

Mark Scheme (Results)

November 2020

Pearson Edexcel GCSE
In Design & Technology (1DT0)
1B: Papers & Boards

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

November 2020
Publications Code 1DT0_1B_2011_MS
All the material in this publication is copyright
© Pearson Education Ltd 2020

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.

Section A – Core content

Question number	Answer	Mark
1 (a) (i)	 Any one property from: good resistance to corrosion (1) good fluidity / casts well (1) machinability (1) 	(1)

Question number	Answer	Mark
1 (a) (ii)	 Any one property from: water proof / water resistant (1) durable / long lasting (1) plasticity / softened when heated (1) tough / impact resistance (1) 	(1)

Question number	Answer	Mark
1 (a) (iii)	Any one property from:	(1)
	excellent for scoring / bending / folding (1)rigid (1)	
	 hygienic / safe for food use / non-toxic (1) 	
	• pure with no smell or taste (1)	
	good printability (absorbency) / takes ink well (1)stiffness (1)	

Question number	Answer	Additional guidance	Mark
1 (a) (iv)	 Any one property from: hard / resistant to wear / indentation (1) tough / impact resistance (1) good compressive strength (1) 	Do not accept strong / high strength	(1)

Question number	Answer	Additional guidance	Mark
1 (b)	A calculation that includes: • correct working 1.35 x 3.55 = 4.7925 (1)	Award full marks for correct numerical answer without working. Allow for ECF if candidate gets part	(2)
	 correct answer to the nearest penny / 2 decimal places £4.79 (1) 	of calculation wrong.	

Question number	Answer	Mark
1 (c)	 Any one advantage for using polyester for the school tie (1) and a linked justification of that advantage (1). It is stain resistant (1) so it will not mark / stain if food / drink gets spilt on it (1) It hangs / drapes well (1) which means it will look nice / presentable when worn / tied (1) It dries quickly (1) so it can be washed overnight and be ready for school the next day (1) It is resistant to abrasion (1) which means it will not get damaged / scarred if it rubs on a blazer / desk (1) It can be recycled (1) which means it does not have to end up in landfill (1) It does not shrink (1) therefore will not lose shape when it gets washed / wet (1) Polyester has good colour retention (1) so colour will not fade over time / resists fading in sunlight (1) Do not accept generic statements related to the fabric construction rather than the polyester fibres. 	(2)

Question number	Answer	Additional guidance	Mark
2 (a)	 Any one manufactured timber from: MDF / Medium Density Fibre board (1) Plywood (1) Chipboard (1) Blockboard (1) Laminboard (1) 	Do not accept hardboard	(1)

Question	Answer	Mark
number		
2 (b)	Any one reason for using SMAs (1) and a linked justification of that reason (1).	(2)
	 If they have been plastically deformed / bent into a shape that is not right / not big enough they can be heated (1) which means they go back to their original shape / can be used again to test a new shape / saves resources (1) Once the correct shape / size / profile has been achieved the material can be heated (1) which means it will go back to its original shape / can be used for something else (1) It is easier to reset / straighten the SMA wire in comparison to copper wire (1) because it can be heated rather than pulled through a die (1) 	

Question number	Answer		Additional guidance	Mark
2 (c) (i)	A calculation that includes:		Award full marks for	(2)
	correct working		correct numerical	
	3/5 x 35	(1)	answer without working.	
	correct answer		Allow for ECF if candidate gets	
	21 mm ((1)	part of calculation wrong.	
	Alternative method 35/5 x 3 = 21 mm			
		(2)		

Question number	Answer		Additional guidance	Mark
2 (c) (ii)	A calculation that includes:		Award full marks for	(2)
	correct working		correct	
	$\pi \times 3.5^2$		numerical	
		(1)	answer without	
	• correct answer 38cm ²		working.	
		(1)	Allow for ECF if candidate gets	
	Accept 38.4895 for 1 mark		part of calculation	
			wrong e.g. they	
			have used mm	
			instead of cm	

Question number	Answer	Mark
2 (d)	Any one reason for using copper for the flowers (1) and a linked justification of that reason (1).	(2)
	 It is malleable / easily bent / formed (1) which means it will hold its shape once formed / stay in that shape permanently without any other form of treatment (1) It is a ductile material (1) which means it can be drawn out into the required long thin wires (1) It is a nice colour (1) and can be left without any additional surface finishing / will tarnish / natural finish (1) It will not rust (1) which would result in the jewellery changing colour / leaving a mark / stain on any clothing (1) 	

Question number	Answer	Additional guidance	Mark
3 (a)	Any one property from:	Do not	(1)
		accept	
	 good electrical insulator (1) 	tough /	
	• lightweight (1)	impact	
	 durable / long lasting / hard-wearing (1) 	resistant	

Question number	Answer	Mark
3 (b)	Any one reason for using corrugated board (1) and a linked justification of that reason (1).	(2)
	 Excellent impact resistance (1) meaning it will cushion / absorb shock / withstand being thrown about in transit / protect the product (1) Excellent strength to weight ratio (1) therefore it provides good protection without adding additional cost to the postal costs (1) It is recyclable (1) which means it does not have to end up being sent to landfill (1) Corrugated board is a cost-effective material / cheap (1) which means it maximises the profits / returns (1) 	

Question number	Answer	Mark
3 (c)	Any one explanation that references the use of robotic materials (1) and a linked justification of that use (1).	(2)
	 They can be used to sense movement by the hand (1) and so can act as steering / directional controllers (1) They can sense pressure / being squeezed (1) therefore eliminating the use of additional buttons (1) Can be used to communicate with users (1) which means that some sensations can be generated back to the hands / vibrations / pulses (1) Robotic materials can be used for computational purposes within 	
	the material (1) therefore reducing the number of internal components (1)	

Question number	Answer		Additional guidance	Mark
3 (d)	A calculation that includes:		Award full marks for correct	(2)
	correct working		numerical answer	
	<u>19 – 12.50</u> x 100 12.50		without working.	
	(1	.)	Allow for ECF if	
	correct answer		candidate gets	
	52%		part of calculation	
	(1)	wrong.	

Question number	Answer	Mark
3 (e)	 Any two explanations that references environmental issues (1) and a linked justification of the issues (1). New materials are required to make the bodies for new games controllers (1) therefore putting pressure on the extraction / mining of finite resources to make plastics (1) Many old controllers are not correctly disposed of / dumped (1) which adds to landfill / increased demand on space / takes hundreds of years to break down (1) Games controllers should be properly disposed of / WEEE regulations (1) which means they are broken down / rare materials / elements taken out for recycling /because they contain hazardous substances / reducing the amount of materials going to landfill / incineration (1) Demand for energy used for materials / during manufacture / fuel for transportation (1) which results in additional demand on finite resources / pollution generated (1) 	(4)

Question number	Answer	Mark
4 (a)	 One electronic sensor given from: Thermistor (1) Thermocouple (1) Thermometer (1) 	(1)

_

Question number	Answer	Mark
4 (b)	Any one disadvantage that references the wearing of the uniform (1) and the linked justification of the disadvantage (1).	(2)
	Lack of breathability (1) which means they will sweat / be hot to wear (1)	
	 They are heavy to wear (1) which will sap their energy / slow them down / only able to wear them for a short time / restrict mobility (1) 	
	 Lack of flexibility / stiffness / bulky (1) which makes it difficult for them to move around easily (1) 	

Question number	Answer	Mark
4 (c) (i)	+ - - -	(1)

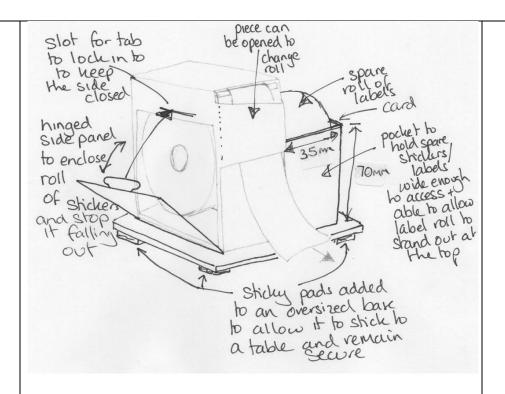
Question number	Answer		Additional guidance	Mark
4 (c) (ii)	A calculation that includes:		Award full marks for correct numerical	(2)
	 correct substitution / transposition 		answer without	
	350 = 1000 x 0.7		working.	
	hours			
	hours = 1000 x 0.7 / 350 = 2 hours		Allow for ECF if	
			candidate gets part	
		(1)	of calculation	
	 correct answer in minutes 		wrong.	
	120			
		(1)		

Question number	Indicative content	Mark
-	Candidates might refer to some/all of the following in their response, but candidates should be rewarded for other pertinent contextualised answers Saves time travelling and reduces cost / expense of travelling / lost time because of travelling Reduction in pollution caused because of travelling Can be recorded to be replayed and shown to those who could not attend Serves as a record of what was discussed and agreed Allows files to be shared over the internet More opportunities for collaborative design Allows for screens to be shared so others can work on ideas and add notes	(6)
	 Requires an investment into physical hardware Needs access to the internet which might not always be available Susceptible to internet reliability and security so might be difficult to access in certain areas and not always able to discuss confidential / sensitive material It relies on a certain etiquette in terms of not interrupting 	

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	Answer	Mark
number		
5 (a)	Marks will be awarded for understanding of design and technology, not graphical skills.	(6)
	Notes and sketches that include:	
	 allow for an empty roll of labels to be easily replaced (1) and held in place without falling out (1) 	
	e.g. hinged side panel / slide out panel / removable central spindle	
	 be held securely on a desk (1) and not move when labels are pulled off (1) 	
	e.g. large base area for stability / self-adhesive pads / detachable base	
	 provide easily accessible storage space (1) for a spare roll of labels (1) 	
	e.g. compartment / pocket / drawer in the base	
	Example of candidate response.	



Annotated notes:

An additional side panel is hinged at the bottom and held in place by a locking tab. This will stop the stickers falling out but is also easy to open to replace.

A pocket has been added to the side of the unit to store a roll of labels. This is 70mm deep and 35mm wide so the roll can be accessed easily.

The unit has a large base which will prevent it from falling over and has sticky pads which fasten it to the desk and stop it from moving.

Question number	Answer	Mark
5(b)	 Any two explanations that include a way the shop signs meet or fail to meet the requirement (1) and a linked justification of that way (1). They have an arrow shaped end (1) which means they will be able show the direction to different departments / parts of the shop (1) The text identifies the product on sale (1) therefore allowing customers to easily identify where they can find products (1) Lightweight which allows them to be stuck to walls with blue tac (1) easily moved / repositioned as things get moved around the store (1) Solid white board is suitable for printing on (1) which means icons can be used to indicate the product for those with language barriers (1) The solid white board is quite thin and can be affected by temperature/humidity (1) meaning the text will bend over / tear / distort / become difficult to see/read (1) They only point in a single direction (1) meaning they are very limiting in pointing the way to where the specific food is in the shop (1) Some of the letters can be mistaken for others due to them being combined with the arrow (1) which can lead to confusion for customers/makes the words difficult to read (1) 	(4)

Question number	Answer	Mark
6 (a)	 Any two factors which include an explanation (1) and a linked justification (1) Diseases could affect trees (1) which means they may need to be cut down / burnt and not used to produce paper (1) Demand for pulp for other types of paper and board is increasing (1) which can result in longer lead times for cartridge paper (1) Pulp used for the paper could contain impurities (1) which means that there will be a longer production / lead in time in producing the paper (1) 	(4)

Question number	Answer	Additional guidance	Mark
6 (b)	Marks will be awarded for understanding of design and technology, not graphical skills.	Cap at 3 marks if	(4)
	Notes and sketches that include:	no sketches or all	
	 Pages are cut to size / stacked in a press (1) Ink is applied to a brayer/roller (1) 	sketches and no	
	 Brayer/roller transfers ink to edges (1) Remove excess ink with a cloth (1) 	notes	
	• Leave to dry (1)		
	Example of candidate response:		
	pager are placed up against pager pager are comped fighting and rolled across inhe and rolled across inhe edges of the pages page have all the edges of the pages been wit to they are then left to she first		
	Annotated notes:		
	Pages have all been cut to size		
	The pages are aligned against a guide		
	They are then left to dry		
	The pages are clamped tightly The roller is covered in ink And rolled across the edges of the pages They are then left to dry		

Question number	Answer	Mark
6 (c)	 Any one explanation that includes a reason for buying A4 sized paper (1) and a linked justification for that reason (1). The size of the pages is quarter of the width of an A4 sheet (1) which means no waste will be produced when cutting the pages (1) The A4 sheet is the most common stock size of paper (1) from 	(2)
	which other 'A' sized sheets can be easily cut (1)	

Question number	Answer	Mark
6 (d)	Any two explanations that include a property (1), plus two linked justifications of that property (1) + (1).	(6)
	 Cartridge paper is opaque (1) which means images will not be able to be seen through the paper (1) since ink / paint / markers will not bleed through from one side to the other (1) Cartridge paper has a smooth surface finish (1) which means it will accept most types of media well (1) therefore allowing high quality art work to be produced (1) It is a pure white colour (1) which means true colours can be represented (1) therefore making artwork more realistic / better for scanning (1) 	

Question number	Answer	Mark
7 (a)	One name given from:	(1)
	 45 degree set square (1) 	
	• Set square (1)	
	DO NOT ACCEPT 'square' or 'try square'	

Question number	Answer	Mark
7 (b)	Any two explanations that include an advantage of using a template (1) plus a linked justification for the advantage (1).	(4)
	 They can be quickly drawn / traced around (1) therefore saving time / speeds up production time (1) Each one will be identical (1) therefore ensuring that each / subsequent part will marry up / line up (1) The template could also be used to mark out additional features such as the centre for the printed design (1) therefore ensuring it is in the correct place (1) They require little skill when using them (1) therefore they can be used by workers with little / limited skill / require no specific technical knowledge (1) 	

Question number	Answer	Additional guidance	Mark
7 (c)	A calculation that includes: Conversion of units either at the start or at the end (1)	Award full marks for correct numerical answer without working.	(5)
	 Calculation of the surface area of the two straight parallel sides 20 x 45 x 2 = 1800 cm² (1) 	Allow ecf if candidate gets part of calculation wrong.	
	 Calculation of semi-circular arc surface area / circumference 2 πrh = 2 x 3.142 x 20 x 45 = 5655.6 cm² 		
	Calculation of half cylinder surface area		
	$5655.6 / 2 = 2827.8 \text{ cm}^2$ (1)		
	Total surface area		
	1800 + 2827.8 = 4627.8 rounded to 4628 cm ²		
	(1)		

Question number	Answer	Mark
7 (d)	 Any two explanations that includes a reason for using screen printing (1), plus two linked justifications of that use (1) + (1). Screen printing is a process that can use different screens / colours (1) which means high quality / colourful prints can be produced (1) making the shelter more attractive to customers / improve product perception (1) Screen printing is achieved using relatively simple equipment (1) which means set up costs are low (1) and therefore does not add significant cost to the cat shelter (1) Screen printing is capable of producing solid blocks of colour (1) which means it is suitable for simple designs (1) therefore making it appropriate for printing the paw prints (1) Screen printing is a versatile process (1) which means it can be used on uneven materials (1) allowing the image to be printed on to corrugated board effectively (1) 	(6)

Question number	Answer	Mark
8 (a)	Any one explanation that includes a reason for using coloured foil block (1) and a linked justification of that reason (1).	(2)
	 It will make it more visually appealing / interesting (1) therefore will encourage people to buy it / send it as a greetings card / allows the card to be sold for a higher price (1) It can be used to enhance specific aspects of the design (1) because contrasting colours of foil will complement each other in the design (1) Red foil could be used to make a red heart (part A) to reflect love (1) giving the card increased personal/sentimental value for the recipient (1) Parts of the flowers can be blocked with natural colours (1) to provide an image that has some element of realism (1) 	

Question number	Answer	Mark
8 (b)	 Any one explanation that includes a reason for using the same stock form of card (1), plus one linked justification of that reason (1) + (1). It means they can buy lots of the same thickness (weight) material / bulk purchase (1) which means they will get a better / cheaper price (1) therefore reducing overall costs / improve profit margin (1) The sizes of card can be cut to suit the stock size (1) which reduces excessive cutting (1) therefore reducing waste (1) Any excess material can be used to make the smaller parts (1) which means there is less waste (1) therefore reducing overall costs / improve profit margin (1) 	(3)

Question number	Answer	Mark
8 (c)	Any two explanations that include a way (1) and a linked justification of that way (1).	(4)
	 It can reduce the amount of lignin in timber (1) therefore reducing the amount of chemicals/bleach needed during card production (1) Can result in taller trees with fewer branches (1) meaning that more timber can be used for the production of card (1) Trees can be modified to grow faster (1) improving the availability of pulp to make card (1) Improved resistance to infection / insect attack (1) reduces the number of trees that are lost / die due to disease (1) 	

Question number	Indicative content	Mark
8 (d)	AO3 (9 marks)	(9)
	Candidates might refer to some/all of the following in their response, but candidates should be rewarded for other pertinent contextualised answers	
	Can be used to send well wishes to relatives/friends	
	Neutral theme so can be used for good luck / love you / get well soon etc messages	
	Suitable for a range of younger and older age groups	
	The card has no text therefore there are no language barriers	
	Financial cost of card plus the cost of postage is expensive in	
	comparison to electronic messages	
	Pressure on demand for cards sent through the post versus	
	digital cards / e-cards / online messaging / mobile phone photos	
	 Keepsake / memento as opposed to online digital document that may disappear over time 	
	 Pressure on consumers to have expensive gifts / cards to mark important celebrations 	
	Parts can be reused/upcycled to make different	
	products/cards/labels	
	The card is produced in batches so it can be updated to meet	
	changing consumer demands	
	Limited life span due to materials used / become damaged over	
	time / ripped	
	If stored correctly will have a longer life span.	

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.