GCSE
DESIGN AND TECHNOLOGY

Mark scheme

Specimen Papers

Version number 1.0

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

Qu	Part	Marking guidance	Total marks	AO
1		**D** Motion sensor	1 mark	AO4
2		**A** Compression	1 mark	AO4
3		**C** Low carbon steel	1 mark	AO4
4		**D** Just in Time Manufacturing	1 mark	AO4
5		**A** Balsa is a natural material used in model making	1 mark	AO4
6		**C** A material that reacts to changes in the environment	1 mark	AO4
7		**D** Planned obsolescence	1 mark	AO4
8		**C** Polyester Resin (PR)	1 mark	AO4
9		**C** 40mm	1 mark	AO4
10		**D** Spruce	1 mark	AO4

11		1 mark for each property correctly identified up to a maximum of 2 marks. **Indicative content:** Properties of natural fibres to make them suitable for clothing include: - Thermal properties - absorbency for dyeing - soft handle - good drape - can be washed and ironed You should accept any other valid response.	2 marks	AO4
12		1 mark for each correct reason stated up to a maximum of 2 marks. Indicative Content: - Strength to weight ratio so that it can be easily carried but supports the weight of the pizza - Low cost in comparison to other packaging materials which makes it cost effective for retailers - Can be printed on so takeaways and restaurants can display their logos - Rigid materials that won't flex and bend as easily as other types of cardboard – offers protection to the pizza. - Thermal properties – keep pizza warm. You should accept any other valid response.	2 marks	AO4
13	1	1 mark for each correct reason identified up to a maximum of 2 marks. - Government targets to reduce CO2 emissions - Increased awareness of environmental issues - Impact of pressure groups - Home installation of solar panels – inducements for these - Minimising reliance on fossil fuels - Improved efficiency over time - Improved technology You should accept any other valid response.	2 marks	AO4

13	2	1 mark for a valid reason 2 marks for a valid and explained reason **or** two valid reasons given Indicative content: • Cost (1mark) High initial investment and long payback period (2 marks) • Visual intrusion (1 mark). Wind and solar farms spoil the landscape and impacts on views (2 marks). • Noise pollution (1 mark). Sound of wind turbines will impact upon local residents (2 marks). • Climate change deniers (1mark). People do not believe there is a need to avoid traditional sources of energy (2 marks). • Efficiency (1 mark). Although the technology is improving not sufficient energy generated compared to the cost of installation etc. (2 marks). • Danger to wildlife (1 mark). Risk to bird and marine life through disturbance of habitat (2 marks). Reward for any other correct response.	2 marks	AO4

13	3	1:10 = 1+10 = 11 83.3 ÷ 11 = 7.572 (1 mark) Answer = 7.6 TWh (1 mark) Accept answer without TWH Do not accept an answer to two decimal points.	2 marks	AO4

SECTION B

14	1 mark for identifying an appropriate source (as per table below) Up to 4 marks for explaining the process	5 marks	AO4

Stock Form	Primary Source
Acrylic rod	Oil
Corrugated cardboard sheet	Trees/wood
Aluminium sheet	Bauxite
Wool yarn	Animal fleece
Medium Density Fibreboard (MDF)	Any of the following are acceptable: • Wood/ • Trees/wood shavings/paper/sawdust • Glue – Urea formaldehyde.

3-4 marks	Complete explanation that is accurate and shows good knowledge and understanding of how primary sources are processed. To demonstrate understanding process should be documented in the correct order.
1-2 mark	Simple description with some errors. Shows basic knowledge and understanding of how primary sources are processed and the order in which this takes place.
0 marks	Nothing worthy of credit

See next page for indicative content.

14	**Indicative content:** The following are not model answers but show some areas of the answer that may be explored. Credit both diagrams and description. Each stage must be relevant to the stock form selected.						

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 depending on the intended use.	• 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 sanded.

15		For each of the two descriptions award up to 2 marks as follows:	4 marks	AO4

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

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.

16	1	For each feature described award up to 2 marks as follows:	2 x 2 marks	AO4

2 marks	Complete description applying both knowledge and understanding of how product/component is suitable for mass production.
1 mark	Simple description with some errors and misunderstanding of how product/component is suitable for mass production.
0 marks	Nothing worthy of credit.

Indicative content:

Product	Features suitable for mass production
Steel car door	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.
Polymer toy musical instrument	Injection moulded which ensures ease of repetition and reduced cost when mass produced. Use of polymer which can be bought in granulated form and then injection moulded. Injection moulding ensures reduced assembly after production. Complex shapes can be produced. Injection moulding allows pigments to be put into the polymer pre-production rather than having to apply a colour or finish to the product after it is made.
Newspaper	Paper can be bought in large rolls so that designs can be printed continuously. Lithography is used for printing on to the product. This process is quick and ensures repetition of identical products. Lithography is a high quality and cheap

 Newspaper	process when producing many of the same product. A guillotine is used to separate sheets after printing. This is a continuous process. This ensures products are all the same and allows for automatic collation the end of production. Manufacture can be totally 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. Several layers of cotton can be cut at the same time. Simple design ensures costs are kept to a minimum. Screen printing allows T shirts to be printed on and then the same design to be used multiple times.	
 Printed circuit board	PCBs are always produced to a standard grid and standard components are designed to fit into that grid. Miniaturisation requires automated processes as components are small and will be too difficult to handle. Automated processes, such as flow soldering, are used to increase production speed. ICs are used to make complex tasks completed with the smallest space necessary. 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, thereby making it more suitable for mass production. Because it is flatpack it reduces costs associated with assembly, storage and transport. Computer Aided Manufacture such as CNC routers can be used on the product to ensure repeatability. Products can then be cut and holes etc. can be located exactly so that	
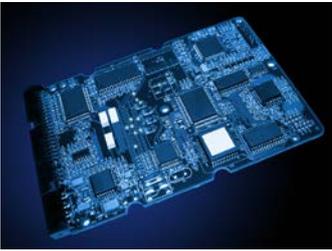
		minimal work is needed in assembly. Holes etc. are positioned so that alternative features can be added and the furniture becomes flexible in terms of its function.		

Reward any other valid responses.
Responses must relate to suitability for mass production.

16	2	**1 mark** for correctly identifying an appropriate industrial process.	5 marks	AO4
		Expected processes include:		

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

Award up to **4 marks** for explaining the process as follows:

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.

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.

If a student has named and described a process that relates to a different product from the one they selected in 16.1, or a process different from the indicative content, credit should still be awarded.

17		**1 mark** for each reason correctly identified.	2 marks	**AO4**
		Indicative content:		

Material	Characteristics / Physical Properties
Polypropylene for use in chair	• Can be heated and remoulded as it is a thermoplastic – easy to mould into complex shape to make the chair comfortable. • Colour can be added to make it suitable for school chairs. • Elasticity enables the product to be flexible. • Tougher than some other polymers such as acrylic and is therefore unlikely to split or crack. • It is a hard material meaning that it is long-wearing and the surface can be easily cleaned.
Foam Core Board – Display board	• Rigid structure which is good for display purposes. • Lightweight so easy to transport • Thin outside layer which can be scored. • Can be printed on to display graphics or text. • Is more aesthetically pleasing than card board for visual purposes.
Brass - Trumpet	• Higher resistance to corrosion. • Capable of taking a high polish. • Can be easily chrome plated. • Good acoustic properties. • Ductile and malleable for forming into shape.

Pine - Wardrobe	• Light natural wood – attractive appearance • Strong, rigid material • Cheaper than other woods • Readily accessible due to the fast growing nature of the trees. • Absorbency - Will take a stained, varnished or painted finish.
Silk - Tie	• Easily dyed to allow for a wide variety of styles. • Lightweight. • Tensile strength - resistant to stretching. • Smooth texture with natural shine. • Absorbent so can be printed on.
PCB – hand-held game	• Consists of insulating and conductive layers. • Copper layer has high conductivity. • Insulating layer is very stable. • Heat resistant in case components overheat.

Reward any other valid responses.
Responses must relate to intended use.

18		9 – 10 marks	A fully coherent and logical discussion which features a range of points with excellent understanding of issues surrounding the use of materials, detailed analysis and evaluation of these issues and reasoned conclusions drawn as to why they are seen as ethical.	8 marks	AO3
		7 – 8 marks	A logical discussion which includes good understanding of the issues surrounding the use 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.	2 marks	AO4
		5 – 6 marks	Response shows good understanding of the issues surrounding the use 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.		

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.

Biodegradable Packaging
- 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 imported oil.

Fairtrade Cotton
- Cotton farmers are paid a living wage which allows them to survive and earn enough money to feed their families
- Ensures workers / farmers get a fair price for their labour / products.
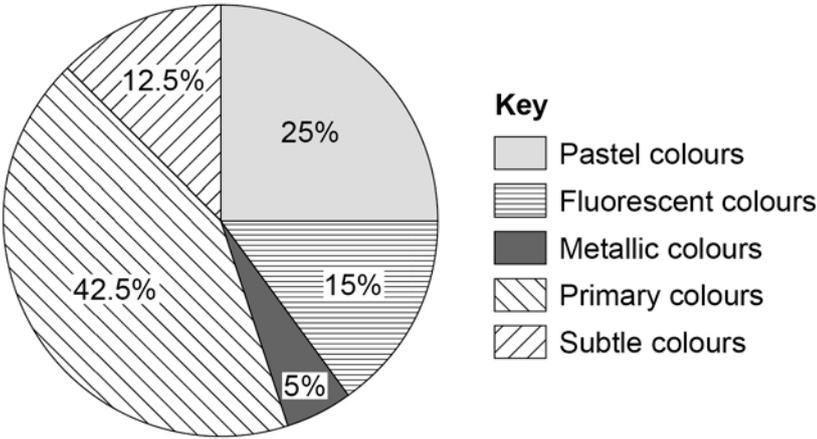- Communities are often given help in setting up local amenities such as

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

19	1,2,3	Award up to 4 marks for each of the three parts of the question as follows:	12 marks	AO3

3 – 4 marks	Well described and justified analysis containing full evaluation, drawing conclusions having considered both positive and negative factors.
1 - 2 marks	Brief points mentioned but not fully explained. Analysis present but limited evaluation / conclusions drawn. May have focused solely on either positive or negative factors.
0 marks	Nothing worthy of credit.

Allow positive and negative responses. Responses may include the following types of answer.

Indicative content:

Suitability for the user	• Waterproof which allows for use when outdoors and does not absorb sweat. • Clear display screen which is easy to read even when moving. • Flat surface which will not snag on clothing • Useful features such as GPS which will allow the user to record their location and distance travelled. • Flat screen susceptible to reflection • Screen can scratch easily
Aesthetic Quality	• Black in colour which is neutral and sophisticated which will appeal to an adult target market. • A plain colour that will not date/go out of fashion and appropriate for a wide range of settings • Brightly coloured icons on the screen that are attractive and easy to recognise • Geometric, simple styling that can be worn by men or women. • Black is a boring colour that will not excite • Square shape face may not appeal to all users
Ergonomics	• Strap has a number of holes to allow the size to be adjusted. • Touch screen makes controls easy to operate when running • Watch is lightweight so is comfortable when worn • Symbols are used on the screen and are clear and easy to see even when glanced at. • Waterproof strap which can become uncomfortable as is not breathable.

20	1	Award marks as follows:	4 marks	AO4

3 – 4 marks	Student demonstrates a clear knowledge of what anthropometrics is and good understanding of why it is important for designers to consider, bringing in relevant points to illustrate this, as per the indicative content below.
1 - 2 marks	Student demonstrates knowledge of what anthropometrics is but understanding of its importance is limited and points to illustrate this may not be given.
0 marks	Nothing worthy of credit.

Indicative content
Anthropometrics is the study of human measurements.
Designers need to consider anthropometric data in order to:

- ensure that wearable items fit
- ensure that products are comfortable
- ensure that products are easy to use
- ensure that products are suitable for their intended user
- allows products to be adjusted within a range

20	2	**Award 1 mark for each valid measure up to a maximum of 2 marks. Award 1 mark for each reason up to a maximum of 2 marks.**	4 marks	AO4

Indicative content is given below but this is not an exhaustive list. Reward any other valid responses.

Measure	Reason
The circumference of peoples' wrists	So the strap can be designed to fit a range of measurements
The width of peoples' wrists.	So the strap can be designed to fit a range of measurements
The size of peoples' fingertips.	So that the buttons are not too close together and can be easily pressed.

21	1	1 mark for **two** correct percentages. $102 \div 240 \times 100 = 42.5\%$ $30 \div 240 \times 100 = 12.5\%$ (or find it by addition of other percentages and subtract from 100)	1 mark	AO4

Colour Scheme	Number of children	Percentage of total
Pastel Colours	60	25
Primary Colours	102	**42.5**
Fluorescent Colours	36	15
Subtle Colours	30	**12.5**
Metallic Colours	12	5
Total	240	

21	2	1 mark for calculating angle of sector; i.e. $102 \div 240 \times 360 = 153$ degrees Or $30 \div 240 \times 360 = 45$ degrees Other methods are acceptable and should be credited. 1 mark for measuring angle and drawing sector correctly. Angles for each sector has to be correct to within a tolerance of +/- 2 degrees If calculations are incorrect in **question 21.1**, errors can be carried over and credit should be given here for presenting data correctly. Shading does not need to be included in order to achieve full marks.	2 marks	AO4

Preferred colour scheme according to 240 children aged between 9 and 11 years

Key
- Pastel colours
- Fluorescent colours
- Metallic colours
- Primary colours
- Subtle colours

25%
15%
5%
42.5%
12.5%

21	3	Marks awarded as follows:	3 marks	AO4

3 marks	Observations are correct and show a clear understanding combined with a thorough explanation as to how this data would influence their redesign. Consideration is given not just to primary colours but also refers to both the support and lack of for other colours.
2 marks	Observations are correct and show some understanding but little explanation of how this data would be used for redesign, likely to focus solely on primary colours.
1 mark	Observations are correct showing basic understanding. No explanation of how the data would be used.
0 marks	Nothing worthy of credit.

Indicative content

- The most popular colour group is primary colours which is likely to be because a lot of children like bright / bold things and to make a statement.
- The data clearly shows a preference for this colour group and this should be taken into account when redesigning the watch.
- Although primary colours were the most popular, the majority of those surveyed did not express a preference for primary colours.
- Pastel, fluorescent and subtle were also relatively popular choices
- These should therefore also be considered when redesigning the watch.
- Metallic was not popular. This is likely to be because it is a more grown up colour choice.
- If I was to design this product I would discount metallic.

Award any other valid responses

22	1	**1 mark for each change or addition to the specification.** **1 mark for explanation of why it is important.**	8 marks	AO4

Indicative content:
- The product must be smaller in size so that it fits on the wrist of a child aged between 9 and 11 and is not too bulky for them.
- The product should be simple to operate with simple features that are easily accessible to children.
- The product should contain cyber safety features to ensure the child is not put at risk by using it.

- The product should be interesting and engaging for children to encourage them to use it; e.g. by containing logos / images on the

		strap. • The product must have tracking feature so parents can track children's whereabouts. • The product could have mini-games to provide entertainment for children. • Greater range of strap adjustment because children likely to grow significantly between ages of 9 and 11. Award any other valid points.			

22	2			3 marks	AO4

3 marks	Clear understanding of the use of a design specification including clear reference to its use in evaluation and how this helps ensure a successful outcome.
2 marks	Some understanding of what a design specification is and some reference to evaluating the final product and how this impacts on the success of the outcome.
1 mark	Basic understanding of the use of a design specification but does not refer to evaluating the final outcome or the impact this has on its success.
0 marks	Nothing worthy of credit.

Indicative content:

A design specification is important because:

- It allows a designer to summarise any research
- It provides a clear criteria from which to work
- It provides a point of agreement between the designer and the client
- It provides a clear focus for the designer in terms of what they want to achieve

A design specification helps to ensure a successful outcome because:

- It allows a designer to modify their design as part of the iterative design process
- It provides a criteria against which to test iterations of the prototype
- It allows a designer to evaluate the success of their final outcome

Award any other valid responses.

23	1	1 mark for an appropriate answer. **Indicative content:** • Corrugated card • Grey board	1 mark	AO4

- Foam core board
- Styrofoam, MDF
- Calico toile
- Breadboarding
- Virtual modelling (accept specific software products such as Autodesk Inventor®, SolidWorks®, SpaceClaim®, Crocodile Clips®, Optitex®)
- 3D printers.

Accept any other valid responses.

23	2			3 marks	AO4

3 marks	Thorough explanation of why designers create models, including excellent understanding of the purpose of models.
2 marks	Some explanation of why designers create models, showing good understanding of the purpose of models.
1 mark	Limited explanation for why designers create models, showing basic understanding of their purpose.
0 marks	Nothing worthy of credit.

Indicative content:

- 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.

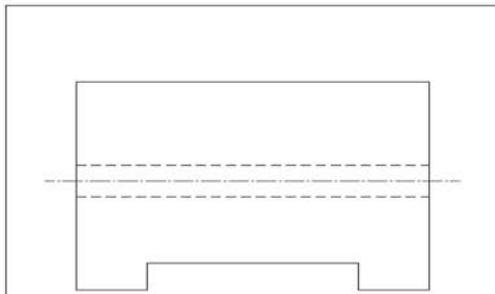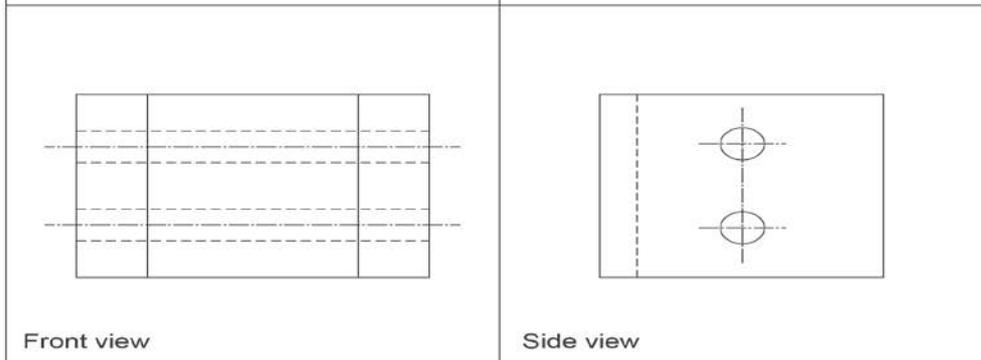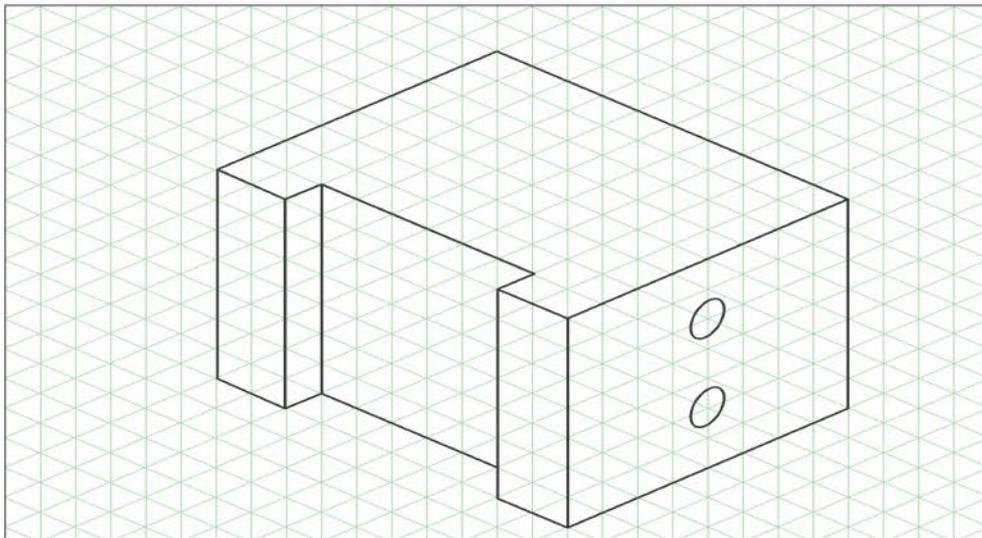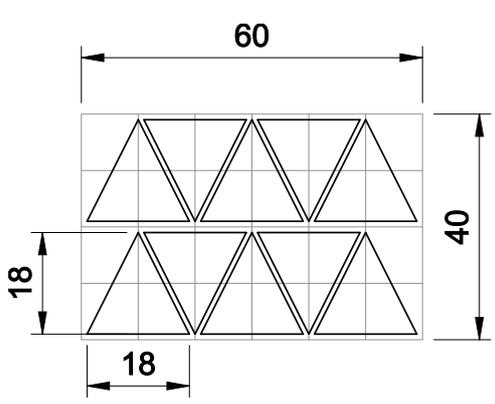| 24 | **Front View**
1 mark – shape is correct.
1 mark – hidden detail is correct.

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.

Plan view

Front view   Side view

Isometric drawing | 5 marks | AO4 |

25	1	1 mark awarded for showing how ten triangles could fit on the grid (given that one triangle is already provided on the grid). An example of the possible layout is shown below. Other correct responses should be rewarded. Triangles do not need to be drawn accurately but it must be clear how they fit on the grid. 	1 mark	AO4

25	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 25.1** correctly they will be unable to obtain the third mark. 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