



Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCSE
Design Technology
Paper 1B: Papers and Boards

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Component 1 mark scheme

Section A – Core content

Question number	Answer	Additional guidance	Mark
1 (a) (i)	Any one property from: • Soft (1) • Insulator of heat (1) • Flexible/flexibility (1) • Warm (1)	Do not accept 'Insulator' on its own	(1)

Question number	Answer	Additional guidance	Mark
1 (a) (ii)	Any one property from: • Stiff / rigid / hard (1) • Waterproof / water resistant / stain resistant / non-absorbent (1) • Food safe / non-toxic (1) • Good heat resistance (1) • Good UV resistance (1) • Lightweight (1)	Do not accept the following on their own: 'Can be recycled' 'Durable' 'Light' 'Strong'	(1)

Question number	Answer	Additional guidance	Mark
1 (a) (iii)	Any one property from: • Good insulator of heat (1) • Good impact resistance (1) • Printability / takes colour well (1) • Food safe / non-toxic (1)	Do not accept the following on their own: 'Insulator' 'Recyclable'	(1)

Question number	Answer	Additional guidance	Mark
1 (a) (iv)	Any one property from: • Corrosion resistance / will not rust (1) • Good fluidity / casts well (1) • Malleability (1)	Do not accept: 'Durable'	(1)

Question number	Answer	Mark
1 (b) (i)	Any one other property of oak that makes it a suitable choice of material for the floorboards (1) and a linked justification of that property (1) • Oak is hard (1) therefore it will withstand abrasive wear from being walked over / on / furniture placed / moved on it (1) • Oak is durable / hardwearing (1) therefore it will be able to withstand abrasive wear / damage from being walked on (1)	(2)

Question number	Answer	Additional guidance	Mark
1 (b) (ii)	A calculation that includes: • correct working out of cost 57.6 / 1.44 (1) • correct answer £40 or £40.00 (1) ECF Award 1 mark if candidates show 1.44 / 57.6 = 0.025 or Award 1 mark if candidates show 57.6 / 1.44² = 27.70 to 27.80	Award full marks for correct numerical answer without working. Allow ECF if candidate gets part of calculation wrong.	(2)

Question number	Answer	Additional guidance	Mark
2 (a)	Any one property of copier paper that makes it an appropriate choice of material for the origami rabbit from: • Flexibility (1) • Bendability / easy to bend (1) • Easily creased / holds shape when folded (1) • Biodegradability (1) • Foldability / easy to fold / easily folded / easily foldable (1)	Do not accept 'Foldable' or 'Folded' on their own	(1)

Question number	Answer	Additional guidance	Mark
2 (b)	Any one advantage explained of using recycled copier paper to manufacture the origami rabbit (1) and a linked justification of that advantage (1) • Using recycled paper will reduce the need to make new paper / reduce environmental damage / is more sustainable / lowers carbon footprint (1) which reduces the need for cutting down trees to make the pulp required for paper production / reduces deforestation / reduces energy consumption / emissions (1) • Recycling paper stops it going to landfill / being thrown away / reduces waste (1) which keeps the space in landfill available for materials that cannot be recycled (1)	Do not accept 'Recycled' on its own	(2)

Question number	Answer	Additional guidance	Mark
2 (c)	Any one feature explained of how SMAs can be used to animate the origami rabbit (1) and a linked justification for that feature (1) • SMAs can be added / connected to the ears / nose / head / tail (1) which can be made to twitch / spring / straighten / fold when activated / heated / cooled / deformed (1) • SMAs can be added / connected to the legs / front paws / arms (1) which can create the impression of the rabbit hopping when activated / heated / cooled / deformed (1) Marking points can be accepted in reverse	Do not accept any reference to 'Move' on its own	(2)

Question number	Answer	Additional guidance	Mark
2 (d)	A calculation that includes: • correct calculation for the area of the standard sheet of A4 paper (Step 1) $29.7 \times 21.0 = 623.7 \text{ cm}^2$ (1) • correct calculation for area of the square sheet (Step 2) $21.0 \times 21.0 = 441 \text{ cm}^2$ (1) • correct calculation of waste percentage (Step 3) $((623.7 - 441) / 623.7) \times 100$ $= 29.29(2929)\%$ (1) • Correct answer rounded to 29% (Step 4) (1) Alternative method for Steps 2 and 3: • correct calculation for waste area cut off (Step 2) $(29.7 - 21.0) \times 21 = 182.7 \text{ cm}^2$ (1) • correct calculation of waste percentage (Step 3) $(182.7 / 623.7) \times 100 = 29.29\%$ (1)	Award full marks for correct numerical answer without working. Allow ECF if candidate gets part of calculation wrong. Award one mark for the correct rounding of an ECF calculation.	(4)

Question number	Answer	Mark
3 (a)	Award one mark from: • Resistor (1) • Fixed resistor (1) Do not accept: • Variable resistor • Preset resistor • Surface mount resistor	(1)

Question number	Answer	Mark
3 (b)	Any one advantage for the manufacturer of making the electronic circuit in batches of 1,000 (1) and a linked justification for the advantage (1) • A batch of circuit boards will take a set amount of time to manufacture (1) therefore the manufacturer can plan how to make best / efficient use of their time / machines / staffing (1) • Any changes in component / material prices can be reflected when a new batch is ordered / manufactured (1) therefore the manufacturer does not have to bear / stand any price increases (1) • If faults are found in a batch of completed / assembled circuit boards modifications can be made / products do not sell (1) therefore material / components wastage / financial loss is kept to a minimum (1) • The manufacturer does not need to buy lots of stock (1) therefore they do not have to invest / tie up money in stock / storage space (1) • The manufacturer can bulk buy components / get discounts (1) therefore being able to take advantage of economies of scale / pass on savings to the customer (1)	(2)

Question number	Answer	Additional guidance	Mark
3 (c)	A calculation that includes: - Correct calculation of number of circuit boards that can be cut from the larger sheet $(32 / 4) \times (16 / 4) = 8 \times 4 = 32$ (1) - Correct calculation of cost of one circuit board $£3.20 / 32 = £0.10$ or 0.1 (1)	Award full marks for correct numerical answer without working. Allow ECF if candidate gets part of calculation wrong.	(2)

Question number	Answer	Mark
3 (d)	Any one advantage of using batteries (1) and a linked justification of the advantage (1) - They do not need to be plugged into a mains power source / require a cable (1) which means the device is free to be used anywhere / fully mobile / portable (1) - The batteries are a small / discrete component (1) which means they do not take up too much space within the circuit / product (1) - You can use rechargeable batteries (1) which means one set can be used again and again (1) - You can use the voice recorder in remote areas / campsites / beach / power cuts (1) because it does not need to be plugged into the mains power supply (1) - The batteries can simply be replaced with new ones (1) which means no time is wasted having to wait to charge it / can be used straightaway (1)	(2)

Question number	Answer	Mark
3 (e)	Any two benefits of using HIPS for the case of the Sing Along Box (1) and a linked justification of that benefit (1) • HIPS is lightweight / has a low density (1) therefore it will be easier for young children to carry / move it around / it is portable (1) • HIPS has good / excellent impact resistance / tough (1) therefore if the box is dropped the contents inside will be protected from damage / the box is unlikely to break (1) • HIPS does not absorb water / is waterproof (1) therefore it can be easily cleaned / wiped down without any risk of damaging the materials / moving / working parts / electronic circuit (1) • As a thermoplastic / thermoforming polymer HIPS can be formed / moulded (1) therefore it is capable of being used to form complex shapes / forms / intricate details (1)	(4)

Question number	Answer	Mark
4 (a)	Any two explanations of a working characteristic of stainless steel (1) and a linked justification of that characteristic (1) • Stainless steel is corrosion resistant / rust proof / non-toxic (1) therefore it will not be affected by the corrosive salt / react with / contaminate the contents / surface will not become blemished / food safe (1) • Stainless steel has good torsional resistance (1) therefore it will not distort / twist when the grinder is rotated (1) • Stainless steel is hard (1) which means it will withstand the abrasive wear / scratching from grinding the salt / will not wear / will extend life span of product (1)	(4)

Question number	Answer	Additional guidance	Mark
4 (b)	A calculation that includes: • Correct calculation of the percentage of material that CANNOT be recycled $100 - 80 = 20 \%$ (1) • Correct calculation of the weight of material that CANNOT be recycled $(20 / 100) \times 270 = 54 \text{ grams}$ (1) ECF Award 1 mark for an answer of 216 grams which is what 80% represents	Award full marks for correct numerical answer without working. Allow ECF if candidate gets part of calculation wrong. 216 alone with no working out is zero marks.	(2)

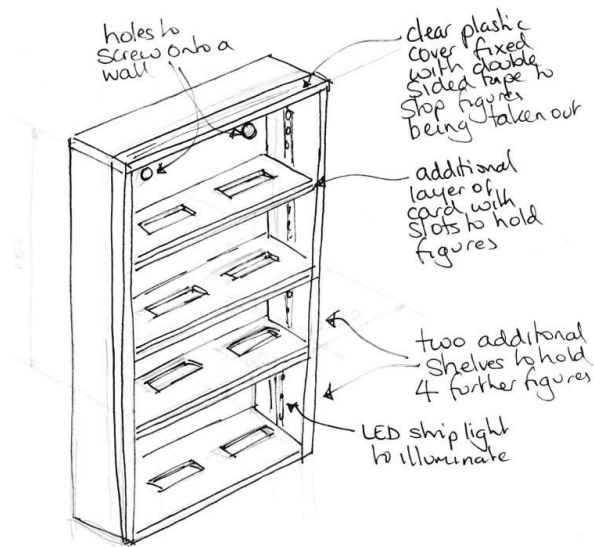
Question number	Indicative content	Mark
4 (c)	• Designers can see / get a better idea of how products work when they are taken apart • Designers can see / draw each individual part that they may be able to improve / refine / combine / design them out / combine them into one individual part • Designers may be able to introduce standardised components into their new designs • Designers can look at ways of trying to reduce material usage / wastage when designing a new product • Designers can take measurements of existing products • Designers can look at how they might improve the assembly / manufacture of a new product to reduce time • Designers take inspiration that they can use in their own work • Designers can analyse / evaluate the materials that have been used • Designers can get to see the intricate workings of the product • Designers are able to evaluate products in terms of working out / discovering what is wrong with them / identify flaws • Designers can work out how they can be improved / made more reliable / energy efficient	(6)

Level	Mark	Descriptor
	0	
Level 1	1 - 2	• Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed. • An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships between factors or competing arguments.
Level 2	3 - 4	• Interrogates and deconstructs information and provides some connections and logical chains of reasoning. • A balanced appraisal of the information/issues, containing judgements that show an awareness of the interrelationships between factors or competing arguments.
Level 3	5 - 6	• Interrogates and deconstructs information and provides sustained connections and logical chains of reasoning. • A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments.

Section B - Papers and Boards

Question number	Answer	Mark
5 (a)	Marks will be awarded for understanding of design and technology, not graphical skills. Notes and sketches that include: • be able to display an additional four collectable figures (1) and include a method to stop them falling off the shelves (1) e.g. unit is made taller / wider to show extra four spaces and double sided tape / glue dots / slots / recessed space / lipped front edge ('door' will also attract credit for stopping the figures falling off the shelf) • include a method to stop the collectable figures from being stolen (1) that still allows them to be seen (1) e.g. hinged / sliding doors & lock / lockable / padlock / mechanical / physical connection (wire ties/cable ties etc) and clear acrylic screen (accept 'clear plastic screen') / acetate / glass screen • be capable of being fixed to a wall (1) and include a lighting system (1) e.g. screws / pins / velcro strips / magnets / euro slots / LEDs / neo pixels / bulbs / strip lights (reference to 'lights' generically without any subsequent graphical indication or reference to wiring does not attract a mark)	(6)

Example of candidate response:

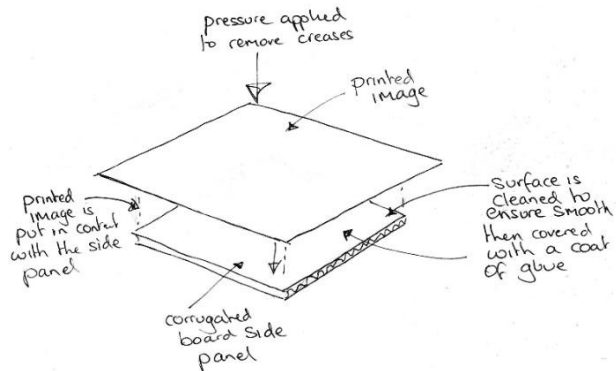


Notes:

- Clear plastic cover fixed with double sided tape to stop figures being taken
- Additional layer of card with slots to hold figures
- Two additional shelves to hold a further 4 figures
- LED strip lights to illuminate
- Holes to screw onto a wall

Question number	Answer	Mark
5(b)	Any two explanations that include a way the number play set meets or fails to meet the requirement (1) and a linked justification of that way (1) • There is a full set / lots of numbers and maths symbols (1) therefore the child will be able to make up lots of different sums / equations (1) • The numbers are all very clear / easy to read (1) therefore there can be no confusion as to what the number is / 6 and 9 cannot be confused (1) • Helps teach them about how the numbers look / differentiate numbers / symbols (1) without the need of having to be able to write (1) • The numbers are easily moved around / rearranged (1) therefore they can learn that some problems / calculations have the same answer (e.g. $6 \times 4 = 24$ and $4 \times 6 = 24$) (1) • There might not be enough numbers / symbols to make up some questions / answers [e.g. $11 \times 11 = 121$ so the set will not be very useful as you will not be able to make the correct answer since you need 6 1s and there are only 3 in the set) (1) / therefore some extended calculations will not be able to be completed (1) [Accept the opposite to the above in that there are enough counters (1) to make some large sums / calculations (1)] • Some of the numbers / symbols might get lost (1) therefore you will not be able to carry out a full range of sums / equations (1) • The plus / multiply symbols are quite similar (1) therefore the child might get confused as to what the sum / equation actually is (1) • There is one disc that is the greater / less than symbol which the child might not be able to identify (1) therefore they may not understand what the purpose of the question / task is (1)	(4)

Question number	Answer	Additional guidance	Mark
6 (a)	Any two explanations for using corrugated board for the desk tidy (1) and a linked justification (1) • Corrugated board has stiffness / stability / rigidity along the length of the corrugations (1) therefore it will stay flat / not warp (1) • Corrugated board is available in large sheets (1) therefore pieces of board do not need to be stuck together to make a panel / piece big enough for the side panel (1) • Corrugated board is a plain brown colour / can be finished in a number of ways (1) therefore it can be customised / finished in a number of styles / colours to increase potential sales / appeal to a wider audience (1) • Corrugated board is relatively cheap (1) therefore it keeps the overall cost of the product down (1) • Corrugated board is readily available (1) can be purchased in large volumes for mass production (1)	Do not accept 'Cheap' on its own	(4)

Question number	Answer	Additional Guidance	Mark
6 (b)	Marks will be awarded for understanding of design and technology, not graphical skills. Notes and sketches that include: • Surface of the corrugated board is cleaned to ensure it is smooth (1) • Glue is applied to the surface of the corrugated board / paper (1) • The side panel and printed design are put into contact / aligned / carefully placed together (1) • Pressure is applied evenly to make sure there are no ripples / bubbles / creases (1) • The side panel and printed design are left for an amount of time for the glue / adhesive to dry (1) Example of candidate response:  Notes: • Surface is cleaned to ensure it is smooth • It is then covered with a coat of glue • Printed image is put into contact with the side panel • Pressure applied to remove creases	Cap at 3 marks if no sketches or all sketches and no notes	(4)

Question number	Answer	Additional guidance	Mark
6 (c)	Any one explanation of a physical characteristic of copier paper (1) and a linked justification of the characteristic (1) • Copier paper has a smooth texture (1) which allows the printed image to be flat and even / not distorted / blurred (1) • Copier paper is opaque / translucent (1) which means that it will not allow the colour of the underlying corrugated board to be seen (1)	Do not accept responses related to 'Absorbency'	(2)

Question number	Answer	Mark
6 (d)	Any two explanations that include a method of assembly (1), plus two linked justifications of that method (1) + (1) Tape / taping (1) • Tape can be applied quickly / with no drying time (1) as it can be attached over / under the joint of the side panel and top of the desk tidy / doesn't need clamping (1) Glue / glueing / adhering (1) • The two parts can be fastened together permanently (1) as the adhesive will soak into both pieces of board and create a solid bond between pieces (1) Staple / stapling (1) • No holes are required in the board (1) as the metal legs of the staple are forced through the joint under pressure (1) Paper fasteners / paper fastening / rivets / riveting (1) [Do not accept 'Split pins'] • The fastener / rivet can be pushed through the board by hand (1) as the end of the fastener / rivet is sharp (1) Eyelet / use of an eyelet (1) • The eyelet is soft / easily deformed by hand (1) forming a physical mechanical joint (1) Cardboard tabs or slots / use of cardboard tabs or slots / tab and slot joint (1) • No further components are required / it is a physical mechanical joint in its own right (1) as tabs from the top panel are inserted to hold the top piece in place (1)	(6)

Question number	Answer	Additional guidance	Mark
7 (a)	Award one mark from: • Craft knife (1) • Scalpel (1) • Hobby knife (1) Award different / phonetic spellings of knife, scalpel and hobby including (there are many other variations): • Craft nife • Scapel • Hoby nife	Do not accept 'Knife' on its own	(1)

Question number	Answer	Mark
7 (b)	Any two benefits for the manufacturer of using stock materials (1) plus a linked justification of the benefit (1) • It means the materials will be widely / readily available / can be bulk purchased / do not have to be cut to a specific non-standard size (1) therefore the materials will be cheaper / reducing overall costs / improve profit margin (1) • The manufacturer does not need to have / hold lots of different sized materials (1) which reduces the need for cutting / machining / reducing waste / processing time (1) • Machines do not have to be reset each time a different sized material is used (1) therefore it helps to reduce the manufacturing time / speed up manufacturing / reduce potential errors that might be introduced (1)	(4)

Question number	Answer	Additional guidance	Mark
7 (c)	A calculation that includes: • Conversion of units at any stage (1) • Calculation of the cost of Part number 1 and 2 (1) 2 at 100 mm = 200 mm or 0.2 m x 2.80 = £0.56 • Calculation of the cost of Part number 3 (1) 1 at 75 mm = 75 mm or 0.075 m x 2.80 = £0.21 • Calculation of the cost of Part number 4 (1) 3 at 100 mm = 300 mm or 0.3 m x 3.30 = £0.99 • Total cost of the material (1) 0.56 + 0.21 + 0.99 = £1.76 Any response of £1760 or £17.60 or equivalent without any working out shown must be awarded 0 marks	Award full marks for correct numerical answer without working. Allow ECF if candidate gets part of calculation wrong. £1760 or £17.60 are partially correct answers given some incorrect conversion of units has taken place but can be awarded 4 marks	(5)

Question number	Answer	Additional guidance	Mark
7 (d)	Any two explanations that include a benefit of using UV varnish (1), plus two linked justifications of that benefit (1) + (1) • The UV varnish will provide a high gloss / shiny / vivid finish (1) which means that contrast between aspects of the design / colours will be enhanced (1) therefore the visual appeal of the display will be improved (1) • The UV varnish will provide a protective surface layer / seal / close the pores (1) which will protect the solid white board from moisture / staining (1) therefore prolonging the life of the product (1) • The UV varnish will improve the stiffness / rigidity of the panel (1) which means it can be punched without fraying / tearing (1) therefore allowing the panels to be attached by string (1)	Do not accept anything related to a smoother surface	(6)

Question number	Answer	Mark
8 (a)	Any one explanation of a physical characteristic of bonded paper (1) and a linked justification of that characteristic (1) • Bonded paper is a heavyweight / denser / thicker type of paper (1) therefore it is stiffer / more rigid / able to support its own weight stood up / stand up (1) • Bonded paper has a fine surface texture (1) therefore the printed images of pop-up fish will have a high quality finish / vivid colours (1)	(2)

Question number	Answer	Mark
8 (b)	Any one explanation of an issue associated with the ecological footprint of using folding boxboard (1) plus two linked justifications of that explanation (1) + (1) • The demand for folding boxboard results in trees being cut down (1) which results in loss of natural habitats (1) therefore birds / animals are having to move into the cities / find other places to live / drop in numbers / potential loss of species (1) • The manufacturing of folding boxboard uses large amounts of water and chemicals [such as bleach] (1) which results in contamination of water sources / environment (1) therefore resulting in potential adverse effects for locals / wildlife (1) • Producing folding boxboard requires the production of pulp (1) which means that large amounts of energy are used during manufacturing (1) therefore resulting in lots of pollution through the burning of fuels to generate electricity (1)	(3)

Question number	Answer	Mark
8 (c)	Any two reasons for manufacturing the features of the pop-up book to a tolerance (1) and a linked justification (1) • The pop-ups will need to be of a certain size (1) otherwise they will not be able to be contained within the pages of the book when it is closed (1) • The shape and size of the cover must be cut / finished to a certain size (1) otherwise it will not provide protection to the pages of pop-up book (1) • The pop-up fish and eggs must be positioned within a certain set of dimensions (1) otherwise they will not be able to pass over each other cleanly when the book is opened up (1) • The spine must be manufactured to the correct size (1) so that the book will close correctly / neatly (1) • The pop-up fish and eggs must be able to move without catching on each other (1) otherwise they will tear and the book will not function as intended (1)	(4)

Question number	Indicative content	Mark
8 (d)	• Folding boxboard has a smooth finish which will allow the printing on the cover to be sharp and have vivid colouring • Folding boxboard is available in a range of thicknesses which will allow the book to be more durable that is beneficial as it will be handled frequently • Folding boxboard is produced from different layers which results in a board that is stiff and difficult to crease • There will be lots of processing of raw materials to manufacture the pop-up book because parts need to be printed and cut out in order to make the various pop-up components • Books of this nature tend to have some parts which are handmade / assembled given the batch size and the intricate details of the parts that need to interact with each other • The pop-ups will need to be cut out accurately so that they can fold flat when the pages of the book are closed together • Once the pop-ups have been added the pages will need to be collated and organised in the correct order for binding • There will need to be some gluing of parts such as the pages to the spine and pop-ups onto the pages • Some of the parts are very narrow and a great deal of care will need to be taken to avoid tearing these when assembling the pop-ups • Any decorative techniques used for the book will need to be assessed to make sure they can withstand repeated opening and closing • Foil blocking could be applied to pages so that they appear more like water • Embossing can be used to provide texture on the fish • Varnishing could be used to emphasise features on pages and also to protect the pages of the book to stop it being marked by finger prints as pages are turned	(9)

Level	Mark	Descriptor
	0	
Level 1	1 - 3	• Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed. • An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships between factors or competing arguments. • A conclusion may be presented but it is likely to be generic assertions rather than supported by relevant judgements.
Level 2	4 - 6	• Interrogates and deconstructs information and provides some connections and logical chains of reasoning. • A balanced appraisal of the information/issues, containing judgements that show an awareness of the interrelationships between factors or competing arguments. • A conclusion is presented that is partially supported by relevant judgements.
Level 3	7 - 9	• Interrogates and deconstructs information and provides sustained connections and logical chains of reasoning. • A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments. • A conclusion is presented that is fully supported by relevant judgements.