Pearson Edexcel

Mark Scheme (Standardisation)

Summer 2019

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

Section A – Core content

Question number	Answer	Mark
1 (a) (i)	Any **one** property from: • resistant to water / waterproof (1) • fungus / insect resistant (1) • durable / weather resistant / rot resistant (1)	**(1)**

Question number	Answer	Additional guidance	Mark
1 (a) (ii)	Any **one** property from: • hard / hardness / good resistance to wear / hard wearing (1) • compressive strength (1) • good fluidity / casts well (1)	Do **not** accept unqualified response in relation to strong or strength. Do **not** accept brittle.	**(1)**

Question number	Answer	Mark
1 (a) (iii)	Any **one** property from: • water resistant / waterproof / weather resistant (1) • durable (1) • crease / stain / abrasion resistant (1) • resistant to mildew / bacteria (1) • fibres have high tensile strength (1)	**(1)**

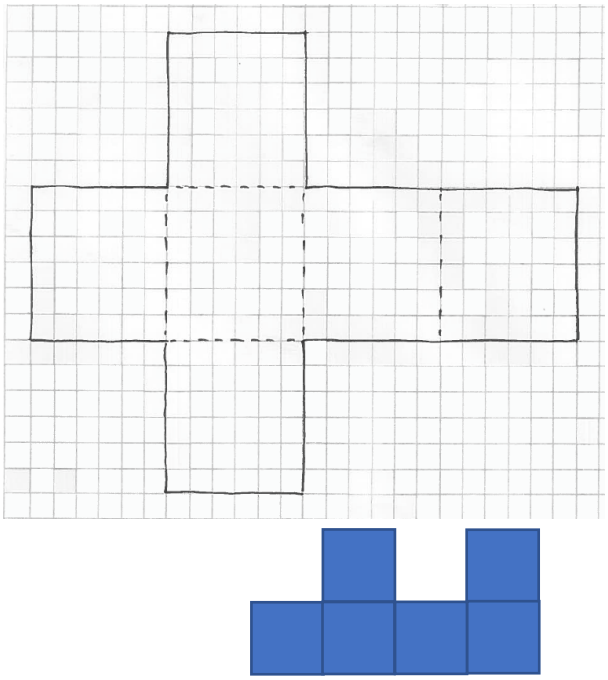
Question number	Answer	Mark
1 (a) (iv)	Any **one** property from: • rigid / stiffness (1) • hygienic and safe for food use (1) • pure with no smell or taste / inert (1) • good printability (1) • good insulator of <u>heat</u> (1)	**(1)**

Question number	Answer	Additional guidance	Mark
1 (b)	A calculation that includes: • correct working $\frac{7.6 - 5.4}{7.6} \times 100$ (1) • correct answer to whole number 29% (1)	Award full marks for correct numerical answer without working. Allow for ECF if candidate gets part of calculation wrong.	**(2)**

Question number	Answer	Mark
1 (c)	Any **one** negative effect (1) and a linked justification of that negative effect (1). • Smaller workforce required (1) therefore there would be loss of jobs / cost of redundancies (1) • The company might go out of business / close / downsize (1) resulting in a loss of jobs / profits reduced / loss of income prosperity in the area (1) • Money will be tied up in old machinery used to make bags / degrading (1) which cannot be used for anything else / still need to be kept serviced / maintained (1)	**(2)**

Question number	Answer	Mark
2 (a)	• Isometric drawing / projection (1) (Only answer)	**(1)**

Question number	Answer	Mark
2 (b)	Any **one** explanation that includes an accurate statement about the use of calico (1) and a linked justification of that statement (1). • Calico is a <u>relatively</u> cheap material (1) therefore it keeps the cost down in terms of prototyping / developing the product (1) • Calico can accept a range of surface finishes (1) therefore colours and designs can also be prototyped / tested out (1) • Calico is absorbent (1) therefore it can accept a range of surface finishes (1) • Calico is rigid / stiff when sewn along a seam (1) which means it can hold its shape / allows a 3D shape to be formed / supports its own weight (1) • Calico is the same on both sides / looks / feels the same on both sides (1) therefore it does not matter which way round the material is used (1)	**(2)**

Question number	Answer	Mark
2 (c)	A net that includes an image drawn with a ruler or free hand. Marks to be awarded for the following. • 6 surfaces separated by lines (1) • Correct size – all surfaces 6 squares by 6 squares (1) • Top surface will fold down to fit (using dashed lines) (1) • Bottom surface will fold up to fit (using dashed lines) (1)  (The third and fourth bullets points above are there to reflect that the top and bottom cannot both be at the top or the bottom since it would leave the play cube without a top or bottom I have shown this below. This would score 2 marks since the top two squares would fold onto each other and there are no dashed lines.)	**(4)**

Question number	Answer	Mark
2 (d)	Any **one** reason that includes an accurate statement about why designers use tracing paper (1) and a linked justification of that reason (1). • It is transparent / translucent / see-through (1) which means it can be placed over a drawing and drawn on to make a copy of the drawing / trace the image / see the pattern of fabric (1) • It can be placed over a drawing and drawn on (1) which means it can be used to transfer images / used as an overlay / used to be written / drawn on to provide additional information / detail (1)	**(2)**

Question number	Answer	Mark
3 (a)	Any **one** property given: • transparent / translucent / clear / see-through (1) • good electrical insulator (1) • lightweight (1) • waterproof (1) • durable / weather resistant (1)	**(1)**

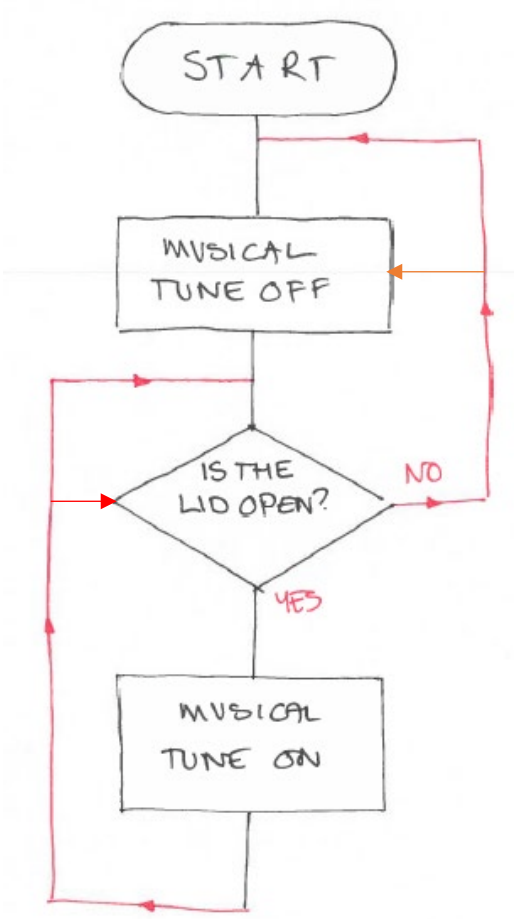
Question number	Answer	Mark
3 (b)	Any **one** reason for using stainless steel (1) and a linked justification of that reason (1). • Stainless steel is a hard material / has good compressive strength (1) therefore it can be pushed into the ground without bending / deforming (1) • Stainless steel is resistant to corrosion (1) therefore it will not rust in the wet / damp ground / retain its aesthetic characteristics (1) • Stainless steel is tough (1) which means it can be knocked into the ground with a hammer / withstand bumps / knocks from lawnmower (1)	**(2)**

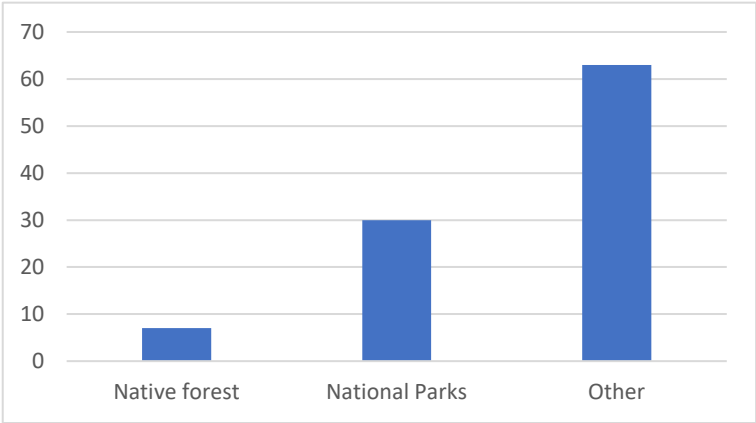
Question number	Answer	Mark
3 (c)	Any **one** explanation that references how the company can reduce their carbon footprint (1) and a linked justification of that way (1). • They can try and use renewable energy sources / maximise energy efficiency for heating / lighting / powering their factory (1) therefore reducing the demand on finite sources / reducing emissions / fumes (1) • They can use new modern / energy efficient machinery / energy recovery systems (1) which will reduce their energy use / consumption (1) • They can use virtual chat rooms / work rooms / video conference for meetings / robots for production (1) which means they will not have to travel / reducing pollution (1) • Potential replacement parts could be sent to customers as electronic files to be produced in situ (1) rather than sending physical components by road / air creating pollution (1) • Any fumes / pollution / waste generated at the factory can be cleaned / scrubbed / carbon filtered / CO^2 capture (1) therefore reducing the amount of pollutants released into the atmosphere (1) • They could use biofuels / electric vehicles (1) to help reduce emissions / fumes (1)	**(2)**

Question number	Answer	Additional guidance	Mark
3 (d)	A calculation that includes: • correct working £4.97 x 1/12 (1) • correct answer to 2 s.f. £0.41 or 41 pence (1)	Award full marks for correct numerical answer without working. Allow for ECF if candidate gets part of calculation wrong. Do not accept 41 on its own	**(2)**

Question number	Answer	Mark
3 (e)	Any **two** ways that references the effects of new and emerging technologies for the apprentices (1) and a linked justification of that way (1) • The apprentices will be exposed to the latest technology / manufacturing methods (1) therefore they will be trained / experienced in the latest / most current methods (1) • They will be very employable / in demand (1) as the technologies develop and spread to other companies / parts of the country / world (1) • They may be highly specialised / highly skilled / ready to move into advanced roles (1) therefore they can command higher salaries (1) • Once they have completed their training they may find themselves out of a job (1) because the new technology has replaced manual workers / more efficient technology (1) • Improved / safer working environments (1) because of the use of electronic control systems (1) • Lower skilled technician roles (1) results in lower paid positions (1)	**(4)**

Question number	Answer	Mark
4 (a)(i)	• LDR / Light Dependent Resistor (1) (Only answer)	**(1)**

Question number	Answer	Mark
4 (a)(ii)	A flowchart that includes feedback loops and labels to the decision box. • 'Yes' and 'No' correctly labelled (1) • Feedback loop with directional arrow from 'No' to above / to the 'MUSICAL TUNE OFF' box (1) • Feedback loop from below 'MUSICAL TUNE ON' to the / just above the diamond decision box (1) 	**(3)**

Question number	Answer	Mark
4 (b)	A bar chart that includes: Correct height for National Parks at 30 (1) Correct height for other at 63 (range of 62-64) (1)  	**(2)**

Question number	Indicative content	Mark
4 (c)	• Collaboration could be used whereby different people look at problems from different perspectives / viewpoints such as technically / from a manufacturing perspective / materials / users' needs and wants • Collaboration allows people / teams to bounce ideas off each other, sparking imagination • Teams might be in different countries and contribute over the internet in chat rooms / video conference • User-centred design considers the needs and wants of others at the centre / heart of all decisions • User-centred design also ensures that users' views and opinions are considered at every stage of the design process • Feedback is taken very seriously in user-centred design ensuring users' needs and opinions are gathered and acted upon • Systems thinking looks at the whole problem and breaks it down into individual parts / blocks • Systems thinking looks at how different parts of a design / system fit / work / interact / feedback back into other parts of the system • Systems thinking considers where any energy / power will come from and what inputs / control / outputs will be required and work together • Evaluation / analysis of existing products / designers / movements • Use of external stimulus / triggers / biomimicry • Iteration is used to fine tune / develop ideas in response to consumer feedback	**(6)**

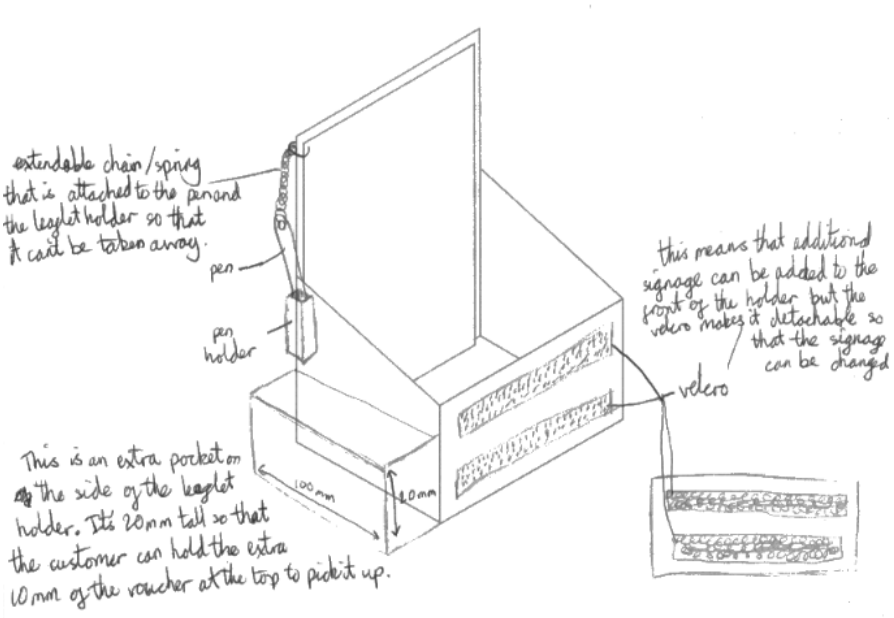
Level	Mark	Descriptor
	0	No rewardable content
Level 1	1 - 2	• Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed. • An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships 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.

Component 1 mark scheme – 1DT0/1B

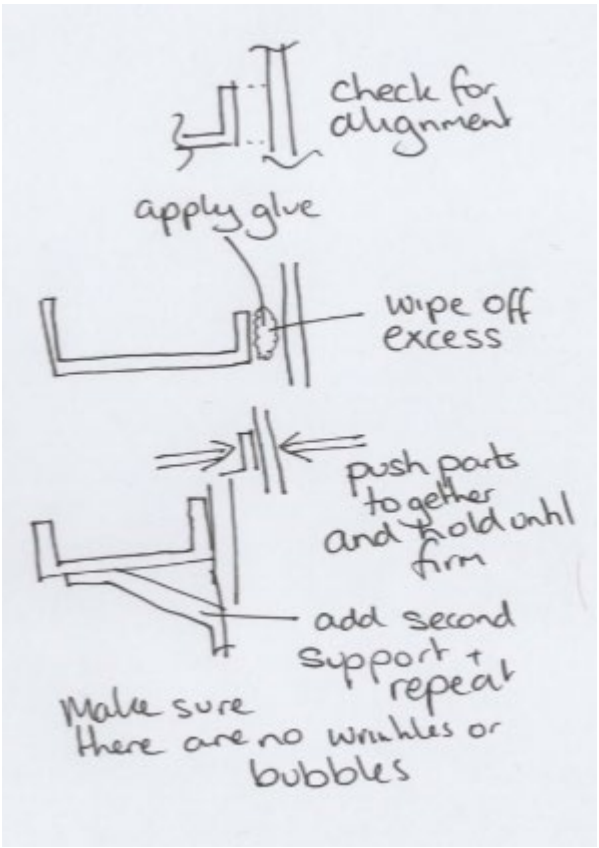
Section B – Papers and Boards

Question number	Answer	Mark
5 (a)	**Marks will be awarded for understanding of design and technology, not graphical skills.** Notes and sketches that include: • provide a method of holding the vouchers separately (1) from the leaflets whilst allowing the vouchers to be removed easily (1) e.g. dividers in main box / box on the front / additional pocket, rack with space for vouchers to fit / means for removal / space for fingers to access vouchers / cut-outs, cutaways / consideration of dimensions • provide a method of adding additional signage (1) that is also detachable (1) e.g. slots, blue tack, Velcro, double-sided tape, temporary fixing • provide a method of holding a pen (1) that prevents it from being taken away (1) e.g. a rack, tube, holes, clip, chain, string, elastic	**(6)**

	Example of candidate response.  Annotated notes: Additional voucher holder slot on the side of the box; dimensions show that the voucher can be removed. Additional signage can be added using velcro strips; these are also shown on the reverse of the additional sign Pen can be stored in the holder on the side. Chain/spring prevents the pen from being taken	

Question number	Answer	Additional guidance	Mark
5(b)	Any **two** explanations that include a way the unit meets or fails to meet the requirement (1) and a linked justification of that way (1). • The head is life sized / in proportion (1) which means the glasses can fit into place without having to be folded (1) • The bridge of the glasses will sit on the nose and the side bits on a small shelf like the ears (1) which simulates how the glasses will be worn / allows the user to see what they look like on (1) • The arms just sit on a small shelf like bit without anything to stop them moving (1) which means the glasses might fall / slip off / move around (1) • Solid white board may lack the strength/durability needed (1) meaning the display will get damaged following repeated use (1) • The angle of the nose is very steep (1) which may mean that the glasses slide down so are not secure (1) • Large solid / stable base (1) which means it has a large surface area in contact with the table / difficult to fall over (1)	Do not accept anything related to secure in relation to theft	**(4)**

Question number	Answer	Mark
6 (a)	Any **two** advantages which include an advantage (1) and a linked justification (1) • Fewer trees need to be cut down / reduces deforestation (1) because sustainable board can be manufactured from waste pulp / wood fibre (1) • Less energy is needed in processing the board compared to using virgin pulp (1) reducing the carbon footprint of the board / lower emissions (1) • The timber / pulp is likely to come from a well-managed forest (1) where trees are replaced in an ethical manner (1)	**(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: • Create an upstand on the end of the balcony to increase gluing area (1) • Add a structural member to support the balcony (1) • Add slots to the balcony (1) • Applying glue / adhesive to surface/s (1) • Providing support whilst the pieces set (1) Example of candidate response:  Annotated notes: Check alignment Apply adhesive Remove excess	Cap at 3 marks if no sketches or all sketches no notes	**(4)**

	Push together Hold in place		

Question number	Answer	Mark
6 (c)	Any **one** explanation that includes a reason for using different types of board (1) and a linked justification for that reason (1). • Different types of board can have different finishes / textures / colours / aesthetic properties (1) therefore they can be used to enhance individual features of the windmill / different parts (1) • Offcuts of different boards can be used up (1) therefore allowing the windmill to be manufactured from scrap materials / saving materials (1) • Different boards have different physical / structural properties (1) therefore they are better suited for sails / stiffness / rigidity / function of the windmill (1)	**(2)**

Question number	Answer	Mark
6 (d)	Any **two** explanations that include a technique (1), and **two** linked justifications of that technique (1) + (1). • Technique – CAM / laser cutter / CNC cutter (1) Explanation 1 - which can repeat cut (1) therefore making identical components (1) Explanation 2 – power settings can be adjusted (1) therefore allows materials to be cut / marked for folding (1) • Technique - cutting jigs / dies (1) Explanation - could be used to cut shapes / parts to size (1) requiring no / little marking out (1) • Technique - Folding jig (1) Explanation - to ensure all fins are bent / folded-in equally (1) to the same angle (1)	**(6)**

Question number	Answer	Additional guidance	Mark
7 (a)	One surface finish or surface treatment given from: • Varnishing (1) • UV varnish (1) • Film (1) • Spot varnishing (1) • Embossing (1) • Hot foil blocking (1) • Lamination (1)	Do not accept 'edge staining' or 'encapsulation'	**(1)**

Question number	Answer	Mark
7 (b)	Any **two** explanations that include a reason for using stock sized paper (1) and a linked justification for the reason (1) • A3 stock sizes of paper can be purchased / bought in (1) making sure that supplies will be readily available / wide range of suppliers (1) • A3 paper is a standardised size to fit printers (1) therefore will allow images to be printed using an inkjet / laser printer (1) • Stock sizes are available in bulk packs / reams (1) reducing material costs (1) • Do not have to invest money in machinery (1) saving capital / training costs (1)	**(4)**

Question number	Answer	Additional guidance	Mark
7 (c)	A calculation that includes: • Conversion of units either at the start or at the end (1) • Tessellation to show that two pieces require minimum of 78cm (400 + 360 + 20 mm) or (X + Y + 2cm) (1) • Calculation of maximum number of tessellations from 782cm length 782 cm – 2 cm = 780 (1) • 780/78 cm = 10 (1) • 10 x 2 pieces per tessellation = 20 (1) Conversion of units (1) 782/40 = 19.55 rounded to 19 whole pieces (1) **Additional method** Conversion of units (1) Area of material 782 x 8 = 6256 cm^2 or 7820 x 80 = 625600 mm^2 (1) Area of trapezium 0.5 x (360 + 400) x 80 = 30400 mm^2 (1) 625600/30400 = 20.58 (1) Rounded down to 20 whole pieces (1)	Do not award the final mark if the final answer is not a whole number. Award full marks for correct numerical answer without working. Allow ecf if candidate gets part of calculation wrong.	**(5)**

Question number	Answer	Mark
7 (d)	Any **two** explanations that includes a working property (1), and **two** linked justifications of that working property (1) + (1). • Copier paper is bright white in colour (1) which provides high quality printing (1) allowing vivid colours to be represented (1) • Copier paper has a smooth surface (1) which allows it to absorb / take ink well (1) and prevents the ink from bleeding (1) • Copier paper is opaque (1) meaning it is unlikely to allow colour/designs from underneath to be seen (1) therefore the printed image will be clear to see (1)	**(6)**

Question number	Answer	Mark
8 (a)(i)	Any **one** explanation that includes a reason (1) and a linked justification of that reason (1). • Decorative techniques make the book look higher quality (1) allowing them to be sold for higher prices (1) • Decorative techniques enhance features of the cover (1) making them stand out against the remainder of the cover (1) • Improves the visual aesthetic / makes it look nicer / adds to the shelf appeal (1) making them more likely to sell (1)	**(2)**

Question number	Answer	Mark
8 (a)(ii)	Any **one** explanation that includes a working property (1), and **one** linked justification of that property (1) + (1). • It has a rough / textured surface (1) which means more grip / friction is created (1) allowing the pages to be turned easier / nicer to write on (1) • It is opaque / less reflective (1) which means printed text will be clear to read (1) therefore text cannot be 'read through' from the other side of the paper (1)	**(3)**

Question number	Answer	Mark
8 (b)	Any **two** explanations that include a negative effect (1) and a linked justification of that effect (1) • Bleached pulp is hazardous to humans / plants / animals / soil / air (1) as they include harmful chemicals (1) • Rivers can become polluted (1) if bleach / chemicals are expelled / leaked into the water systems (1) • More energy is used / potential use of finite resources (1) as bleaching requires increased processing / generates / produces more emissions (1) • Demand on natural resources / impact on local communities / deforestation (1) as bonded paper is made from virgin pulp (1)	**(4)**

Question number	Indicative content	Mark
8 (c)	• Difficult to meet demand / measure globally in terms of demand for the book / increased use of digital alternatives • Demand for paper increases pressure on raw material sources in regions where trees are grown • Demand requires large numbers of trees to be felled which may need to be found in other locations • Deforestation causes issues for local communities in terms of land use / loss of habitats / emissions / local eco-habitats/ground stability / increased prosperity / income / attracts workers / jobs • Transportation and pollution issues to local communities because of high volumes of trees that will need to be cut down and transported • Dimensions of the pages are non-standard 'A' sizes so will need to be cut specifically • Large amounts of chemicals will need to be used which can pollute water courses • Paper is quite easy to recycle and use for other products once it has been separated out from general waste • Any waste paper can be reclaimed/recycled for use in other products • Surface treatments do not significantly reduce the ability to recycle paper • Paper will degrade over time when it is sent to landfill • Edge staining does not impact on the ability to recycle the book • Edge staining could increase 'shelf appeal' and result in improved sales	**(9)**

Level	Mark	Descriptor
	0	No rewardable content
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.