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## Mark Scheme (Results)

November 2021

Pearson Edexcel GCSE  
In Design & Technology (1DT0)  
1D: Systems

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November 2021

Question Paper Log Number 65432

Publications Code 1DT0\_1D\_2111\_MS

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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 – 1DT0/1D**

**Section A – Core content**

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
1 (a) (i)	Any <b>one</b> property from: <ul style="list-style-type: none"> <li>• Hard (1)</li> <li>• Tough (1)</li> <li>• Straight / close grained (1)</li> <li>• Slightly flexible (1)</li> <li>• Compressive strength (1)</li> </ul>	<b>(1)</b>

<b>Question number</b>	<b>Answer</b>	<b>Additional information</b>	<b>Mark</b>
1 (a) (ii)	Any <b>one</b> property from: <ul style="list-style-type: none"> <li>• Lightweight (1)</li> <li>• Tough (1)</li> <li>• Hygienic / inert (1)</li> <li>• Plasticity (1)</li> <li>• Waterproof (1)</li> </ul>	Do not accept 'High impact' on its own Do not accept 'can be recycled' Do not accept 'durable'	<b>(1)</b>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
1 (a) (iii)	Any <b>one</b> property from: <ul style="list-style-type: none"> <li>• Warm / traps air / insulator (1)</li> <li>• Breathable (1)</li> <li>• Durable (1)</li> <li>• Soft (1)</li> </ul>	<b>(1)</b>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
1 (a) (iv)	Any <b>one</b> property from: <ul style="list-style-type: none"> <li>• Opaque (1)</li> <li>• Absorbent (1)</li> <li>• Rough / textured surface (1)</li> </ul>	<b>(1)</b>

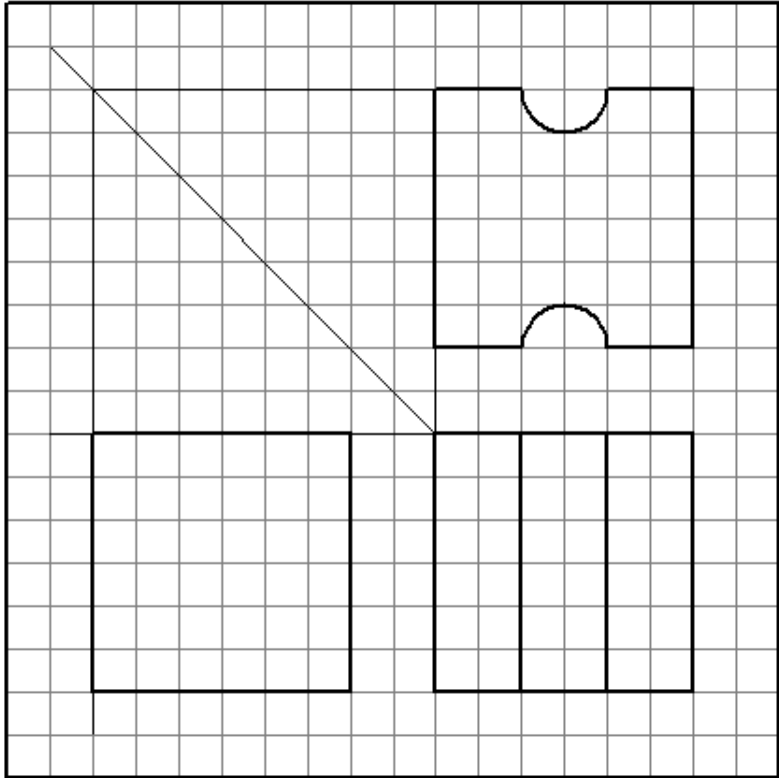
Question number	Answer	Mark
1 (b)	<p>Any <b>one</b> advantage of using wind to generate energy (1) and a linked justification of that advantage (1).</p> <ul style="list-style-type: none"> <li>• The energy generated is free (1) once the installations / construction / investment costs have been paid off (1)</li> <li>• The energy generated is a clean fuel source / does not rely on any burning of materials (1) therefore reducing emissions / greenhouse gases / preserves fossil fuels (1)</li> <li>• It is a sustainable / renewable source of energy (1) which means it will never run out (1)</li> <li>• The UK has good levels of offshore wind / hilly terrain / exposed landscape (1) which provides a good / constant / consistent level of power / electricity (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Additional guidance	Mark
1 (c)	<p>A calculation that includes:</p> <ul style="list-style-type: none"> <li>• correct setting out of formula</li> </ul> $\frac{800 - 500}{500} \times 100$ <p>(1)</p> <ul style="list-style-type: none"> <li>• correct answer</li> </ul> <p>60%</p> <p>(1)</p>	<p>Award full marks for correct numerical answer without working.</p> <p>Allow for ECF if candidate gets part of transposition wrong.</p>	<b>(2)</b>

Question number	Answer	Mark
2 (a)	<p>Any <b>one</b> non-ferrous metal from:</p> <ul style="list-style-type: none"> <li>• Copper (1)</li> <li>• Brass (1)</li> <li>• Bronze (1)</li> <li>• Pewter (1)</li> </ul>	<b>(1)</b>

Question number	Answer	Mark
2 (b)	<p>Any <b>one</b> reason for using standard sized rods (1) and a linked justification of that reason (1).</p> <ul style="list-style-type: none"> <li>• They will be readily available from a supplier (1) which means the company do not have to invest in machinery / time to manufacture the rods (1)</li> <li>• They will be able to buy long lengths which they simply cut to the size they require (1) which means only very simple processing is required which will reduce the level of skill required / speed up manufacturing times (1)</li> <li>• A standard 10mm drill bit can be used (1) so no further reduction of the material diameter is required (1)</li> <li>• They would be mass produced by specialist manufacturers (1) which means a reduction in unit cost / cheaper (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
2 (c)	<p>Any <b>one</b> property of felted wool fabric that makes it an appropriate choice of material (1) and a linked justification of that property (1)</p> <ul style="list-style-type: none"> <li>• It does not fray (1) which means it will leave a neat finish / edge around the base (1)</li> <li>• It is soft / smooth / cushioned (1) which means it will not damage any surface the game is placed on (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
2 (d)	<p>A completed orthographic drawing that shows:</p>  <ul style="list-style-type: none"> <li>• correct width of the cube at 30mm for side view = 6 spaces on the grid (1)</li> <li>• correct depth of the cube at 30mm for side view = 6 spaces on the grid (1)</li> <li>• correct size of the semi-circle on the plan view = 2 spaces on the grid (1)</li> <li>• correct position / presence of the second semi-circle at the front edge / bottom edge of the plan view (1)</li> </ul>	(4)

Question number	Answer	Additional Guidance	Mark
3 (a)	<p>Any <b>one</b> composite from:</p> <ul style="list-style-type: none"> <li>• Carbon fibre (1)</li> <li>• Concrete (1)</li> <li>• Plywood (1)</li> <li>• MDF (1)</li> <li>• Chipboard (1)</li> <li>• Robotic materials (1)</li> <li>• Reinforced polymers / textiles (1)</li> </ul>	Do not accept GRP / fibre glass / glass fibre	<b>(1)</b>

Question number	Answer	Mark
3 (b)	<p>Any <b>one</b> reason for using fibreglass (1) and a linked reason for the use (1)</p> <ul style="list-style-type: none"> <li>• Fibreglass is a tough material (1) which means it can withstand the knocks and bumps of hitting rocks / stones (1)</li> <li>• Fibreglass is water resistant (1) which means that it will not absorb water when out on the river (1)</li> <li>• Fibreglass can be moulded into complex shapes (1) which means it can be used to create curved shapes / smooth lines / streamlined shape / create a single piece moulding (1)</li> <li>• A high-quality surface finish can be achieved on the mould / product (1) which will reduce friction / allows to boat to move better through the water (1)</li> <li>• Fibreglass forms a lightweight structure (1) which means it will be easy to lift the boat out of the water (1)</li> <li>• Low maintenance material (1) which means it does not need to be re-varnished / repainted (1)</li> <li>• Resin can be pigmented (1) which means no painting / colouring is needed after moulding (1)</li> </ul>	<b>(2)</b>



Question number	Answer	Additional guidance	Mark
3 (c)	<p>A calculation that includes:</p> <ul style="list-style-type: none"> <li>• correct working out <math>100/2 = 650/x</math></li> </ul> <p><math>(2 \times 650)/100</math></p> <ul style="list-style-type: none"> <li>• correct answer 13ml</li> </ul> <p>Alternative method</p> <ul style="list-style-type: none"> <li>• <math>6 \times 2 = 12\text{ml} + (0.5 \times 2) = 1 \text{ ml}</math></li> <li>• <math>12 + 1 = 13\text{ml}</math></li> </ul> <p>Alternative method</p> <ul style="list-style-type: none"> <li>• <math>(650/100) \times 2 = 6.5 \times 2</math></li> <li>• 13ml</li> </ul> <p>Alternative method</p> <ul style="list-style-type: none"> <li>• <math>(2/100) \times 650</math></li> <li>• 13ml</li> </ul>	<p>Award full marks for correct numerical answer without working.</p> <p>Allow for ECF if candidate gets part of calculation wrong.</p>	<b>(2)</b>

Question number	Answer	Mark
3 (d) (i)	<p>Correct class of lever given</p> <ul style="list-style-type: none"> <li>• Class 1 / type 1 / 1<sup>st</sup> class (1)</li> </ul>	<b>(1)</b>

Question number	Answer	Mark
3 (d) (ii)	<p>Correct type of movement given</p> <ul style="list-style-type: none"> <li>• Oscillation (1)</li> </ul>	<b>(1)</b>

Question number	Answer	Mark
3 (e)	<p>Any <b>two</b> benefits of sports textiles (1) and a linked justification of the benefits (1).</p> <ul style="list-style-type: none"> <li>• Sports textiles can be lightweight / flexible (1) therefore they will not weigh down the athlete too much / move with the body (1)</li> <li>• They can have inbuilt sensors / monitors such as heart rate monitors (1) therefore their performance can be monitored and data recorded for analysis later (1)</li> <li>• They can contain UVA/UVB blockers / barriers (1) which means they protect the athlete from harmful rays / sunburn when out training / exercising / performing (1)</li> <li>• They can be used to control bacteria (1) which means the athlete has more protection from infection / odours / reduces body odour (1)</li> <li>• They can have waterproof coatings (1) which means the fabrics will not absorb water / retain water / moisture / wet fabrics rubbing on the skin (1)</li> <li>• They can be wicking fabrics which draw water / moisture away from the body (1) which means they can take away / absorb sweat (1)</li> <li>• They can stretch / hug the body (1) which means they will provide less drag (1)</li> <li>• They can be breathable (1) which allows the moisture to escape from inside the garment (1)</li> </ul>	<b>(4)</b>

Question number	Answer	Mark
4 (a)	<p>Any <b>one</b> working property of corrugated board (1) and a linked justification of that property (1).</p> <ul style="list-style-type: none"><li>• It is flexible / easily folded / bent (1) which means it can be folded along the 'grain / flutes' to create the form of the package (1)</li><li>• It can be easily printed on / has good printability (1) which means surface graphics / branding can be easily applied to the surface (1)</li><li>• It is a fully biodegradable material (1) which means it is sustainable / can be put into compost bins / does not need to go to landfill (1)</li><li>• It has good impact resistance (1) which means it will offer some protection to the lightbulb in transit (1)</li></ul>	<b>(2)</b>

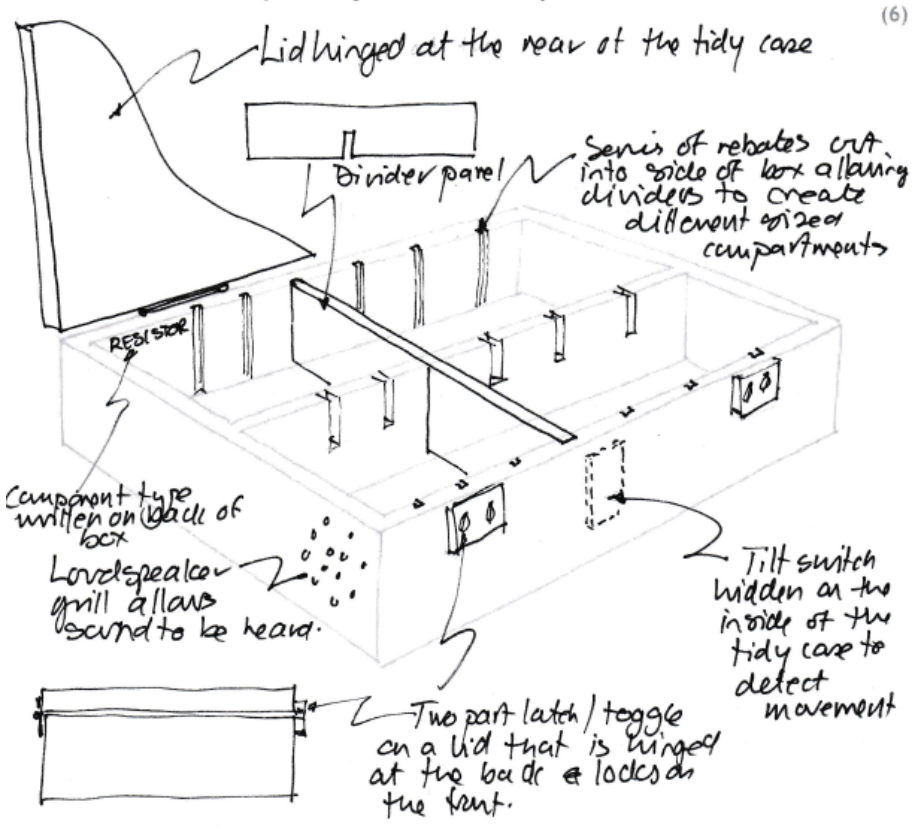
Question number	Answer	Mark
4 (b)	<p>Any <b>one</b> explanation that references the way that the cost of materials has been kept to a minimum (1) and a linked justification of that way (1).</p> <ul style="list-style-type: none"> <li>• Only one material type has been used (1) which means other / separate / additional materials do not need to be purchased / stocked / incur additional / further costs (1)</li> <li>• It is an open-sided package with the bulb held inside a cutting (1) which has reduced the area of material required to make a fully enclosed package (1)</li> <li>• It is a regular / rectangular shape (1) which means that long rectangles can be cut efficiently from the stock material without leaving too much waste / can be effectively lay planned (1)</li> </ul>	(2)

Question number	Answer	Additional guidance	Mark
4 (c)	<p>A calculation that includes:</p> <ul style="list-style-type: none"> <li>• correct working out of current area  <math>40 \times 8 = 320\text{cm}^2</math> (1)</li> <li>• correct working out of increase in area  <math>320 \times 1/8 = 40\text{cm} + 320 = 360\text{cm}^2</math> (1)</li> </ul> <p>Alternative method</p> <ul style="list-style-type: none"> <li>• correct working out of current area  <math>40 \times 8 = 320\text{cm}^2</math> (1)</li> <li>• correct working out of increase in area  <math>320 \times 1.125 = 360\text{cm}^2</math> (1)</li> </ul> <p>Alternative method</p> <ul style="list-style-type: none"> <li>• correct working out of current area  <math>40 \times 8 = 320\text{cm}^2</math> (1)</li> <li>• <math>320 \times 9/8 = 360\text{cm}^2</math> (1)</li> </ul>	<p>Award full marks for correct numerical answer without working.</p> <p>Allow for ECF if candidate gets part of calculation wrong.</p>	(2)

Question number	Indicative content	Mark
4 (d)	<ul style="list-style-type: none"> <li>IoT has given rise to services and products like 'Hive'</li> <li>Electrical plug sockets / light bulbs can sense being used and can monitor and provide feedback / data to relatives to see daily routines are being carried out such as boiling kettles / ovens / toasters</li> <li>Cameras / webcams can be placed in homes / on front doors so that movements can be observed by relatives / carers / when not at home</li> <li>Trackers / presence sensors / 'track my mobile' can be used to monitor to see where people are</li> <li>Personal alarms / alert / call buttons can be worn by users, if they fall / feel unwell the alarms can be pushed and will alert emergency services / relatives</li> <li>On line shopping / supermarket / home deliveries allow users to shop from their own homes and to have food delivered to their own homes based on what has been eaten / what is left in the cupboards / use of RFID tags</li> <li>Use of SMART locks / lights / heating</li> <li>Smart appliances can be controlled remotely and through voice activation</li> </ul>	(6)

Level	Mark	Descriptor
	0	
Level 1	1 - 2	<ul style="list-style-type: none"> <li>Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed.</li> <li>An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships between factors or competing arguments.</li> </ul>
Level 2	3 - 4	<ul style="list-style-type: none"> <li>Interrogates and deconstructs information and provides some connections and logical chains of reasoning.</li> <li>A balanced appraisal of the information/issues, containing judgements that show an awareness of the interrelationships between factors or competing arguments.</li> </ul>
Level 3	5 - 6	<ul style="list-style-type: none"> <li>Interrogates and deconstructs information and provides sustained connections and logical chains of reasoning.</li> <li>A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments.</li> </ul>

Section B – Systems

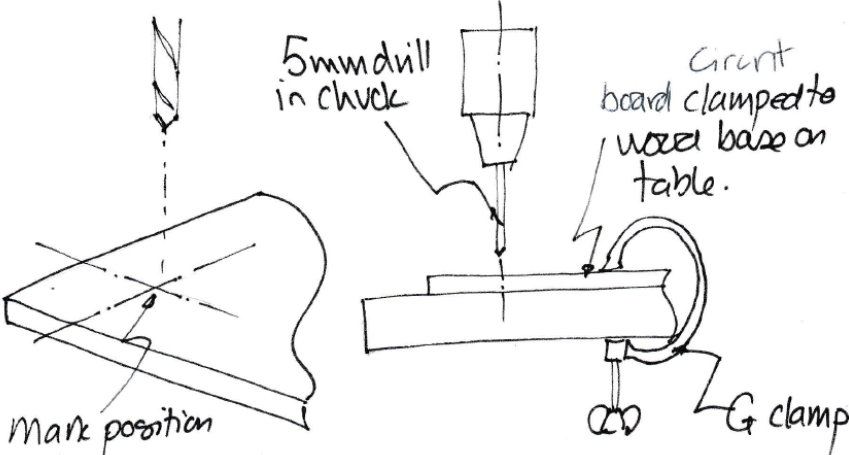
Question number	Answer	Mark
5 (a)	<p><b>Marks will be awarded for understanding of design and technology, not graphical skills.</b></p> <p>Notes and/or sketches that include:</p> <ul style="list-style-type: none"> <li>• Provide separate storage spaces for different sized boxes of electronic components (1) and allow the type of components to be seen (1) e.g. removable slots / dividers / trays / label holders / boxes face up with sizes written on them / space to write</li> <li>• Include a lockable method (1) to stop the boxes of electronic components from falling out when being moved (1) e.g. latch / catch / padlock / hasp and staple to hold a lid / cover in place / slide tray</li> <li>• Provide an audible warning (1) that will alert the user if someone tries to move the tidy case (1) e.g. Buzzer / siren / loudspeaker / form of sensor that senses movement piezoelectric sensor / tilt switch / micro switch on the handle</li> </ul> <p>Example of candidate response</p>  <p>(6)</p>	(6)

	<p>Annotated notes:</p> <ul style="list-style-type: none"><li>Lid hinged at the rear of the tidy case</li><li>Divider panel</li><li>Series of rebates cut into side of the box allowing dividers to create different sized compartments</li><li>Component type written on back of box</li><li>Loudspeaker grill allows sound to be heard</li><li>Tilt switch hidden on the inside of the tidy case to detect movement</li><li>Two-part latch / toggle on a lid that is hinged at the back and locks on the front</li></ul>	
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Question number	Answer	Mark
5(b)	<p>Any <b>two</b> explanations that include a way the boot meets or fails to meet the requirement (1) and a linked justification of that way (1).</p> <ul style="list-style-type: none"> <li>• It has holes on both sides of the boot / shaped like a boot (1) which means that the size / proportions will be the same as their own foot (1)</li> <li>• They will be able to sit down / work at a table when learning (1) which means that they will not have to be bending / reaching down (1)</li> <li>• The boot may move about (1) which would make it difficult when pulling tight on the lace / doing up the bow (1)</li> <li>• The whole boot is quite small (1) therefore it might be difficult to tie knots and bows on (1)</li> <li>• The laces are quite long (1) which means they might get tangled / tied in knots (1)</li> <li>• The timer / buttons adds a fun / competitive feature (1) which encourages children to compare progress / to practice (1)</li> <li>• The time may put pressure on the child (1) which results in the laces not being tied correctly / leads to frustration (1)</li> </ul>	<b>(4)</b>



Question number	Answer	Mark
6 (a)	<p>Any <b>two</b> explanations of physical characteristics of polymers (1) and a linked justification (1)</p> <ul style="list-style-type: none"><li>• Polymers are electrical insulators (1) which means they will not conduct electricity / makes the case safe (1)</li><li>• Polymers are tough (1) which means the product can be dropped / knocked without becoming damaged (1)</li><li>• Polymers are waterproof (1) which means they will not be damaged by water (1)</li></ul>	<b>(4)</b>

Question number	Answer	Mark
6 (b)	<p><b>Marks will be awarded for understanding of design and technology, not graphical skills.</b></p> <p>Notes and/or sketches that include:</p> <ul style="list-style-type: none"> <li>• Marking out of the hole / position (1)</li> <li>• Clamp to the machine bed or hold in vice (1)</li> <li>• Put the drill bit into the chuck (1)</li> <li>• Wear PPE to protect your eyes (1)</li> <li>• Turn machine on and lower the drill bit into the circuit board (1)</li> </ul> <p>Example of candidate response:</p>  <p>Board is clamped to piece of wood to prevent break out &amp; to protect the drill / machine bed. Clamped down to stop board moving. Drill held in chuck, turned on &amp; lowered into the circuit board. PPE worn for protection to eyes.</p> <p>Annotated notes:  Circuit board is clamped to a piece of wood to prevent break out and to protect the drill / machine bed  Clamped down to stop circuit board moving  Drill held in in chuck, turned on and lowered into the circuit board.  PPE worn for protection to eyes.</p>	(4)

Question number	Answer	Mark
6 (c)	<p>Any <b>one</b> explanation that includes a reason for manufacturing the holes to a tolerance (1) and a linked justification for that reason (1).</p> <ul style="list-style-type: none"> <li>• The holes for the fixing screws must be drilled within a set size (1) so that the screws going through the front panel line up with the holes in the circuit board (1)</li> <li>• The holes must be of the correct size (1) so that the screw bites into the hole when being fixed into the polymer case (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
6 (d)	<p>Any <b>two</b> surface finishes or treatments (1), plus <b>two</b> linked justifications of that surface finish or treatment (1) + (1).</p> <ul style="list-style-type: none"> <li>• The words could be applied using vinyl stickers (1) which means they can be manufactured separately (1) therefore the colour / type of font / size of font can be changed quite easily (1)</li> <li>• The words could be moulded into the case directly during the moulding process (1) which means that no secondary processing is required (1) therefore speeding up the overall manufacturing process time (1)</li> <li>• The words could be applied using paint / screen printed / pad printing (1) which means the letters / words can be different colours / sizes / fonts (1) therefore making them stand out from each other (1)</li> <li>• The words could be laser / mill engraved (1) which would cut them into the surface / paint rubbed in (1) therefore creating a highlight / texture (1)</li> </ul>	<b>(6)</b>

Question number	Answer	Mark
7 (a)	<p>Only answer:</p> <ul style="list-style-type: none"> <li>• Transistor (1)</li> </ul>	(1)

Question number	Answer	Mark
7 (b)	<p>Any <b>two</b> explanations that include an advantage of using CAD (1) plus a linked justification for the advantage (1).</p> <ul style="list-style-type: none"> <li>• Libraries of components exist / pre-drawn (1) which saves time rather than having to draw them / come with correct pin spacing (1)</li> <li>• Simulations allow faults to be easily identified (1) enabling modifications / reduce board size / identify problems before manufacture (1)</li> <li>• Designers can experiment with different component values / different circuits/building blocks (1) without risk of damage (1)</li> <li>• The software can be linked to CNC machines (1) which means that the PCBs can be cut direct from the computer (1)</li> <li>• Components can be copied and pasted / auto routing can be used (1) which speeds up the design process (1)</li> </ul>	(4)

Question number	Answer	Additional guidance	Mark
7 (c)	<p>A calculation that includes:</p> <ul style="list-style-type: none"> <li>• Calculation of the cost of PCB A  <math>50 \times 15 \times 0.01 = \text{£}7.50</math>  (1)</li> <li>• Calculation of the cost of PCB B  <math>24 \times 20 \times 0.01 = \text{£}4.80</math>  (1)</li> <li>• Calculation of the cost of PCB C  <math>4 \times 2 = 8 \text{ cm}^2</math>  (1)</li> <li><math>8 \times 40 \times 0.01 = \text{£}3.20</math>  (1)</li> <li>• Calculation of the cost of total  <math>7.50 + 4.80 + 3.20 = \text{£}15.50</math>  (1)</li> </ul>	<p>Award full marks for correct numerical answer without working.</p> <p>Allow ecf if candidate gets part of calculation wrong.</p>	<b>(5)</b>

Question number	Answer	Mark
7 (d)	<p>Any <b>two</b> explanations that includes a reason for manufacturing in batches (1), plus <b>two</b> linked justifications of that reason (1) + (1).</p> <ul style="list-style-type: none"> <li>• Once the batch has been made the production line can be changed (1) which means that other PCBs can be made (1) therefore ensuring that staff are employed / manufacture continues to utilise machinery / make profits (1)</li> <li>• Specific orders from retailers can be made / met (1) which means that manufacturers do not have to hold lots of stock (1) therefore they do not end up with lots of money invested / tied up in stock (1)</li> <li>• Batch production can generally respond quickly to customers' demands (1) which means any new orders can be turned around quickly / demand met (1) therefore ensuring that supplies reach the retailers in good time / when ordered (1)</li> <li>• If any errors are found / PCBs do not work (1) only a small amount of boards will need to be replaced / upgraded (1) which means that not too much money / time will have been wasted / boards have to be disposed off (1)</li> </ul>	<b>(6)</b>

Question number	Answer	Mark
8 (a)	<p>Any <b>one</b> explanation that includes an effect of the tension (1) and a linked justification of that effect (1).</p> <ul style="list-style-type: none"> <li>• The jib ties might stretch if they are not big enough (1) so they might not be able to support the weight of the jib / collapse / break (1)</li> <li>• The tension / pressure / weight on the jib ties might result in a shearing action on the pivots / attachment points (1) which could result in the arm / hinge shearing / breaking (1)</li> <li>• If the load is too heavy the tensional forces might be too great (1) so the jib ties might snap (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
8 (b)	<p>Any <b>one</b> explanation that includes an advantage of sub-assembly (1), plus <b>one</b> linked justification of that advantage (1) + (1).</p> <ul style="list-style-type: none"> <li>• It means it will be made to its own specification (1) which means it will be subjected to its own QC checks (1) therefore it can be treated as a separate product / replaced as a complete unit (1)</li> <li>• It could be made by a separate specialist company (1) which means the tower crane manufacturer does not need to invest in specialist machinery / different materials processing / use of skilled staff (1) therefore keeping investment / specialist staff costs down (1)</li> </ul>	<b>(3)</b>

Question number	Answer	Mark
8 (c)	<p>Any <b>two</b> explanations that include effects of crude oil extraction and processing (1) and a linked justification of those effects (1).</p> <ul style="list-style-type: none"> <li>• The extraction, processing and transportation of crude oil creates emissions (1) which can contribute to global warming / negative effects on health (1)</li> <li>• Crude oil needs to be transported by sea (1) which increases the probability of natural disaster from accidents and oil spills (1)</li> <li>• The extraction and processing of crude oil can pollute the local environment (1) poisoning the land / wildlife (1)</li> </ul>	<b>(4)</b>

Question number	Indicative content	Mark
8 (d)	<p><b>AO3 (9 marks)</b></p> <ul style="list-style-type: none"> <li>• It is a close representation of a real crane so form is largely dictated by function</li> <li>• The crane looks stable but might tip over if the load is too heavy</li> <li>• The crane can be changed / moved by the controller remotely</li> <li>• The form of the controller is ergonomic which makes it more attractive</li> <li>• The HIPS can be brightly coloured to reflect a real crane</li> <li>• Electronic components often use colour for identification purposes</li> <li>• The crane uses standard triangulated beams and supporting ties to increase strength to weight ratio</li> <li>• Crude oil is widely available from a range of countries if it becomes impossible to source it from Saudi Arabia</li> <li>• Demand for crude oil increases pressure on environment locally to the country of manufacture</li> <li>• Local communities are over-dependent upon crude oil which is a finite resource</li> <li>• The electronics contains scarce elements which are exploited and non-renewable so close to running out</li> <li>• The electronics contains hazardous elements which can affect health if not disposed of responsibly</li> <li>• Crude oil needs to be transported from Saudi Arabia by sea which increases probability of natural disaster from accidents and oil spills</li> <li>• Transportation and pollution issues to local communities because of high volume oil extraction</li> <li>• HIPS is quite easy to recycle and reuse once it has been separated out</li> <li>• Waste from the production can be used for other things</li> <li>• Although HIPS is quite easy to recycle it is not widely recycled if it is not returned to the manufacturer/specialist processor</li> <li>• The difficult and dangerous recycling process of the electronic components is often carried out in developing countries raising health concerns</li> <li>• The use of rechargeable batteries make the model more sustainable as they last much longer than disposable examples so there is less waste</li> </ul>	<b>(9)</b>



Level	Mark	Descriptor
	0	
Level 1	1 - 3	<ul style="list-style-type: none"> <li>• Attempts to interrogate and deconstruct information but connections and logical chains of reasoning are flawed.</li> <li>• An unbalanced appraisal of the information/issues, containing judgements that show a limited awareness of the interrelationships between factors or competing arguments.</li> <li>• A conclusion may be presented but it is likely to be generic assertions rather than supported by relevant judgements.</li> </ul>
Level 2	4 – 6	<ul style="list-style-type: none"> <li>• Interrogates and deconstructs information and provides some connections and logical chains of reasoning.</li> <li>• A balanced appraisal of the information/issues, containing judgements that show an awareness of the interrelationships between factors or competing arguments.</li> <li>• A conclusion is presented that is partially supported by relevant judgements.</li> </ul>
Level 3	7 - 9	<ul style="list-style-type: none"> <li>• Interrogates and deconstructs information and provides sustained connections and logical chains of reasoning.</li> <li>• A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments.</li> <li>• A conclusion is presented that is fully supported by relevant judgements.</li> </ul>

