Pearson Edexcel

Mark Scheme (Standardisation)

Summer 2019

Pearson Edexcel GCSE
In Design & Technology (1DT0)
1F: Timbers

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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 – 1DT0/1F

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)**

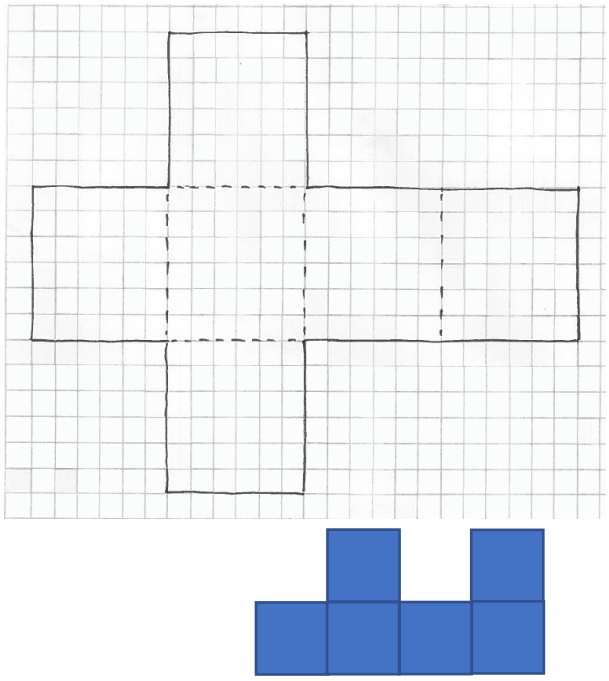
Question number	Answer	Mark
1 (a) (iv)	Any **one** property from: • rigid / stiffness (1) • hygienic and safe for food use (1) • pure with no smell or taste / inert (1) • good printability (1) • good insulator of <u>heat</u> (1)	**(1)**

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)**

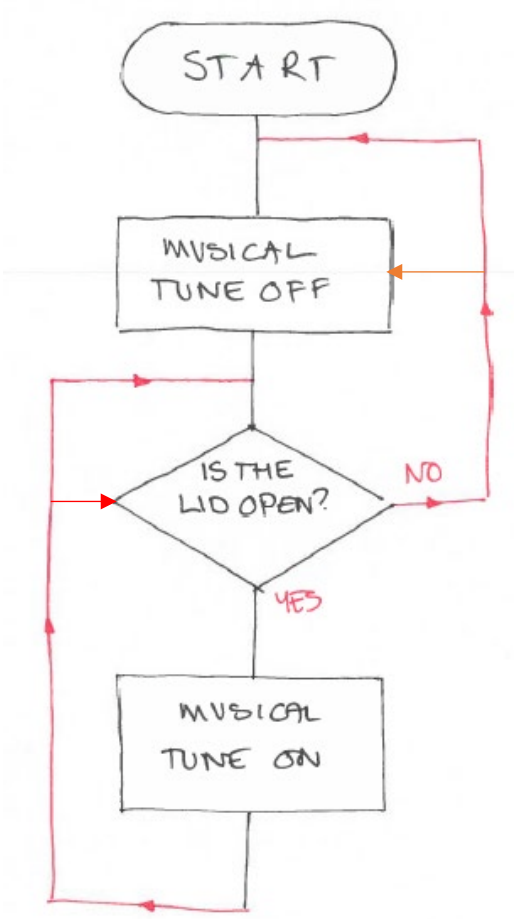
Question number	Answer	Mark
3 (b)	Any **one** reason for using stainless steel (1) and a linked justification of that reason (1). • Stainless steel is a hard material / has good compressive strength (1) therefore it can be pushed into the ground without bending / deforming (1) • Stainless steel is resistant 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)**

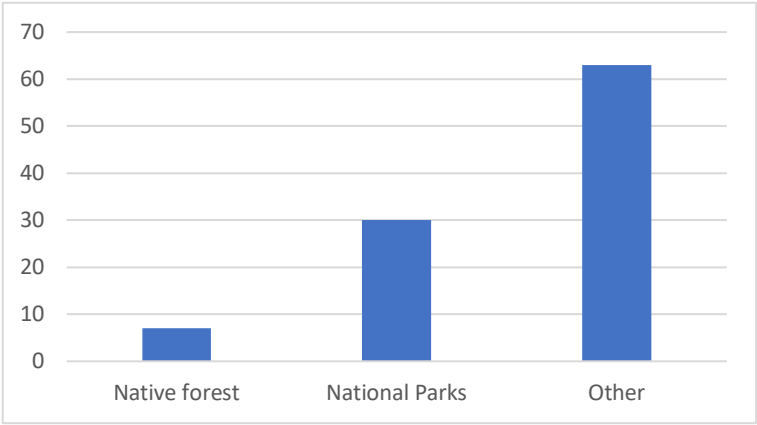
Question number	Answer	Mark
3 (c)	Any **one** explanation that references how the company can reduce their carbon footprint (1) and a linked justification of that way (1). • They can try and use renewable energy sources / maximise energy efficiency for heating / lighting / powering their factory (1) 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)**

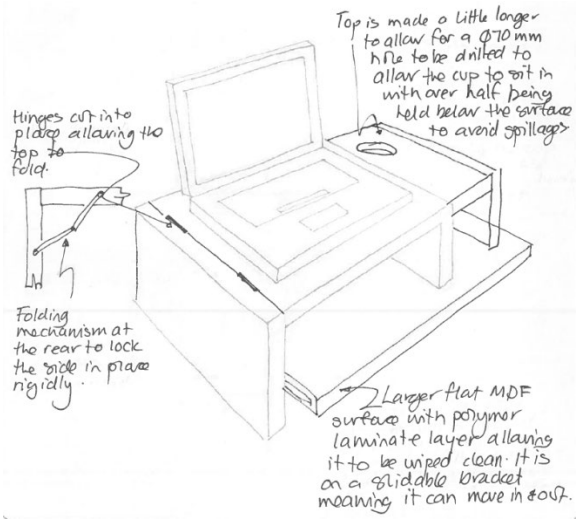
Question number	Answer	Mark
4 (b)	A bar chart that includes: Correct height for National Parks at 30 (1) Correct height for other at 63 (range of 62-64) (1)  	**(2)**

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 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.

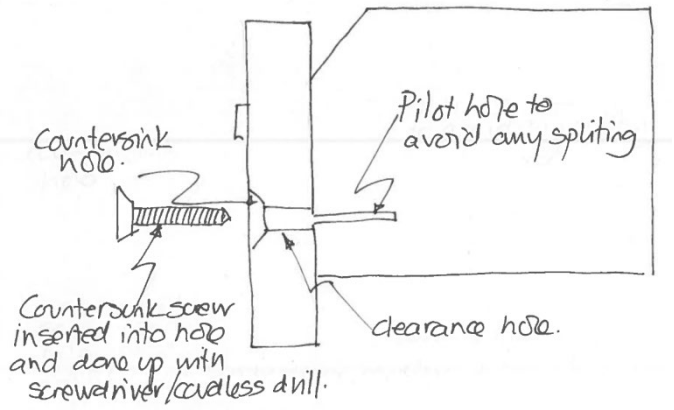
		• A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments.

Section B – Timbers

Question number	Answer	Mark
5 (a)	**Marks will be awarded for understanding of design and technology, not graphical skills.** Notes and sketches that include: • fold away flat (1) but still provide a rigid platform to work on (1) e.g. hinges / locking methods / flat pack • provide a method to hold the coffee cup (1) without the risk of it being tipped over (1) e.g. hole for coffee cup (60-70 mm) to hold approximately half the height / larger top • provide additional writing surface (1) that is flat and wiped clean (1) e.g. tray at the bottom / shelf / flap on the side / appropriate surface finish / veneer / material Example of candidate response.  Annotated notes: Hinges cut into place allowing the top to fold. Folding mechanism at the rear to lock the side in place rigidly. Top is made a little larger to allow for a diameter 70 mm hole to be drilled to allow the cup to sit in it with over half being held below the surface to avoid spillages. Large flat MDF surface with polymer laminate layer allowing it to be wiped clean. It is on a sliding bracket meaning it can be moved in and out.	**(6)**

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 / correctly proportioned (1) which means the glasses can fit as if they were being worn / 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 / prevents arms from falling (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) • 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) • Timber stocks will not run out / be depleted (1) because as trees are cut down several new ones are planted / maintaining natural habitats (1) • The product can be marketed / marked with the FSC logo (1) which might increase sales / promote education / widen potential market appeal /allows consumers to make informed choices about products (1) • Certification comes with the timber (1) which shows users / consumers that the countries / source of timber is being protected from deforestation (1)	**(4)**

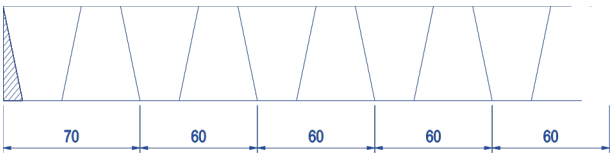
Question number	Answer	Additional guidance	Mark
6 (b)	**Marks will be awarded for understanding of design and technology, not graphical skills.** Notes and sketches that include: • Marking out where to drill (1) • Use of pilot hole to guide / avoid splitting timber (1) • Clearance hole for the screw to pass through (1) • Countersunk recess for screw head to fit into / flush surface (1) • Inserting / fixing / screwing the screw in place / potential use of glue (1) Example of candidate response:  Annotated notes: Pilot hole to avoid any splitting. Countersunk hole. Clearance hole. Countersunk screw inserted into hole and done up with screwdriver /cordless drill.	Cap at 3 marks if no sketches or all sketches no notes	**(4)**

Question number	Answer	Additional guidance	Mark
6 (c)	Any **one** explanation that includes a reason for using different timbers (1) and a linked justification for that reason (1). • Different timbers have different colours / grains / textures (1) therefore they can be used to show different parts / features of the creature (1) • Small scraps can be used up for the different parts of the creature (ears / nose / face) (1) therefore reducing waste / making efficient use of the material you have available (1)	Do not allow aesthetic opinion	**(2)**

Question number	Answer	Additional guidance	Mark
6 (d)	Any **two** explanations that include a technique (1), plus **two** linked justifications of that technique (1) + (1). • Technique – CAM/CNC machining (1) Explanation - which can repeat cut (1) therefore making identical components quickly / accurately (1) • Technique - cutting jigs (1) Explanation - could be used to cut shapes / parts to size (1) requiring no / little marking out (1) • Technique – cutting / sanding / wasting (1) Explanation – the corner would be cut off with a tenon / band saw (1) and finished on a disc / belt sander (1) • Technique – cutting template (1) Explanation – profile fixed to work to follow / copy around (1) therefore producing exact copy / profile / identical part (1)	Do not accept responses related to marking out	**(6)**

Question number	Answer	Mark
7 (a)	One surface finish given from: • paint (1) • stain (1) • varnish (1) • wax (1) • oil (1) • shellac (1) • veneer (1)	**(1)**

Question number	Answer	Mark
7 (b)	Any **two** explanations that include a reason for using a stock sized wooden dowel (1) plus a linked justification for the reason (1) • They can be bulk purchased / bought in (1) therefore no need to make them / just cut to length (1) • The dowels would be an exact size (1) therefore a standard 6 mm drill bit can be used to make the holes for the pegs to fit into (1) • It would be wasteful to make them from square stock material (1) therefore it reduces waste / cost (1) • It would be a time-consuming process to make them (1) therefore it speeds up the overall production / manufacturing time (1) • Widely available from a range of suppliers (1) therefore always likely to be in stock somewhere (1) • Stock sizes would be used from available range / sizes (1) therefore allowing design / manufacturing decisions to be made to suit (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 7 cm (40 + 20 + 10 mm) or (X + Y + 1cm) (1) • Calculation of maximum number of tessellations from 181 cm length 181 cm – 1 cm = 180 (1) • 180/ 6 cm = 30 (1) • 30 x 2 pieces per tessellation = 60 (1) Two marks without recognition of tessellation Conversion of units (1) 181/4 = 45.25 = 45 whole bodies (1) **Alternative graphical solution:**  • Conversion to cm: Timber strip = 181cm Pair of bodies = 6cm • Calculation 181/6 = 30 (with required 1cm remaining) • Therefore 30 pairs can be obtained from strip • Answer = 60 bodies	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)**

	Alternative solution 181 x 4 = 724 cm^2 (1) $\frac{1}{2}$(4 + 2) x 4 = 12 cm (1) 724 ÷ 12 **OR** 72400 ÷ 1200 (1) = 60.3 (1) = 60 (1)		

Question number	Answer	Additional guidance	Mark
7 (d)	Any **two** explanations that includes a working property (1), plus **two** linked justifications of that working property (1) + (1). • Beech is tough (1) which means it will withstand the knocks and bumps during play as it tumbles / falls down (1) therefore it does not break / dent / bruise (1) • Beech is a hard material / wood (1) which means it will withstand the rubbing / wear / abrasion as it tumbles down the pine back (1) therefore it will not wear away / rub / damage / lasts a long time (1) • Beech has a close / dense grain (1) which means it will not easily splinter (1) therefore not cause any harm / injury to the user (1)	Do not accept beech as a hardwood	**(6)**

Question number	Answer	Mark
8 (a)(i)	Any **one** explanation that includes a reason (1) and a linked justification of that reason (1). • It will prevent the rapid spread of fire (1) therefore slowing down the speed at which a fire might spread in the loft / roof / give more time for anyone to get out of the house / upstairs rooms (1) • It will protect the timber from fire (1) which means that it would stop the roof falling into the house in the event of a fire (1) • To stop the truss burning / catching alight (1) and collapsing / roof tiles falling into the house (1)	**(2)**

Question number	Answer	Mark
8 (a)(ii)	Any **one** explanation that includes a working property (1), plus **one** linked justification of that property (1) + (1). • It is a relatively lightweight material (1) which means it will not add too much / excessive weight to the structure (1) therefore not putting additional / unnecessary weight / load on the walls / foundations (1) • Pine can be used in either tension or compression (1) which means it can be used structurally (1) therefore creating the triangulated structure of the roof truss (1) • Pine trees grow fairly straight / tall (1) which means there are long lengths of wood suitable for trusses with little grain run-off (1) therefore they are less prone to splitting/bending (1)	**(3)**

Question number	Answer	Mark
8 (b)	Any **two** explanations that include an advantage (1) and a linked justification of that advantage (1). • Timber could be grown which is free from disease / pests (1) therefore it will last longer / not get wood worm / dry rot (1) • Timber can be grown quicker (1) therefore meeting the increasing demand (1) • Timber can be made to grow straighter / less prone to warping / twisting (1) therefore will not move / twist as much when inside / used for things like skirting boards / longer single length spans (1)	**(4)**

Question number	Indicative content	Mark
8 (c)	• Difficult to meet demand / measure / gauge demand around Europe in terms of building programmes • Demand for trusses / timber increases pressure on forests locally to the country of manufacture • Demand requires timber so forests might need to be cut down in other regions / countries around the world • Loss of forest causes issues for local communities in terms of land use / loss due to wash off / fertility of soil and local eco-habitats • Transportation and pollution issues to local communities because of high volume logging • Timber is quite easy to recycle and dispose of once it has been separated out • Any short lengths of timber from the production of the roof trusses can be used for other things • Fire proofed coating would make it difficult to use for burning as heat source	**(9)**

Level	Mark	Descriptor
	0	No rewardable contentwgfv
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.