GCSE
DESIGN AND TECHNOLOGY

Mark scheme

Specimen Papers

V0.1

aqa.org.uk

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Qu	Part	Marking guidance	Total marks	AO
		SECTION A		
1		**D** Motion sensor	1 mark	AO4
2		**C** 99.9 x 101.07mm	1 mark	AO4
3		**A** Compression	1 mark	AO4
4		**C** Low carbon steel	1 mark	AO4
5		**D** Just in Time Manufacturing	1 mark	AO4
6		**A** Cotton	1 mark	AO4
7	1	**C** A material that reacts to changes in the environment	1 mark	AO4
7	2	Possible answers may include: Shape memory alloy Photochromic dyes Thermochromic material One mark for any response worthy of credit	1 mark	AO4
8		**B** Planned obsolescence	1 mark	AO4
9		**C** A type of polymer	1 mark	AO4
10		**D** 40mm	1 mark	AO4

11		**C** Pine	1 mark	AO4

12	1	1 mark for correct answer. Expected answers include: • MDF (Medium Density Fibreboard) • GRP (Glass Reinforced Plastic) Credit should be given for other acceptable responses.	1 mark	AO4

12	2	1 mark for each property correctly identified up to a maximum of 2 marks. **Indicative content:** Properties of MDF include: • smooth surface • easy to paint • no natural grain • being porous. Properties of GRP include: • high strength to weight ratio • temperature resistance • easy to form complex shapes. As with 12.1, credit should be given to other acceptable responses that do not relate MDF or GRP.	2 marks	AO4

13		1 mark for each correct reason stated up to a maximum of 2 marks. Expected answers include: • Strength to weight ratio • Low cost in comparison to other packaging materials • Can be printed on • Rigidity • Thermal properties.	2 marks	AO4

14	1	1 mark for a correct answer. Credit should be given for any fossil fuel. Possible answers include: • Oil • Gas • Coal. Reward any other correct response.	1 mark	AO4

14	2	1 mark for each correct reason stated up to a maximum of 2 marks. Expected answers include: • Use of finite resources which cannot be replaced • The process of extracting the materials can be detrimental to the environment • The process can be expensive • Burning fossil fuels can cause pollution. Reward for any other correct response.	2 marks	AO4

SECTION B

<table>
<tr>
<td>15</td>
<td>1</td>
<td>1 mark for correct response.

<table>
<tr><th>Stock Form</th><th>Raw Material</th></tr>
<tr><td>Acrylic rod</td><td>Oil</td></tr>
<tr><td>Corrugated card</td><td>Trees/wood</td></tr>
<tr><td>Aluminium sheet</td><td>Bauxite</td></tr>
<tr><td>Wool yarn</td><td>Animal fleece</td></tr>
<tr><td>Medium Density Fibreboard (MDF)</td><td>Any of the following are acceptable:
• Wood/
• Trees/wood shavings/paper/sawdust
• Glue – Urea formaldehyde.</td></tr>
</table>
</td>
<td>1 mark</td>
<td>AO4</td>
</tr>
</table>

15	2		2 x 2 marks	AO4

3-4 marks	Complete description that is accurate and shows understanding of how raw materials are processed.
1-2 mark	Simple description with some errors and misunderstanding of how raw materials are processed.
0 marks	Nothing worthy of credit.

Each stage must be relevant to the stock form selected.

Indicative content:
The following are not model answers but show some areas of the answer that may be explored. Credit both diagrams and description.

Acrylic rod	**Corrugated card**	**Aluminium sheet**	**Wool yarn**	**MDF board**
• Crude oil is extracted from the ground • Oil is transported by a tanker to an oil refinery • Oil is put through a distillation process where heavy crude oil is separated into groups called 'fractions'. • Polymerisation takes place • Plastic is then extruded and then cut into small pellets.	• Trees are cut down and debarked • Timber is chipped and water and chemicals are added to create pulp • The pulp is then washed, refined cleaned and sometimes bleached • Water is then drained out and the paper is heated and dried. It is then wound onto large rolls.	• The bauxite is mined from the ground • This material is then washed to remove the clay • Aluminium oxide is then extracted from the bauxite through refining. • Aluminium is then created from an electrolytic process • The liquid aluminium is cast into different shapes dependin	• Sheep are sheared to remove the wool fleece • The fleece is then cleaned, sometimes using an acid bath to remove oils and dirt • The wool is then dried and teased/picked • The wool is then combed in a process called 'carding' • The wool is then spun and often twisted to make useable yarn.	• Trees are cut down and then debarked • The wood is then chipped into small pieces • They are then cleaned and pulped turning softwood chips in to wood fibres • Urea formaldehyde is added to the mixture and the material is pressed into sheets • These sheets are then dried, trimmed and

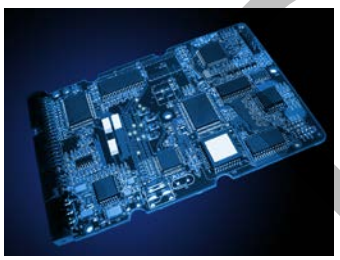
			g on the intended use.		sanded.		

16		For each of the two descriptions award up to 2 marks as follows: **Indicative content:** Candidates will draw on their own experience of different material areas to answer the question. For each example, candidates should fully explain each point to access full marks. Both materials and products are acceptable if adequately explained. The following are possible examples answers but any other examples must be given credit where correct. • Plywood is created in layers to strengthen the material. • Plywood layers are laid with the grain in different directions. This ensures the weak lines of the grain are strengthened. • Many buildings use reinforced concrete to improve the tensile strength of the material. • Reinforced concrete uses the compressive strength of concrete and the tensile strength of steel combined to make a more suitable building material. • Interfacing can be used to stiffen the collar of a cotton shirt. • Laminating of fabrics can be used to stiffen and strengthen. • Corrugated cardboard is made using layers of cardboard with a corrugated middle layer. This strengthens the material. • Packaging is also strengthened using structural pieces of corrugated card e.g. a wine carrier. This uses internal pieces which separate the products but also provide internal struts.	4 marks	AO4

2 marks	Complete description demonstrating both knowledge and understanding of how materials and/or products are strengthened or reinforced.
1 mark	Simple description with some errors and misunderstanding of how materials and/or products are strengthened or reinforced.
0 marks	Nothing worthy of credit.

<table>
<tr>
<td>17</td>
<td>1</td>
<td>For each feature described award up to 2 marks as follows:
<table>
<tr><td>2 marks</td><td>Complete description demonstrating both knowledge and understanding of how product/component is suitable for mass production.</td></tr>
<tr><td>1 mark</td><td>Simple description with some errors and misunderstanding of how product/component is suitable for mass production.</td></tr>
<tr><td>0 marks</td><td>Nothing worthy of credit.</td></tr>
</table>
Indicative content:
<table>
<tr><th>Product</th><th>Features suitable for mass production</th></tr>
<tr><td> 
Steel car door</td><td>Steel is bought in rolls which enables large amounts to be stored easily.
The material is press formed into shape which is an automated method of manufacture.
Spot welding of attachment points etc. can be automated and flexible manufacturing is used to ensure parts are moved and welded with the same machinery.</td></tr>
<tr><td> 
Polymer toy musical instrument</td><td>Injection moulded which ensures ease of repetition and reduced cost when mass produced.
Use of plastic which can be bought in granulated form and then injection moulded.
Plastic comes in a range of colours which enables products to be made in a range of colours.
Injection moulding ensures reduced assembly after production.
Complex shapes can be produced.
Injection moulding allows pigments to be put into the plastic pre-production rather than having to apply a colour or finish to the product after it is made.</td></tr>
<tr><td> 

Newspaper</td><td>Paper can be bought in large pieces or rolls so that designs can be nested together to ensure less waste.
Lithography is used for printing on to the product.
This process is quick and ensures repetition</td></tr>
</table>
</td>
<td>2 x 2 marks</td>
<td>AO4</td>
</tr>
</table>

 Newspaper (continued)	of identical products. Lithography is a high quality and cheap process when producing many of the same product. A guillotine is used when cutting out the shape of the product. This is a continuous process. This ensures products are all the same and reduces the amount of assembly necessary at the end of production. Manufacture can be mainly automated.
 Cotton T–shirt	Cotton is a natural material that is readily available in large quantities. Products can be nested together on large sheets of cotton to minimise waste. Automated machines can cut patterns in material to ensure repeatability and consistency. Simple design ensures many products can be sold to customers. Several layers can be cut at the same time. Screen printing allows T shirts to be printed on and then the same design to be used multiple times.
 Printed circuit board	Automation is used to ensure precise soldering. This allows very intricate detail that if done by hand would not work. ICs are used to make complex tasks completed with the smallest space necessary. Components are designed to fit into a standard module. Spaces in the PCB are always the same to allow for easy assembly. PCB's are printed rather than using wires.
 Flatpack furniture	Flat manmade boards such as MDF, Plywood and chipboard are often used to ensure a uniform board. Computer Aided Manufacture such as CNC routers are used to ensure repeatability. Products can then be cut and holes etc. can be located exactly so that minimal work is needed in assembly. Holes etc. are positioned so that alternative features can be added and the furniture becomes flexible in terms of its function.

17	**2**	**1 mark** for correctly identifying an appropriate 'main' industrial process. Award up to **4 marks** for explaining the process as follows:	5 marks	AO4

4 marks	Thorough detailed description of a process that is mostly accurate with all stages present and in correct order. Thorough understanding of the process with a labelled diagram or good notes to explain the process.
3 marks	Methodical description of most stages of the process, usually in the correct order with some inaccuracies. Sound understanding of the process with a mainly correct labelled diagram or good notes. Response may lack some important key points.
2 marks	Process described using mostly appropriate terminology with some gaps. Some understanding demonstrated either with a vague diagram or with some short description of the process.
1 mark	Basic description of the process, missing some stages and with errors. May be with a vague diagram without actually naming the process.
0 marks	Nothing worthy of credit.

Expected processes include:

Steel car door	Polymer toy musical instrument	Newspaper	Cotton T–shirt	Printed circuit board	Flatpack furniture
Press Forming Spot Welding	Injection Moulding	Lithography	Sewing Screen Printing/Dye Sublimation	Soldering	CNC Router

Indicative content:

The following descriptions of possible processes are not exhaustive and other points can be used to gain maximum marks. Notes should be supported with labelled diagrams.

Car Door – Press Forming
A punch and die is used to press sheet metal into shape. This means using a ductile material as the process is done at room temperature.
Holes can be cut at the same time as shapes are pressed in to the metal.

Polymer toy Musical Instrument – Injection Moulding
A polymer is placed in the hopper and enters the chamber of the injection moulding machine. The chamber is heated until the plastic melts. The plastic is then forced in to a mould where it cools to create the shape of the object.

Newspaper – Lithography
Aluminium plates are exposed to UV light and then put on rollers. The rollers

		pick up ink where the plate has been exposed and water elsewhere. The rollers then transfer the image on to the paper that passes through. T – Shirt – screen printing This is a low cost process where mesh is used to transfer ink on to the fabric. Areas are blocked out with a stencil where the ink should not go. A blade or squeegee is moved across the screen to fill the open mesh apertures with ink. Printed Circuit Board – Soldering The circuit board is passed over a pan of molten solder in which a pump produces an upwelling of solder. As the circuit board makes contact with this wave, the components become soldered to the board. Sometimes, the components are glued onto the surface of a printed circuit board (PCB) before being run through the molten solder wave. Flatpack Furniture – CNC Router Items are secured in place on the router using clamps or a vacuum bed. The file is sent to the router and different lines are set to different depths of cuts. The router then cuts the lines drawn at varying depths and with great accuracy.		

18

1 mark for each property correctly identified.

Both properties must relate to the same chosen material. If no material chosen award zero marks.

Indicative content:

Material	Characteristics/Properties
Polypropylene	• Can be heated and remoulded as it is a thermoplastic • Comes in a wide range of bright colours • Can be recycled • It is flexible and less brittle than other plastics such as acrylic • Deteriorates in UV light.
Foam Core Board	• Stiff structure which is good for model making • Composite material which is difficult to recycle • Thin outside layer which can be scored.
Brass	• Non corrosive • Good thermal and electrical conductivity • Orange/gold bronze colour.
Mahogany	• Light natural wood • Easy to work with • Cheap and easily accessible • Can split easily or warp if not in stable humidity • Can be attacked by fungi or insects.
Silk	• Easily dyed • Lightweight • Resistant to shrinking and stretching • Sun resistant.

Reward any other correct responses.

2 marks

AO4

19

9 – 10 marks	A fully coherent and logical discussion which features a range of points with excellent understanding of issues surrounding the selection of materials, detailed analysis and evaluation of these issues and reasoned conclusions drawn as to why they are seen as ethical.
7 – 8 marks	A largely coherent and logical discussion which includes good understanding of the issues surrounding the selection of materials and demonstrates a good range of well analysed and evaluated points and some conclusions drawn as to why they are seen as ethical.
5 – 6 marks	Response shows some understanding of the issues surrounding the selection of materials demonstrating a range of points with some analysis/evaluation. Argument may lack some coherency and conclusions drawn may be unsubstantiated.
3 – 4 marks	Some understanding of the issues and some worthy discussion. Limited analysis and evaluation, lacking coherency and limited conclusions which may also be unsubstantiated.
1 – 2 marks	One or two brief valid points or one point with some explanation. Answer shows limited understanding of the issues with no coherent argument. Analysis only rather than evaluation. No conclusions drawn.
0 marks	Nothing worthy of credit.

8 marks

2 marks

AO3

AO4

Indicative content:

The indicative content below is intended to illustrate points that students may make with regard to the examples given in the question, which would demonstrate their understanding of why these materials are seen as ethical. Students may discuss some or all of these examples or may bring other materials into their answer. There is no requirement for them to discuss the examples given. You should award marks for anything worthy of credit.

<u>Biodegradable Plastic</u>

- Decomposes much more quickly so that less waste is left in landfill
- Does not use up as many finite resources such as oil
- Is not as harmful to the environment when extracted
- They require less energy to process into a useable material
- They are easier to recycle/use less energy to recycle
- They are non-toxic when they break down
- Biopolymers reduce our reliance on foreign oil.

<u>Fairtrade Cotton</u>

- Cotton farmers are paid a living wage which allows them to survive and earn enough money to feed their families
- Fairtrade protects workers from exploitation

		• Communities are often given help in setting up local amenities such as schools wells etc • It gives smallscale farmers access to global markets • Buying this product shows your support for these communities. <u>Recycled Components</u> • Components often contain valuable materials such as gold, copper, aluminium • These materials are difficult to extract and take a large amount of energy to extract and refine • These materials are non-renewable and are becoming more difficult and costly to find • Many components contain harmful materials that should not be left in landfill • Saves landfill space.		

SECTION C

<table>
<tr>
<td>20</td>
<td>1</td>
<td>
<table>
<tr><td>2 marks</td><td>Identify intended target market and demonstrate understanding of why.</td></tr>
<tr><td>1 mark</td><td>Intended target market identified but lacks understanding.</td></tr>
<tr><td>0 mark</td><td>Nothing worthy of credit.</td></tr>
</table>
Indicative content:

Intended target market identified eg teenagers, adults etc
Qualified response e.g. young people aged between 11 and 18 as these chairs are often seen in schools.

</td>
<td>2 marks</td>
<td>AO4</td>
</tr>
</table>

<table>
<tr>
<td>20</td>
<td>2</td>
<td>
Award up to 4 marks for each of the three parts of the question as follows:
<table>
<tr><td>3 – 4 marks</td><td>Well described and justified analysis explaining two or more points and containing full evaluation.</td></tr>
<tr><td>1 - 2 marks</td><td>Brief points mentioned but not fully explained. Analysis present but no evaluation / conclusions drawn.</td></tr>
<tr><td>0 marks</td><td>Nothing worthy of credit.</td></tr>
</table>
Allow positive and negative responses. Responses may include the following types of answer. Two of these statements would merit full marks as each is explained.
Indicative content:
<table>
<tr><th></th><th>Chair</th><th>Radio</th><th>Dress</th></tr>
<tr><td>Suitability for the user</td><td>Easy to wipe clean which may be useful in a school environment
The correct size for the target market of teenagers which makes it comfortable to sit in
The correct size to fit under standard size tables in</td><td>Soft handle suggesting that the radio can be carried
Aerial retracts to make it more compact when not needed
Screen to make it easy to see the radio stations.</td><td>The correct size to fit the consumer
Comes in a range of sizes
Zip down side to ensure secure and easy fastening and a tight fit.
Comfortable</td></tr>
</table>
</td>
<td>12 marks</td>
<td>AO3</td>
</tr>
</table>

	school • Stackable so that they can be put away and areas cleared for other tasks.		to wear • Easy to wash and line dry.
Aesthetic Quality	• Blue in colour which will be appealing to children who tend to like primary colours • A common colour for the school environment so it will match the classrooms • A plain colour that will not date/go out of fashion and appropriate for a wide range of settings • More pattern/colour could be applied to make it more interesting.	• Simple colour scheme that will fit in with a wide range of users • Geometric shapes used in the design which makes the product look simple and functional.	• Black in colour which is liked by a wide variety of users and goes with a range of accessories • Classic shape of dress unlike more fashionable designs which may have a smaller market.
Environment	• Oil based plastic seat which is a finite resource and may run out • Difficult to separate the steel legs with the plastic seat so more difficult to recycle	• Metals such as copper are used in the electronic circuitry of the radio • These are a finite resource which may run out • Their extraction is	• Some synthetic materials such as polyester used which impact the environment. • This dye used is synthetic which can

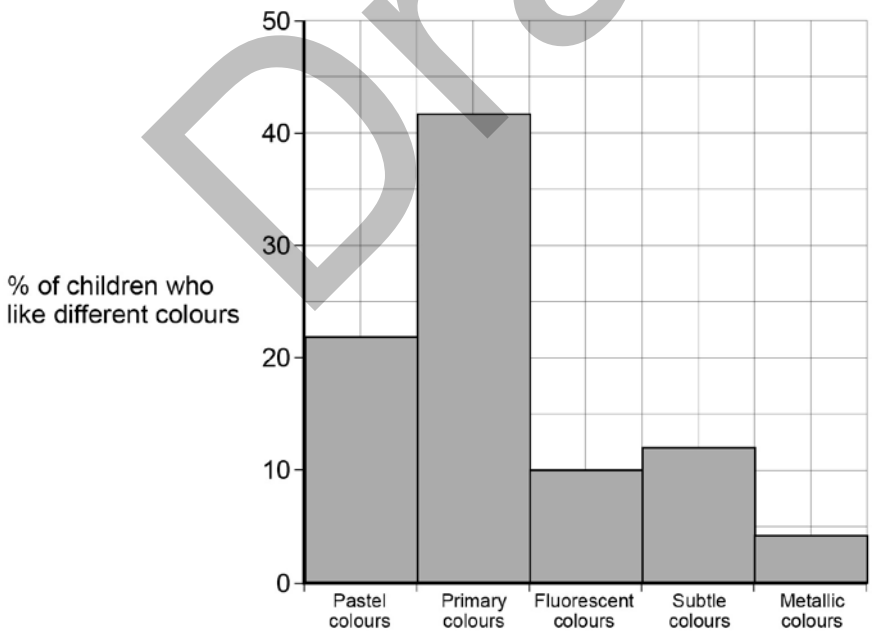
			• It may be possible to order new parts e.g. if the seat breaks so that the product can be repaired rather than thrown away • Industrial processes using machinery such as injection moulding machinery are used in the manufacture These take a great deal of energy to make and during their use.	also harmful to the environment • The radio case is made of aluminium which also must be extracted • All these materials need to be transported throughout their lifecycle which affects their environmental impact • The radio uses batteries or electricity in use • This also reduces fossil fuels such as oil, coal and gas.	be harmful when waste is released into the environment. • Oil used in the production of synthetic materials is a non - renewable resource. • High fashion item which is likely to only be used for a short period of time and then discarded or recycled by another user.	

21		**Award 1 mark for each valid example given, up to a maximum of 2 marks.** **Award 1 mark for each valid explanation up to a maximum of 2 marks.** Possible answers are given below but this is not an exhaustive list. Reward any other valid responses.	4 marks	AO4

Product	Anthropometric data	How it is used in the design of your product
Chair	The measurement of the person's leg from the bottom of their feet to the back of the knee when sitting.	This should be used to decide on the height of the seat of the chair.
Chair	The width of the average person when sitting.	To ensure the seat is wide enough to be comfortable.
Radio	The size of the average person's fingertip.	To ensure that the buttons are the correct size or that they are spaced far enough apart so that you don't press the wrong button.
Radio	The length of the thumb.	So that buttons are in reach while the radio is held.
Dress	The height of the consumer	To ensure that the dress is the correct length for the user.
Dress	The size of the waist.	To ensure that the waist fits snugly and accentuates the figure.

22	1	1 mark for each correct percentage. 105/250 X 100 = 42 30/250 X 100 = 12 See table below	2 marks	AO4

	Number of children	Percentage of total
Pastel Colours	55	22
Primary Colours	105	**42**
Fluorescent Colours	50	20
Subtle Colours	30	**12**
Metallic Colours	10	4
Total	250	

22	2	1 mark for correct scaling. 1 mark for accurate drawing of the chart.  	2 marks	AO4

<table>
<tr>
<td>22</td>
<td>3</td>
<td>Marks awarded as follows:

<table>
<tr><td>3 marks</td><td>Observation showing clear understanding and thorough explanation as to how this data would influence their redesign.</td></tr>
<tr><td>2 marks</td><td>Observation is correct but may lack understanding. Some explanation of how this data would be used for redesign.</td></tr>
<tr><td>1 mark</td><td>Observation correct but does not demonstrate understanding. No explanation of how the data would be used.</td></tr>
<tr><td>0 marks</td><td>Nothing worthy of credit.</td></tr>
</table>

Responses may include but are not limited to:

• The most popular colour group is bold colours which is likely to be because a lot of children like bright things and to make a statement. If I was to design this product I would use bold colours in my design to make it suitable for this target market. Bright colours are often used in children's toys etc
• The least popular colour group is metallic colours as they don't seem as eye-catching to the younger market. I would make sure I do not use these when designing.</td>
<td>3 marks</td>
<td>AO4</td>
</tr>
</table>

<table>
<tr>
<td>23</td>
<td></td>
<td>Suitability of the design for the user - 3 marks.

<table>
<tr><td>3 marks</td><td>The student shows clear understanding of the change of target market and indicates a range of areas where changes have been made due to this. The response is suitable for the user.</td></tr>
<tr><td>2 marks</td><td>The student shows some understanding of the change of target market and the response is partially suitable for the user.</td></tr>
<tr><td>1 mark</td><td>The student shows limited understanding of the change of target market.</td></tr>
<tr><td>0 marks</td><td>Nothing worthy of credit.</td></tr>
</table>

Creativity and Innovation – 3 marks.

<table>
<tr><td>3 marks</td><td>The student demonstrates an imaginative response that is creative and innovative in more than just surface decoration.</td></tr>
<tr><td>2 marks</td><td>The student demonstrates some creativity such as changing shape, size and colour of product in order to make more attractive to user.</td></tr>
<tr><td>1 mark</td><td>The student demonstrates a minimal amount of creativity, changing only something straightforward,</td></tr>
</table>
</td>
<td>12 marks</td>
<td>AO4</td>
</tr>
</table>

	such as colour.
0 marks	Nothing worthy of credit.

Selection of Materials – 3 marks.

3 marks	Reference to one or more possible materials with good understanding of their properties and how these influence selection.
2 marks	Reference to one or more possible materials with some understanding of properties but lacking understanding of why these influence selection.
1 mark	Reference to a possible material with limited understanding of properties and no link between properties and selection.
0 marks	Nothing worthy of credit.

Quality of communication – 3 marks

3 marks	Clear and engaging presentation of ideas through both notes and sketches. Evidence of good 3D drawing.
2 marks	Notes have been presented through notes and sketches, clarity may be lacking.
1 mark	Some attempt at presenting ideas through notes or sketches.
0 marks	Nothing worthy of credit.

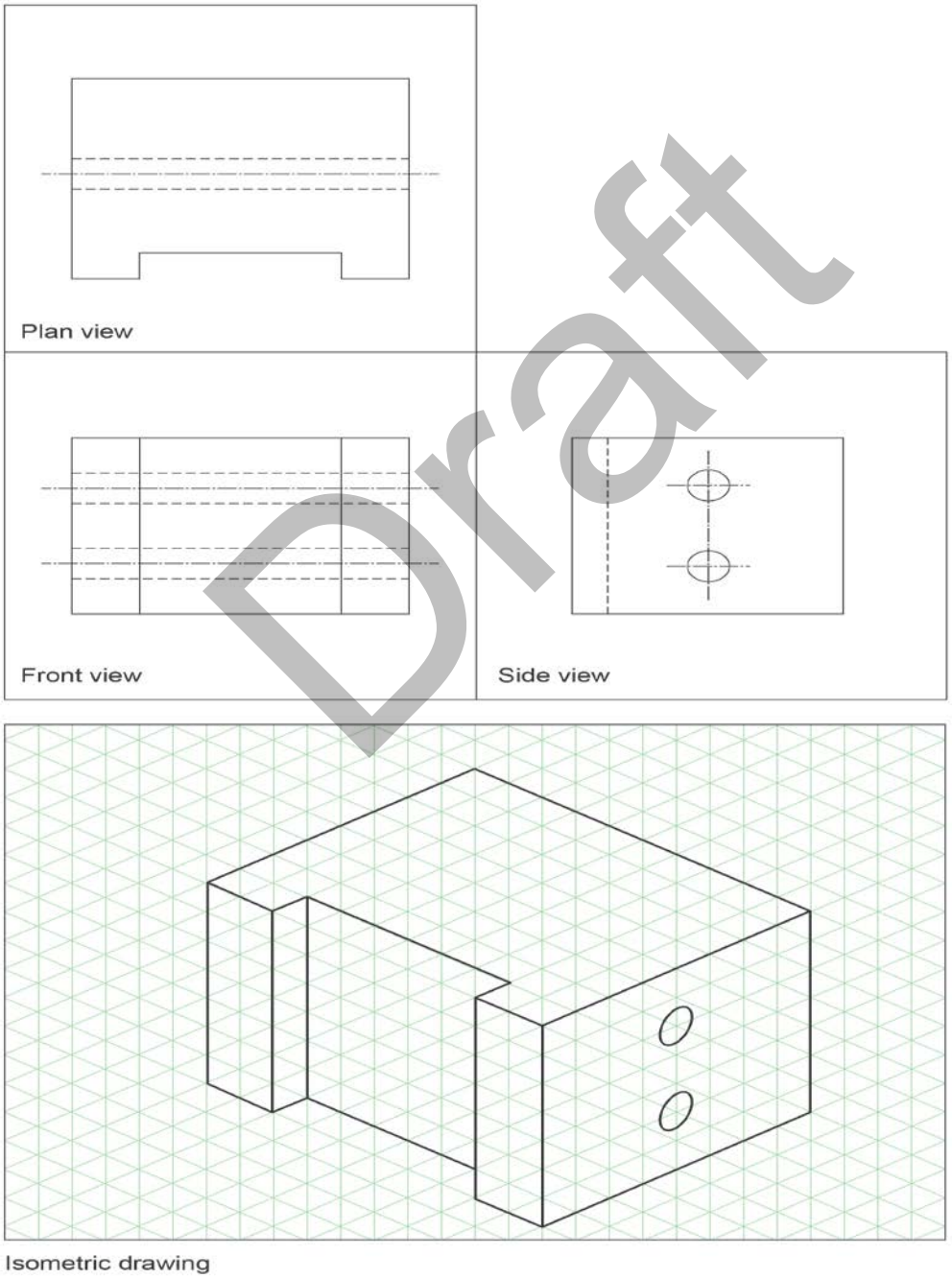
24	1	1 mark for an appropriate answer. **Indicative content:** • Corrugated card • Grey board • Foam core board • Styrofoam, MDF • Calico toile • Breadboarding.	1 mark	AO4

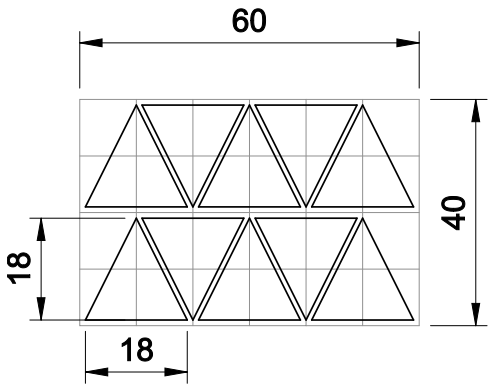
<table>
<tr>
<td>24</td>
<td>2</td>
<td>
<table>
<tr><td>3 marks</td><td>Thorough explanation of why designers create models, including excellent understanding of the purpose of models, Examples given and fully explained.</td></tr>
<tr><td>2 marks</td><td>Some explanation of why designers create models, showing good understanding of the purpose of models. Examples given with some explanation.</td></tr>
<tr><td>1 mark</td><td>Limited explanation for why designers create models, showing basic understanding of their purpose. No examples used.</td></tr>
<tr><td>0 marks</td><td>Nothing worthy of credit.</td></tr>
</table>

Typical answer will reference:

Identifying any issues before full production which saves time and cost
Quicker speed of manufacture
Allowing customers or potential target market to look at a model and give feedback
Having a product you can hold and test in terms of aspects such as how well it functions/fits/feels etc.

</td>
<td>3 marks</td>
<td>AO4</td>
</tr>
</table>

25		**Front View** 1 mark – shape is correct. 1 mark – hidden detail is correct. **Isometric Drawing** 1 mark – general shape is correct. 1 mark – indent is correct. 1 mark – holes are in the correct place. Do not penalise if holes are not totally correct, but must be circular or elliptical.  	5 marks	AO4

26	1	1 mark for correct drawing of all ten triangles.  	1 mark	AO4

26	2	1 mark for calculating the area of a rectangle. 1 mark for calculating the area of a triangle. 1 mark for adding the areas of the triangles together and subtracting from the area of the rectangle to find wastage. Please note if students has not answered **question 26.1** correctly they will be unable to obtain the third mark. Award mark for drawing triangles as above even if sides are joined. Calculation Area of rectangle: 60 x 40 = 2400 Area of triangle: ½ x 18 x 18 = 162 Area of 10 triangles: 162 X 10 = 1620 Material wasted: 2400 – 1620 = 780mm^2	3 marks	AO4