



National
Qualifications
2026

2026 Design and Manufacture

National 5

Question Paper Finalised Marking Instructions

These marking instructions have been prepared by examination teams for use by Qualifications Scotland appointed markers when marking external course assessments.

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General marking principles for National 5 Design and Manufacture

Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates' responses.

- (a) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
- (b) If a candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your team leader.
- (c) To be awarded marks candidates must respond to the command word used in the question. For example, listing a valid point, even if correct, should not be awarded marks if the question asked for an outline, description or explanation.
- (d) Mark consecutive responses to match the marks in 'name/state' questions. For example, if two responses are given to a **1 mark** question, only the first response should be marked.
- (e) Candidates must answer all aspects of the question to gain full marks. For example, if the questions require two reasons candidates must make two valid and substantiated points relating to the question to gain both marks. If the questions require three stages to be described, candidates must provide a structure of characteristics and/or features of each of the three stages to be awarded all **3 marks**.
- (f) For each candidate response, the following provides an overview of the marking principles. Refer to the specific marking instructions for further guidance on how these principles should be applied.
 - (i) Questions that ask candidates to **name/state**
Candidates will normally be required to make the same number of statements as marks available in the question.
 - (ii) Questions that ask candidates to **outline**
Candidates must provide a brief sketch of content. More than naming, but not a detailed description. Candidates will normally be required to make the same number of actual/appropriate points as marks available in the question.
 - (iii) Questions that ask candidates to **describe**
Candidates must provide a statement or structure of characteristics and/or features. This should be more than an outline or a list. Candidates may refer to, for instance, a concept, experiment, situation, or facts in the context of, and appropriate to, the question. Candidates will normally be required to make the same number of factual/appropriate points as marks available in the question.
 - (iv) Questions that ask candidates to **explain**
Candidates must generally relate cause and effect and/or make relationships between things clear. This will be related to the context of the question or a specific area within a question.

Marking instructions for each question

Section 1

Question			Expected response	Max mark	Additional guidance
1.	(a)	(i)	State two benefits of using softwoods in the manufacture of the coffee station: • readily available • sustainable • easy to cut/work • looks attractive • strong/sturdy • durable/tough Any other suitable response.	2	1 mark for each correct response up to a maximum of 2 marks. Unqualified '<i>quick</i>', '<i>cheap</i>' or '<i>easy</i>' responses score 0 marks. <i>'Softwoods are easy to source.'</i> (1 mark) <i>'It is easy to cut out joints.'</i> (1 mark) <i>'It is cheaper than hardwood.'</i> (1 mark) <i>'It is lightweight.'</i> (0 marks)
		(ii)	A description that includes two of the following: • measure using steel rule • draw lines perpendicular to the edge using try square • mark depth parallel to the edge using marking gauge • mark centres with a bradawl/dowel pin Any other suitable response.	2	To be awarded marks candidates must provide a description when answering this question. 1 mark for each correct description up to a maximum of 2 marks. A list of tools on its own scores 0 marks. <i>'Use a steel rule to measure the sizes.'</i> (1 mark) <i>'Use a try square to mark the line across the edge.'</i> (1 mark) <i>'Mark the lines with a try square.'</i> (1 mark) <i>'Use a bradawl/dowel pin/centre punch to create an indent at the dowel position.'</i> (1 mark) <i>'Use an engineer's square to mark the line across the edge.'</i> (0 marks) <i>'Mark line parallel to the edge.'</i> (0 marks) <i>'Use a pencil, rule and try square'</i> (0 marks) Sketches may attract marks independently. If the graphic indicates the right tool but has been annotated incorrectly marks should be awarded.

Question			Expected response	Max mark	Additional guidance
		(iii)	Name a suitable drill bit that could be used to make the holes: • twist drill • forstner bit	1	1 mark for correct response. <i>'Jobber drill.'</i> (1 mark) <i>'Step drill.'</i> (0 marks)
		(iv)	An outline that includes the following: • set the depth stop on drill • measure and tape the drill bit for guidance Any other suitable response.	1	1 mark for correct response. <i>'Mark the drill bit with masking tape'</i> (1 mark) <i>'Put masking tape on the drill.'</i> (1 mark) <i>'Mark with pen at the correct depth'</i> (1mark) <i>'Set the depth stop'</i> (1 mark) <i>'Set the depth on the drill'</i> (1 mark) <i>'Set the table to the correct depth'</i> (1 mark) Reference to depth on its own does not warrant a mark. <i>'Set the depth.'</i> (0 marks) <i>'Depth stop.'</i> (0 marks) <i>'Use masking tape.'</i> (0 marks) <i>'Set the drill.'</i> (0 marks) <i>'Use a steel ruler.'</i> (0 marks) <i>'Put a steel rule in the cut hole to check depth'</i> (0 marks)

Question			Expected response	Max mark	Additional guidance
		(v)	A description that includes: - remove pencil marks/glue with eraser/sandpaper - remove imperfections, for example, bumps/chips/gaps - sand the wood using abrasive papers - dampen the wood to raise the grain - remove dust/use white spirit/damp cloth Any other suitable response.	3	To be awarded marks candidates must provide a description when answering this question. 1 mark for each valid stage up to a maximum of 3 marks. <i>'Fill holes with wood filler.'</i> (1 mark) <i>'Sand it.'</i> (1 mark) <i>'Sand with rough sandpaper then sand with smooth sandpaper.'</i> (1 mark) <i>'Sand it, wet the wood, sand it again.'</i> Shows a deeper level of understanding than references to different grades of sandpaper. (2 marks)
		(vi)	State two reasons why wood stain is a suitable finish for the base: - quicker to apply with a cloth - dries more quickly - changes the colour - creates a contrast - ability to see the grain Any other suitable response.	2	1 mark for each valid reason up to a maximum of 2 marks. <i>'Stain will change the colour of the light softwood to look like a darker wood.'</i> (1 mark) <i>'Stain will allow the wood grain to be seen through the new colour.'</i> (2 marks) <i>'Quicker to apply than varnish.'</i> (1 mark) <i>'It looks good.'</i> (1 mark) 0 marks awarded for references to durability/ prevents rotting/protects wood from moisture. <i>'Quick to apply.'</i> (0 marks) for the unqualified quick.
		(vii)	An explanation that includes any of the following: - allows the screw to sit flush with the surface - will stop the screw scratching surfaces Any other suitable response.	1	To be awarded marks candidates must provide an explanation when answering this question. 1 mark for a valid response. <i>'So that the product sits flat.'</i> (1 mark) <i>'Looks nicer'.</i> (0 marks) as the screw is on the bottom of the base, so will not be visible.

Question			Expected response	Max mark	Additional guidance
	(b)	(i)	A statement that includes two of the following: - looks attractive - chemical resistant/easy to clean - moisture/weather resistant - resistant to corrosion - easy to cut/drill/shape/bend - lightweight Any other suitable response.	2	1 mark for each correct response up to a maximum of 2 marks. Responses referring to strong or durable score 0 marks as they are given in the question. <i>'It is light in weight.'</i> (1 mark) <i>'It can be painted.'</i> (1 mark) <i>'Easy to work with.'</i> (1 mark)
		(ii)	An outline that includes: - cross filing - draw filing - use suitable abrasives (paper/cloth/wool) - polishing/buffing Any other suitable response.	2	1 mark for each valid stage up to a maximum of 2 marks. <i>'Cross file and draw file.'</i> (2 marks) <i>'Cross file the edges.'</i> (1 mark) <i>'File it.'</i> (1 mark) <i>'Rub with emery cloth then wet and dry.'</i> (1 mark) <i>'Rub the edges with steel wool and soap.'</i> (1 mark) <i>'Paint it.'</i> (0 marks) References to 'sand/glass paper' on their own (0 marks) Sketches may attract marks independently. If the graphic indicates the right process but has been annotated incorrectly marks should be awarded.
		(iii)	A description that includes two of the following: - put the metal bar into an vice or bending bars - in a vice with the bend line at the edge or use a box folder - use a hammer/mallet to bend the metal bar - use of a jig/former/template check the angle.	2	To be awarded marks candidates must provide a description when answering this question. 1 mark per correct description up to a total of 2 marks. <i>'Bend it using the box folder'</i> (1 mark) <i>'Using and engineers square to check the right angle'</i> (1 mark) Box folder named as 'bending machine' or 'gabro' is acceptable.

Question			Expected response	Max mark	Additional guidance
	(c)	(i)	Name a suitable hardwood for the peg: • beech • oak • mahogany • ash Any other suitable response.	1	1 mark for a valid response. Balsa is not suitable as it is not strong enough.
		(ii)	An outline that includes: • finding the centres on ends by joining the diagonals with a straight edge/rule • drawing circle on ends • saw down diagonal using a tenon saw on one end • using a centre punch/bradawl/drill to mark centres • remove corners using a plane Any other suitable response.	4	1 mark for each valid stage up to a maximum of 4 marks. Where candidates refer to marking diagonals or circles on the end of the blank it is not necessary to reference a tool. A list of tools on its own scores 0 marks. <i>'Find the middle by drawing from one corner to another with a steel rule and pencil.'</i> (1 mark) <i>'Plane the corners off'.</i> (1 mark) <i>'Use a centre punch.'</i> (1 mark) <i>'Mark the waste.'</i> (0 marks) <i>'Saw the X.'</i> (0 marks) <i>'Cut the X.'</i> (0 marks) <i>'Use a punch.'</i> (0 marks) <i>'Saw diagonals'</i> (0 marks). Candidate must name the type of saw.

Question			Expected response	Max mark	Additional guidance
		(iii)	An outline that includes: • apply a thin coat • apply an even coat • cover all surfaces • increase speed of lathe • ensure that the lathe tools are sharp • move the lathe tool slowly • take fine cuts • apply appropriate pressure with tool • sand the work using a range of glass paper grades from rough to smooth or from low numbers to high • burnishing the wood • apply wax/varnish whilst turning • multiple layers applied • sand between layers Any other suitable response.	2	1 mark for each correct response up to a maximum of 2 marks. <i>‘Wax the wood’. (1 mark)</i> <i>‘Polish the wood.’ (1 mark)</i> <i>‘Burnish the wood.’ (1 mark)</i> <i>‘Use wood shavings against the turned piece.’ (1 mark)</i> <i>‘Sand it at a higher speed.’ (1 mark)</i>

Question			Expected response	Max mark	Additional guidance
	(d)	(i)	A description that includes three of the following: • set odd-leg callipers to correct size • mark lines for centre using odd-leg callipers • centre punch the middle of the crosses • draw lines at 90 with an engineer's square • draw lines with a scribe Any other suitable response.	3	To be awarded marks candidates must provide a description when answering this question. 1 mark for each correct outline up to a maximum of 3 marks. Candidates must refer to marking out the centres and corners, a maximum 2 marks for centres. A list of tools on its own scores 0 marks. <i>'Use engineer's blue'. (1 mark)</i> <i>'Set odd leg callipers to 20mm and draw line.'</i> (1 mark) <i>'Mark all the lines with odd leg callipers.'</i> (1 mark) <i>'Use a steel rule to measure the sizes.'</i> (1 mark) <i>'Use a scribe to mark the lines.'</i> (1 mark) <i>'Mark the lines with an engineer's square and scribe.'</i> (2 marks) <i>'Set odd leg callipers to 25mm and draw horizontal line, then set the odd-leg callipers to 10mm and draw vertical line to mark centres, then set the odd-leg callipers to 20mm to mark the long red line.'</i> (3 marks) References to 'a try square.' (0 marks) Sketches may attract marks independently. If the graphic indicates the right tool but has been annotated incorrectly marks should be awarded.
		(ii)	Name a suitable tool that could be used to cut the corners: • tin snips • junior hacksaw • hacksaw • coping saw (blades are available that cut both wood and metal). Any other suitable response	1	1 mark for a correct response. <i>'Use a notcher'. (1 mark)</i> <i>'Use a guillotine'. (1 mark)</i>

Question			Expected response	Max mark	Additional guidance
		(iii)	Name a suitable finish for the spoon holder: • paint • dip coating Any other suitable response.	1	1 mark for a correct response. <i>'Use polish'. (0 marks)</i>
2.	(a)		An outline that includes any of the following: Set up stage • consider what information is required from the user trip • unpacking, assembling, or configuring • read instruction and find out how to use product • identify important stages in using the product, eg install, use and storage • preparing the user or environment Undertaking • testing the product considering features like ergonomics, aesthetics, or performance. • describe what the user does step-by-step • maintenance • storage • use in all possible conditions and environments Putting away/ decommissioning • packing the product down • folding it, or placing it in storage • ease of disposal • compactness • overall maintenance at the end of a cycle Collating • record findings • analyse information gained from user trip Any other suitable response.	3	1 mark for each valid description up to a maximum of 3 marks. Some interpretation may be required from the marker with reference to the bullet points on the left. Typical response: <i>'Consider the target audience.'</i> (1 mark) <i>'Analyse results.'</i> (1 mark) <i>'Use the item for a period of time.'</i> (1 mark) 0 marks awarded for references to a user trial. <i>'Distribute the item.'</i> (0 marks) <i>'Hand out item to target audience.'</i> (0 marks)

Question			Expected response	Max mark	Additional guidance
	(b)		An outline containing any of the following: • can be written to suit the target market • to gather opinions from a wide range of people • questionnaires can be completed using a variety of methods • questionnaires can be completed anonymously • can be used to inform a specification • specific questions can be asked • a rating system can be used to further refine the process • the results are easy to present in the form of graphs/charts • can be collated quickly • easy analysis of data Any other suitable response.	3	1 mark for each valid point leading to a clear explanation up to a maximum of 3 marks. Unqualified 'quick', 'cheap' or 'easy' on their own score 0 marks. <i>'You can get lots of opinions and they are easy to collate.'</i> (2 marks) <i>'You can get public opinion/feedback.'</i> (1 mark) <i>'Easy to distribute via paper/ email/internet.'</i> (1 mark) <i>'You can collect information.'</i> (0 marks) <i>'They are quick to do.'</i> (0 marks)
3.			An outline that refers to the following stages: • identify a set of suitable parameters for the table heading • populate the rows with suitable attributes • randomly generate a combination of attributes • generate ideas from results Any other suitable response.	3	1 mark for each valid point leading to a clear outline, up to a maximum of 3 marks. It is possible to attract 3 marks by drawing a morphological analysis table that highlights the bullet points to the left. <i>'Morphological analysis is when the designer makes a table with columns relating to different aspects affecting the design, they list options in each column, randomly select one option from each column and sketch an idea that includes the selections.'</i> (3 marks)

Question			Expected response	Max mark	Additional guidance
4.	(a)		An outline that includes two of the following: • can be used to show alignment of parts • joining methods can be clearly shown • to show individual parts • useful to show the number of parts Any other suitable response.	2	1 mark for each valid point up to a maximum of 2 marks. Different answers must be given in parts (a) and (b). <i>'You can see how it fits together.'</i> (1 mark) <i>'You can get the sizes.'</i> (0 marks)
	(b)		Outline including any of the following: • communicates aesthetic qualities; colours, textures, patterns, proportion • communicates material • can be used to present to a client • can be used in marketing Any other suitable response.	2	1 mark for each valid point leading to a clear outline, up to a maximum of 2 marks. Different answers must be given in parts (a) and (b). <i>'You can see it in 3D.'</i> (1 mark) <i>'You can see how it looks as a finished/final product.'</i> (1 mark) <i>'You can see the colours.'</i> (1 mark) <i>'You can see the colours and patterns.'</i> (1 mark) <i>'These graphics can be used to communicate what materials the product is made from.'</i> (1 mark) <i>'Easy to send to the client.'</i> (1 mark) <i>'Easy to modify if produced by CAD.'</i> (1 mark) <i>'Easy to store.'</i> (0 marks) <i>'Easy to send.'</i> (0 marks)

Question			Expected response	Max mark	Additional guidance
5.			Description including any of the following general reasons: • provides better understanding of 3D form • to help generate ideas • easily changed • to develop ideas • to communicate with the client • to check/test aspects of the design • can be altered and refined as feedback is gained • cheaper than making the product repeatedly Candidates would have to refer specifically to computer-generated models to gain marks for: • very accurate • different views and versions can be created • realistic representation of materials and textures • long term economic benefit • easy to edit/change • can send/share electronically • ease of storage • easy to export to CAM/CNC/rapid prototyping Any other suitable response.	2	To be awarded marks candidates must provide a description when answering this question. 1 mark per correct response up to a total of 2 marks. Candidates may refer to physical or computer-generated models. Multiple references to testing or refining design factors may gain multiple marks. <i>‘To check the sizes.’ (1 mark)</i> <i>‘To see what it looks like in real life.’ (1 mark)</i> <i>‘To see what it looks like.’ (0 marks)</i> <i>‘To check it.’ (0 marks) – this response is too vague.</i>

Question			Expected response	Max mark	Additional guidance
6.	(a)	(i)	Candidates are expected to describe how the following design factors may have influenced the treadmills: - ergonomics Typical responses could include reference to: Anthropometrics Any one part of the treadmill linked to one piece of appropriate anthropometric information. - diameter of handle, hand grip diameter - size of buttons, thumb/finger size - width of treadmill, leg spacing/hip width - length of treadmill, stride length Physiology - soft parts on the handles for comfort/grip - ease of pressing buttons - ease of lifting the running deck Psychology - red emergency stop - white buttons on black background are easy to see Any other suitable response.	4	To be awarded marks candidates must provide a description when answering this question. 1 mark for each reason valid description, up to a maximum of 4 marks. Different answers must be given in parts (i), (ii) and (iii). Anthropometrics 0 marks should be awarded for percentiles only. <i>'Fits 50th %ile sizes.'</i> (0 marks) <i>'Length of treadmill should match the length of the stride/leg.'</i> (1 mark) Physiology <i>'The buttons are easy to push by the user.'</i> (1 mark) <i>'The treadmill is easy to fold up.'</i> (1 mark) Psychology <i>'The red safety clip gives a reassuring feeling.'</i> (1 mark) 0 marks should be awarded for generic statements about ergonomics. <i>'The handles fits user's sizes.'</i> (0 marks) <i>'The handle is comfortable.'</i> (0 marks)

Question			Expected response	Max mark	Additional guidance
		(ii)	Candidates are expected to describe how the following design factors may have influenced the treadmills: - function Typical responses could include reference to: - the belt changes speed to allow the user to walk/run - handles allow the user to rest - incline to increase difficulty for the user - length of treadmill for gait of user - area at side of treadmill to allow user to stand whilst setting up machine - the display shows your current speed - compartment on the console to hold a water bottle Any other suitable response.	3	To be awarded marks, candidates must provide a description when answering this question. 1 mark for each valid description, up to a maximum of 3 marks. Different answers must be given in parts (i), (ii) and (iii). Ergonomic responses can gain marks as long as they are speaking about a specific functional part/feature of the treadmill. <i>‘Walking/running/exercise on the treadmill.’ (1 mark)</i> <i>‘The speed of the treadmill can be changed.’ (1 mark)</i> <i>‘Metal area to hold to record users pulse rate.’ (1 mark)</i> <i>‘The angle of the treadmill can be changed.’ (1 mark)</i> <i>‘The treadmill can take impact so less harm comes to the user when running.’ (1 mark)</i> <i>‘The treadmill can hold a water bottle.’ (1 mark)</i> 0 marks should be awarded for generic statements. <i>‘The treadmill is adjustable.’ (0 marks)</i> <i>‘The belt can move.’ (0 marks)</i> <i>‘It is easy to turn on.’ (0 marks)</i>

Question			Expected response	Max mark	Additional guidance
		(iii)	Candidates are expected to describe how the following design factors may have influenced the treadmills: • safety Typical responses could include reference to: • safety clip to attach to user • emergency stop button • compartments to hold items securely • hand grips so that your hands don't slide off the bars • non-slip belt • selection of materials that are easy to clean Any other suitable response.	3	To be awarded marks, candidates must provide a description when answering this question. 1 mark per correct response up to a total of 3 marks. Different answers must be given in parts (i), (ii) and (iii). <i>'The compartments allow the user to keep their water and phone safe whilst running.'</i> (1 mark) Candidates can gain more than 1 mark per safety aspect listed. <i>'It's got an emergency stop and a safety clip which can be attached to the user.'</i> (2 marks) <i>'It has compartments.'</i> (0 marks) <i>'No sharp corners.'</i> (0 marks)

Question			Expected response	Max mark	Additional guidance
	(b)		Candidates are expected to describe the following areas: • shape • form • texture • line • proportion • symmetry • contrast • harmony • pattern • fashion • material • theme/style Any other suitable response.	3	To be awarded marks, candidates must provide a description when answering this question. 1 mark per correct description up to a total of 3 marks. To gain 1 mark, candidates should refer to one of the broad areas and link it to the bottle. <i>‘The bottle is pink.’ (1 mark)</i> <i>‘The bottle is pink and black.’ (1 mark)</i> <i>‘The pink and black parts of the bottle contrast.’ (2 marks)</i> <i>‘The bottle has a curved shape.’ (1 mark)</i> <i>‘The bottle is bright and has appealing colours.’ (1 mark)</i> <i>‘The bottle has a bumpy texture.’ (1 mark)</i> <i>‘The plastic material looks good.’ (0 marks)</i> Vague/opinion-based responses attract 0 marks. <i>‘Colourful’ (0 marks)</i> <i>‘It’s bright.’ (0 marks)</i> <i>‘It looks good.’ (0 marks)</i> <i>‘It has nice colours.’ (0 marks)</i> <i>‘The colours look nice.’ (0 marks)</i> <i>‘Textured grip’ (0 marks)</i> A list of aesthetic terms attract 0 marks. Multiple references at any of the broad areas attract 1 mark.

Question			Expected response	Max mark	Additional guidance
	(c)	(i)	A description that includes one of the following: • research into new materials pushes the development on new products • research into new technology pushes the development on new products • research into new production methods pushes the development on new products • innovative technology generates new products or features • new products are created that are not based on market research Any other suitable response.	1	To be awarded marks candidates must provide a description when answering this question. <i>‘When a new technology is developed it means new products can be designed.’ (1 mark)</i> <i>‘Technology push refers to new products being developed because new technologies have been developed.’ (1 mark)</i>
		(ii)	A description that includes one of the following: • when products are developed in response to market forces or customer needs • changes in society mean new products are required by users Any other suitable response.	1	To be awarded marks candidates must provide a description when answering this question. <i>‘Market pull refers to when companies have to come up new products because consumers want them.’ (1 mark)</i>

Section 2

Question			Expected response	Max mark	Additional guidance
7.	(a)	(i)	Candidates are expected to state two reasons why polystyrene is a suitable material for the plastic packaging: • easy to form/moulded • tough/durable • recyclability • non-toxic • readily available Any other suitable response	2	1 mark for each correct statement up to a maximum of 2 marks. <i>'It is durable.'</i> (1 mark) <i>It is flexible.'</i> (1 mark) <i>'It is see through.'</i> (1 mark). <i>'it can be easily moulded'</i> (1 mark) <i>'Light weight'</i> (1 mark) <i>'Scratch resistant'</i> (1 mark) (has some degree of scratch resistance) <i>'Weather resistant.'</i> (0 marks) <i>'It is strong.'</i> (0 marks) <i>'It is cheap.'</i> (0 marks) <i>'Easy to clean.'</i> (0 marks) <i>'Reheated and reshaped.'</i> (0 marks)
		(ii)	Candidates are expected to state two reasons why the metal alloy is a suitable material for the body of the car: • strong • durable • recyclability • non-toxic • moisture/ weather resistant • resistant to corrosion Any other suitable response	2	1 mark for each correct statement up to a maximum of 2 marks. <i>'It is scratch resistant.'</i> (1 mark) <i>'It can be painted.'</i> (1 mark) <i>'It can be easily moulded.'</i> (1 mark) <i>'It is realistic.'</i> (1 mark) <i>'It is resistant to chemicals.'</i> (1 mark) <i>'It is cheap.'</i> (0 marks) <i>'Light weight'</i> (0 marks)

Question			Expected response	Max mark	Additional guidance
	(b)		Candidates are expected to state two identifying features that show products are die cast: • accuracy • solid metal products • consistency of product • high quality finish • intricate/complex shapes • split lines • injection marks • ejection marks • flashing Any other suitable response	2	1 mark for each identification feature of die casting up to a maximum of 2 marks. Based on the given product reference to a smooth surface finish can be awarded 1 mark. <i>‘Smooth surface finish.’ (1 mark)</i> <i>‘Made from metal.’ (1 mark)</i> <i>‘No sharp edges.’ (0 marks)</i>
	(c)	(i)	Candidates are expected to state a manufacturing reason for each feature of vacuum forming: • tapered edges Expected responses include: • slope allows easy removal of pattern	1	1 mark for correct manufacturing reason. <i>‘Stops plastic sticking to pattern.’ (1 mark)</i>
		(ii)	Candidates are expected to state a manufacturing reason for each feature of vacuum forming: • rounded corners Expected responses include: • reduces risk of plastic tearing/ breaking	1	1 mark for correct manufacturing reason. <i>‘Stops the material getting too thin at the corners.’ (1 mark)</i>

Question		Expected response	Max mark	Additional guidance
8.	(a)	Responses could include any of the following: • fast production rate • less labour intensive/ reduction in labour costs • reduction in work related injuries/illnesses • the process can be automated • product can be created directly from CAD drawing • creates complex products that are free from the restraints of traditional manufacturing techniques • large volumes can be produced • accuracy of parts • reduces waste • repeatability • increased efficiency • machines can run 24 hours a day without sick leave or holidays • provides consistency as each part is manufactured identically • processes are flexible in the manufacture of products • economies of scale • quality of product more consistent Any other suitable response.	4	To be awarded marks candidates must provide a description when answering this question. 1 mark for each valid point leading to a clear explanation, up to a maximum of 4 marks. Different answers must be given in parts (a) and (b). Unqualified '<i>cheap</i>' or '<i>easy</i>' responses score 0 marks. Example answer: <i>'The increase of automation in mass manufacture has led to a reduction in the number of workers, saving money on wages.'</i> (2 marks) <i>'Products can be made faster to meet consumer demand.'</i> (1 mark) <i>'The process is fully automated.'</i> (1 mark) <i>'Easy to change for different products.'</i> (1 mark) <i>'More efficient.'</i> (1 mark) <i>'Consistent quality.'</i> (1 mark) <i>'High quality.'</i> (0 marks) Responses that refer to the process of a CAD model are unlikely to gain marks.

Question		Expected response	Max mark	Additional guidance
	(b)	Responses are expected to include two of the following: • products are cheaper so more accessible to buy • encourages a throw away society • a larger range of products available • products are more readily available/meets consumer demand • reduction in jobs • economic decline of area • skilled workers required for higher level roles • some workers becoming deskilled • reduction in work related injuries Any other suitable response.	2	To be awarded marks candidates must provide a description when answering this question. Different answers must be given in parts (a) and (b). 1 mark for each valid point leading to a clear description, up to a maximum of 2 marks. Responses must be linked to society to gain marks. <i>‘The increase of automation in mass manufacture has led to a reduction in the number of workers required and so has meant workers are becoming deskilled.’ (2 marks)</i> <i>‘More people can afford to buy products.’ (1 mark)</i>

Question			Expected response	Max mark	Additional guidance
9.			Candidates are expected to outline three benefits of using standard components in products: • produced in a range of standard sizes so easy to plan into production • reduces the need for manufacturer to employ a workforce to assemble the products • cheaper to buy than producing inhouse • manufacturer has adaptability to use components on different products • consistent quality – could be good or bad • available in large quantities • easy to source • fewer stages in production. • simple assembly process Any other suitable response.	3	1 mark for each valid point leading to a clear outline, up to a maximum of 3 marks. Unqualified <i>‘quick’</i>, <i>‘cheap’</i> or <i>‘easy’</i> responses score 0 marks. <i>‘Speeds up production process.’</i> (1 mark) <i>‘Will fit common tools.’</i> (1 mark) <i>‘Easy to source.’</i> (1 mark) <i>‘Easy to work with.’</i> (1 mark) <i>‘Easy to take apart and move house.’</i> (1 mark)
10.			Candidates are expected to describe the steps that could be taken to increase the life expectancy of products: • easy to access replacement parts • finishes • appropriate quality of materials • improve the manufacturing quality • limit the amount of products being produced to meet demand • improve the assembly quality • quality assurance during the manufacturing process • user instructions to clarify correct use of the product • improved device management options • easy to maintain • method to protect product • long-life battery/cells Any other suitable response.	3	To be awarded marks candidates must provide a description when answering this question. 1 mark for each valid point leading to a clear outline, up to a maximum of 3 marks. <i>‘Use more expensive materials.’</i> (1 mark) <i>‘Reduce the number of parts.’</i> (1 mark) <i>‘Reuse parts.’</i> (1 mark)

[END OF MARKING INSTRUCTIONS]