:

- Can provide security (special tamper evident holograms can be used to prevent access to boxes). [1]
- Brand protection – the use of holograms on labels can mark the genuineness of the product. [1]
- Advertising – Holograms can provide eye-catching pictures which add appeal and generate more interest. [1] [2]

Correct alternative responses will be given full credit.

4

6 Incorporating two aspects of aesthetics and two aspects of ergonomics.
Indicative content

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Aesthetics – Aspect 1: Colour

The kettle has a high gloss black finish for both the main body and the base assembly. The switch to release the lid, the electrical on/off switch and the water level indicator are of a different colour which helps to provide a contrast to the high gloss black finish. The matt black finish of the lead and plug blends in with the black finish of the main body.

Aesthetics – Aspect 2: Line shape and Form

The kettle has been based around a tapered cylindrical geometrical shape, both stylish and functional. The line of the kettle is based around soft smooth curves giving a modern feel to the product. The soft curved profile blends from the main body of the kettle into the handle which is also repeated in the internal profile of the handle adding to the product’s appeal.

Ergonomics – Aspect 1: Handle

The shape of the handle is suitable for both left-handed and right-handed users when operating the product. The profile of the handle not only allows for a comfortable secure grip but would also accommodate a wide range of users. The press switch on the handle to open the lid is ergonomically positioned for easy operation by the thumb. The surface profile of this switch ensures good contact for operation.

Ergonomics – Aspect 2: Level indicator

The level indicator on the side of the product communicates well with the user. The size of the display ensures that the user can see the information from a suitable distance when filling the kettle with water. Safety information in the form of min and max levels are displayed to assist the user. In addition, information on the amount of litres, and equivalent number of cups of water allows the user to determine how much water they are putting into the kettle against their needs.

Detailed selection and use of a writing form and style appropriate to the content. The content is organised with excellent information outlined for each area and widespread and accurate use is made of appropriate technological vocabulary. The spelling, grammar and punctuation are accurate.	[6]–[8]
Good selection and use of a writing form and style which is mostly appropriate to the content. The content is organised with good information outlined for each area and some use is made of appropriate technological vocabulary. The spelling, grammar and punctuation are mostly accurate.	[4]–[5]
Limited selection and use of a writing form and style to the content. The content is poorly organised with basic information outlined for each area and little use is made of appropriate technological vocabulary. The spelling, grammar and punctuation are inaccurate.	[1]–[3]
The response is not worthy of any credit.	[0]

[8]

8

- 7 (a) A design could be based on a change to the front profile (recessed) of the tray to accommodate a magnetic strip which could be pop riveted in position.

An appropriate detailed annotated sketch of a design change to the front of the tray that would enable the brush to stand upright in the paint.	[4]
Both the sketch and the annotation are good. The design change to the front of the tray fulfils the requirement as it would enable the brush to stand upright in the paint. The design lacks the finesse appropriate for the product.	[3]
Limited sketch lacking detail and appropriate annotation. Difficulties in determining if the design change to the front of the tray would enable the brush to stand upright in the paint.	[1]–[2]
The response is not worthy of any credit.	[0]

[4]

Correct alternative responses will be given full credit.

- (b) A design could be based on a L shape light gauge metal plate (to provide support to the tray) with one square bracket U bolt with washers and wing nuts. The wing nuts will enable the user to tighten the bracket and tray to the leg of the ladder.

Detailed annotated sketches of a design that is appropriately attached to the side of the tray and allows the user to quickly and safely secure the tray to the leg of the ladder.	[5]–[6]
Both the sketches and the annotation are good. The design fulfils the requirement as it is attached to the side of the tray and allows the user to quickly and safely secure the tray to the leg of the ladder. The design lacks the finesse appropriate for the product.	[3]–[4]
Limited sketches lacking detail and appropriate annotation. Difficulties in determining if the design is attached to the side of the tray and allows the user to quickly and safely secure the tray to the leg of the ladder.	[1]–[2]
The response is not worthy of any credit.	[0]

[6]

Correct alternative responses will be given full credit.

Total

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10

40