National
Qualifications
2023

2023 Design and Manufacture

National 5

Finalised Marking Instructions

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

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/select**
Candidates must provide the answer in brief form/name. 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)	• red pine • spruce. **Any other suitable response.**	**1**	**1 mark** for correct response. Any other suitable response could include: • cedar • douglas fir • larch • any reference to 'pine'.
		(ii)	• forstner bit. **Any other suitable response.**	**1**	**1 mark** for correct response. Any other suitable response could include: • spade/flat bit.
		(iii)	• jack plane • smoothing plane. **Any other suitable response.**	**1**	**1 mark** for correct response. *'Plane.'* **(1 mark)** *'Block plane.'* **(1 mark)** *'Plough plane' or 'rebate plane.'* **(0 marks)** Any reference to 'chisel'. **(0 marks)**

Question			Expected response	Max mark	Additional guidance-
	(b)	(i)	Description of how the corner rebate joint could be marked and cut out accurately. Marking out stage: • measure the thickness of wood and mark from end of the other piece with a steel rule • draw lines at 90 degrees with try square • mark depth with marking gauge. Cutting stage: • use a clamp to hold a guide piece of wood next to the line • cut the line to the required depth using a tenon saw/gent's saw. • remove the waste wood with a chisel (naming a specific chisel is not required) • level the bottom of the joint with a rebate plane/chisel. There is no requirement to refer to the identified stages in the correct sequence. **Any other suitable response.**	**4**	Candidates must refer to both the marking out and cutting stages to gain full marks. **A maximum of 3 marks** may be awarded to responses that only refer to one of the stages. Responses that do not refer to appropriate tools score **a maximum of 1 mark.** Candidates may use sketches to aid their descriptions. Lists of tools score **0 marks** for example 'use a saw and chisel.' '*Mark the distance with a rule.*' scores **0 marks** (a rule should be used to measure). References to *'clamping/securing in a vice'* on its own score **0 marks**. Basic statements such as *'mark the wood with a pencil'* score **0 marks.** '*Mark the lines with a try square.*' **(1 mark)** *'Find the centre using a marking gauge.'* **(1 mark)** References to sanding/filing the bottom of the joint score **0 marks.** Use of the same tool for more than one stage e.g *'saw across the grain with tenon saw and saw down the end grain.'* **(2 marks)** *'Cut the joint with a tenon saw.'* **(1 mark)**

Question			Expected response	Max mark	Additional guidance
		(ii)	• rub • dowel. **Any other suitable response.**	**1**	**1 mark** for correct response. Any other suitable response could include: • butt • dovetail • finger • biscuit. Other references to the same joint score **0 marks**, for example, *'Lap.'* **(0 marks)** *'Corner halving.'* **(0 marks)**
		(iii)	• measuring diagonals • using try/engineers square in corners. **Any other suitable response.**	**2**	To be awarded marks candidates must provide an outline when answering this question. **1 mark** for valid point leading to a clear outline. References to '*jig*' or '*template*' can score **1 mark**. *'Use a try square.'* **(1 mark)**. *'Measure the diagonals.'* **(1 mark).** *'Measure it.'* **(0 marks).**
		(iv)	• PVA glue.	**1**	**1 mark** for correct response. 'Wood glue' **(1 mark)** 'Glue' **(0 marks)** Trade names of glues. **(0 marks)**
		(v)	• remove pencil marks/glue with eraser/sandpaper • sand the wood using abrasive papers/steel wool • dampen the wood to raise the grain • remove dust/use white spirit/damp cloth • remove imperfections, for example, bumps/chips/gaps. **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.** *'Sand with rough sandpaper then sand with smooth sandpaper.'* **(1 mark)** *'Sand it, wet the wood, sand it again.'* Shows a deeper level of understanding than references to different grades of sandpaper. **(3 marks)**

Question			Expected response	Max mark	Additional guidance
	(c)	(i)	State any **two** of the following: • easy to cut/shape • attractive • polishes to a high shine • does not rust/non-ferrous • easy to source • comes in sheet form • gold colour. **Any other suitable response.**	**2**	**1 mark** for each correct response, up to **a maximum of 2 marks.** Unqualified *'quick'*, *'cheap'* or *'easy'* **on their own** score **0 marks.** The following properties do not refer to suitability for the clock face and score **0 marks**: • durable against wear • strong • weight. *'Easy to clean.'* **(0 marks)** *'It has a gold colour.'* **(1 mark)** *'It looks like gold.'* **(1 mark)** *'It's gold.'* **(0 marks)** Unqualified *'gold'* responses score **0 marks.**

Question			Expected response	Max mark	Additional guidance
		(ii)	Description of how to mark out the centre of the clock face, with reference to workshop tools. Typical responses are likely to include reference to: • set odd leg callipers to centre of material (no mention of steel rule required as the distance can be approximated and marked from both edges) • draw centre lines by running odd leg callipers down the edge of the metal • use a steel rule for measuring the position of the centre lines **Any other suitable response.**	**2**	To be awarded marks candidates must provide a description when answering this question. **1 mark** for valid point leading to a clear description. Candidates may use sketches to aid their descriptions. *'Measure halfway across with steel rule.'* **(1 mark)** *'A scriber to mark the lines.'* **(1 mark)** *'Mark the lines with an Engineer's square.'* **(1 mark)** *'Mark the lines with an Engineer's square and scriber.'* **(2 marks)** Responses that do not refer to appropriate tools score **a maximum of 1 mark.** Lists of tools score **0 marks**, for example, '*use a scriber and steel rule.'* *'Mark the distance with a rule*' scores **0 marks** (a rule should be used to measure). *'Use a steel rule to draw the lines.'* **(0 marks)** Some candidates may interpret that the star outline was there before the centre lines were drawn: *'Use a steel rule to join the points of the star.'* **(1 mark)** *'Use a steel rule and a scriber to connect the points of the star.'* **(2 marks)**

Question			Expected response	Max mark	Additional guidance
		(iii)	Name **one** of the following: • tin snips • junior hacksaw • hacksaw • coping saw (blades are available that cut both wood and metal). **Any other suitable response.**	**1**	**1 mark** for correct response. 'Guillotine/notcher.' **(1 mark)** 'Abrafile.' **(1 mark)** '*Laser cutter*', '*plasma cutter*' and '*water-jet cutter*' are not **manual** workshop tools. (**0 marks)**
	(d)	(i)	• bar secured in chuck • chuck key removed • material running true centre • cutting tool centred • guard down. **Any other suitable response.**	**2**	**1 mark** for each correct response up to **a maximum of 2 marks.** Marks can only be awarded for checks on the centre lathe. No marks should be awarded for reference to personal safety or protective equipment. *'You must wear goggles.'* **(0 marks)** *'The guard.'* **(0 marks)** *'Put the guard down.'* **(1 mark)** *'Put the guard down and make sure the work piece is secure.'* **(2 marks)**
		(ii)	Name the following: • parallel turning • step turning. **Any other suitable response.**	**2**	**1 mark** for each correct response up to **a maximum of 2 marks.** *'Facing off'* **(1 mark)** *'Parting off'* (**1 mark)** References to '*threading.*' **(0 marks)**

Question			Expected response	Max mark	Additional guidance
		(iii)	Description of how an external thread could be created on the end of the bar. Typical responses are likely to include reference to: • chamfering the end • clean die • die secure in die stock • check the die is undamaged • adjust die screws • use of cutting compound/lubricant • accurate alignment • reverse to release cut particles. **Any other suitable response.**	**2**	To be awarded marks candidates must provide a description when answering this question. **1 mark** for valid point leading to a clear description. References to ensuring a good quality thread on a lathe can gain marks. *'Slow down the speed of the lathe.'* **(1 mark)** *'Ensure the die is sharp.'* **(1 mark)** Candidates can refer to internal or external threads as the question asks for the creation of a thread. *'Use a lathe.'* **(0 marks)**
		(iv)	Adhesive for permanently joining the moon to the brass bar. • epoxy resin. **Any other suitable response.**	**1**	**1 mark** for correct response. *'Gluing.'* **(0 marks)** *'Metal glue.'* **(0 marks)** *'Super glue.'* **(0 marks)** as there is a small contact area between the curved and flat surfaces. Trade names of glues. **(0 marks)** References to soldering/welding score **0 marks**.

Question			Expected response	Max mark	Additional guidance
	(e)	(i)	An outline that includes any of the following: • place wood underneath plastic • mask plastic before drilling • use stepped drill bit/pilot hole • clamp/hold the workpiece securely • drill before forming curve • feed drill through slowly. **Any other suitable response.**	**1**	**1 mark** for a correct response. *'Drill it slowly.'* **(1 mark)** *'Clamp it.'* **(1 mark)**
		(ii)	Description how the right-angled bend could be formed accurately. Typical responses are likely to include reference to: • heating plastic over a strip heater • use of a former/jig/vice • leaving until cool before removing from former/jig/vice • check the angle is 90°. **Any other suitable response.**	**2**	To be awarded marks candidates must provide a description when answering this question. Candidates may use sketches to aid their descriptions. **1 mark** for each valid point or effective sketch leading to a clear description, up to **a maximum of 2 marks.** Description must reference workshop tools. To gain marks for *'heating in an oven'*, this must be qualified with *'the use of a former'*. *'Bend it.'* **(0 marks)** *'Bend it on the strip heater.'* **(0 marks)** *'Heat it.'* **(0 marks)** *'Bend it on the line bender.'* **(1 mark)** *'Bend it to the required shape.'* **(1 mark)** *'Leave it to cool'* scores one mark (does not reference a workshop tool but no additional tool required at this point).

Question			Expected response	Max mark	Additional guidance
		(iii)	Explanation of drilling before bending. • the work piece is easier to secure/hold • easier to position the location of the hole • the work piece is less likely to crack. **Any other suitable response.**	**1**	**1 mark** for a correct response. Unqualified *'easier'* **on its own** score **0 marks.**
2.	(a)		Benefits of questionnaires: Explanation must reference benefits of using a questionnaire. Explanation containing any of the following reasons: • to gather opinions from a wide range of people • questionnaires can be completed using a variety of methods, for example, face to face in an appropriate location or via mass email, giving flexibility • questionnaires can be completed anonymously • can be collated quickly • specific questions can be asked, for example, aesthetics, ergonomics, function – to direct the person being surveyed • to find a target market/market niche • can be written to suit the target market • a rating system can be used to further refine the process • the results are easy to present in the form of graphs/charts. **Any other suitable response.**	**3**	**1 mark** for each valid point leading to a clear explanation up to **a maximum of 3 marks.** To be awarded marks candidates must provide an explanation when answering this question. Unqualified *'quick'*, *'cheap'* or *'easy'* **on their own** score **0 marks.** '*They are quick to do.'* **(0 marks)** '*You can get lots of opinions and they are easy to collate.'* **(2 marks)** '*You can get public opinion/feedback.'***(1 mark)** '*Easy to distribute via paper/email/ internet.*' **(1 mark)**

Question			Expected response	Max mark	Additional guidance
	(b)		Description must reference the use of a specification in the design process. Description of any of the following: • to inform the designer what the proposal must achieve by the end of the design process • to help explore/refine/develop the proposal • as an ongoing evaluation tool. **Any other suitable response.**	**1**	Candidates do not need to name the stage of the design process to gain marks. Definitions of a specification score **0 marks**. *'To evaluate how well an initial design idea meets the requirements of the brief.'* **(1 mark)** *'To check the design is within budget'* or *'to check all requirements of the specification are met by the end of the design process.'* **(1 mark)**

Question			Expected response	Max mark	Additional guidance
3.	(a)		Description of the key stages of brainstorming that includes any **three** of the following: Typical responses for brainstorming could include reference to: • communicate the purpose of the activity • group activity • coming up with lots of ideas within a designated time • record all ideas • no ideas too silly • spark ideas off each other • select the most promising idea(s) for future development. **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 description, up to **a maximum of 3 marks**. Candidates do not need to refer to all stages to gain full marks. Reference to '*a topic being shared*' could gain a mark. '*People shout out lots of ideas and someone writes them down.*' **(2 marks)** '*Think of lots of ideas.*' **(0 marks)** *'People think of lots of ideas'* (**1 mark)** (refers to a group).
	(b)		Idea generation techniques: • morphological analysis. **Any other suitable response.**	**1**	**1 mark** for correct response. Candidates may also gain marks by referring to the following: • taking your pencil for a walk • technology transfer • analogy/biomimicry • lateral thinking /SCAMPER • lifestyle/mood boards • theme board as inspiration. '*Existing products*' score **0 marks.** Mind maps score **0 marks** as they are not an idea generation technique.

Question			Expected response	Max mark	Additional guidance
4.	(a)		Outline including any of the following: • sketches can be produced quickly which allows lots of ideas to be produced in a short time • communicates your idea visually • sketches can be used to explore/evolve • you are not limited or constrained by computer software • if mistakes are made, they can be easily changed or discarded • you do not need any specific information, ideas can emerge naturally • no specialist equipment is required. **Any other suitable response.**	**2**	To be awarded marks candidates must provide an outline when answering this question. **1 mark** for each valid point leading to a clear explanation, up to **a maximum of 2 marks.** Unqualified *'cheap'* or *'easy'* **on their own** score **0 marks.** In the context of this question an **unqualified '*quick*' is accepted**. *'To see how it is put together.'* **(1 mark)** *'Helps communicate your idea visually.'* **(1 mark)** *'Gives a rough idea of what it will look like.'* **(1 mark)** *'Easy to change.'* **(1 mark)**
	(b)		Outline including any of the following: • dimensions can be shown • exploded/assembly drawings show how parts join together • individual parts can be identified • the required number of each part can be indicated • component materials of each part can be shown • orthographic views of product • scaled up details. **Any other suitable response.**	**2**	**1 mark** for each valid point, up to **a maximum of 2 marks.** To be awarded marks candidates must provide an outline when answering this question. *'To allow manufacture.'* **(1 mark)** *'To show the sizes of the parts.'* **(1 mark)** *'To show how the parts go together.'* **(1 mark)** '*To see how it works/functions.'* **(0 marks)** '*To see what it looks like.'* **(0 marks)** *'To show the client'*. **(0 marks)**

Question			Expected response	Max mark	Additional guidance
	(c)		Explanation of why models may be used in the design process could include any of the following general reasons: • to help generate ideas • to explore ideas • to refine ideas • to check/test the design before production • to support planning for manufacture • provides a better understanding of 3D form • allows user to interact with the design • to check ergonomic aspects of the design • to communicate with the client • 3D printing or rapid prototyping can be a cheaper and faster method of testing proposals than more traditional manufacturing techniques • cheaper than making the product repeatedly. **Any other suitable response.**	**3**	**1 mark** per correct response up to a total of **3 marks**. Candidates may refer to physical models in general. They do not need to refer directly to sketch, scale or block. Multiple references to testing or refining design factors may gain multiple marks. '*To check it.*' **(0 marks)** '*To check the sizes.*' (**1 mark)** *'To see what the final product will look like.'* **(1 mark)** References to *'computer generated models'* score **0 marks**.

Question			Expected response	Max mark	Additional guidance
5.			Descriptions must reference how ergonomics may have influenced the kettle design. Anthropometric: A description of the relationship between the body part and all or a part of the kettle. • handle length • handle diameter (grip size) • handle 'gap' size • size and position of switches/controls • access for cleaning/maintenance. Physiological: • weight of kettle • force required to operate buttons/switches • grip comfort • safety of non-slip grip • how easily it can be removed from the base • ease of opening and closing the lid. Psychological: • colour of parts to provide visual information; black handle indicating a safe part to hold, red on switch so it stands out • sound when kettle is switched on/finished boiling • easy to see water level. **Any other suitable response**	**4**	**1 mark** per correct response up to **a total of 4 marks.** Typical responses could include reference to anthropometric, physiological and/or psychological aspects of ergonomics. There is no need to identify which. Ignore incorrect percentile range if given. Any one kettle part linked to one piece of appropriate anthropometric information will gain a mark. *'The length of the handle must be the correct size for the width of the hand.'* **(1 mark)** *'The size of the buttons must relate to thumb/finger size.'* (**1 mark)** *'The length of the handle has to be the correct size to be lifted by everyone.'* (**0 marks)** No marks for noting percentiles only, for example, *'95th percentile'* on its own scores **0 marks.**

Question			Expected response	Max mark	Additional guidance
6.	(a)		Candidates must describe/reference how safety has influenced the design of the bicycle. Typical responses could include reference to: • reflectors • lights • chain guard • brakes • basket • rack to hold items • hand grips so that your hands don't slide off the bars • adjustable seat height • bell • tyres suitable for different conditions • selection of materials. **Any other suitable response.**	**3**	**1 mark** per correct response up to **a total of 3 marks.** *'The bicycle has an adjustable seat height.'* **(0 marks)** *'The bicycle has an adjustable seat height so it can be set at a safe height for different users.'* **(1 mark)** *'The basket allows the user to carry items safely without impairing the balance of the bicycle.'* **(1 mark)** *'It has a soft seat so you don't get a sore rear end.'* **(0 marks).** This is a comfort factor. Candidates can gain more than one mark per safety aspect listed. *'It's got brakes and they have to be easy to pull.'* **(2 marks)** *'It's got reflectors.'* **(1 mark)** *'It's got a bell to alert others.'* **(1 mark)** *'There is a chain guard.'* **(1 mark)** *'It has a basket.'* **(0 marks)** *'No sharp corners.'* **(0 marks)** References to *'mud guards'* score **0 marks.**

Question			Expected response	Max mark	Additional guidance
	(b)		Candidates must describe/reference how function has influenced the design of the bicycle. Typical responses could include reference to: • adjustable seat post • basket • rack to hold items • chain guard • brakes • soft grips on the handlebars • mud guards • bike stand • pedals. **Any other suitable response.**	**3**	**1 mark** per correct response up to **a total of 3 marks.** Additional marks cannot be awarded for repeats of answers used in (a) and (b). To gain marks, candidates must give more than a list of bicycle parts. Ergonomic considerations linked to function can gain marks. *'It's got brakes.'* **(0 marks)** *'It's got a basket.'* **(0 marks)** *'It's got a basket for storage.'* **(1 mark)** *'It has a basket and a rack at the rear for holding bags.'* **(2 marks)** *'It has a reflector on the front wheel and a reflector on the back wheel so that you can be seen.'* **(1 mark)** *'Brakes can be used to control the speed of the bicycle.'* **(1 mark)** *'The bicycle has an adjustable seat height.'* **(1 mark)** *'Grips on the handlebars.'* **(1 mark)** *'The pedals are easy to push.'* **(1 mark)**

Question			Expected response	Max mark	Additional guidance
7.	(a)		Candidates should describe the comparison of the following areas of aesthetics: • colour • shape • form • texture • style • line • proportion • symmetry • contrast • pattern • fashion • material. **Any other suitable response.**	**3**	**1 mark** per correct comparison up to **a maximum of 3 marks**. To gain **1 mark,** candidates must compare at least two clocks. *'Clock A is modern.'* (**0 marks)** *'Clock A is more modern than clock B.'* **(1 mark)** *'Clock A is turquoise and clock C is purple.'* **(1 mark)** *'The symmetrical design of Clocks A and B contrasts with the asymmetrical design of Clock C.'* (**1 mark)** A list of aesthetic terms scores **0 marks.**
	(b)		Description including **two** of the following: • trust in a brand name/reputation • guaranteed sales for manufacturer • self-promoting/advertising • premium pricing • customer loyalty • perception of a high-quality product from that brand. **Any other suitable response.**	**2**	To be awarded marks candidates must provide a description when answering this question. **1 mark** for each valid point leading to a clear description, up to **a maximum of 2 marks.** *'Well known, so people are more likely to buy it.'* **(1 mark)** *'If customers believe the brand produces high quality products, then they are more likely to purchase an additional product from the same brand.'* (**1 mark)**

Question			Expected response	Max mark	Additional guidance
8.	(a)	(i)	**Copper**	**1**	**1 mark** for naming the correct material.
		(ii)	Correct **responses for COPPER** are likely to include reference to: • strong • durability/long-lasting/ hardwearing • resistance to corrosion/rust/weatherproof • suitable for die casting • readily available • does not require a finish • easy to work with • aesthetic reasons ('looks good'). **Any other suitable response.**	**1**	**1 mark** for correct statement. Different answers/reasons must be given in parts (a)(ii) and (b)(ii). To gain marks candidates must refer to the suitability for the tap of the **metal they selected** in part (a)(i).
	(b)	(i)	**ABS**	**1**	**1 mark** for naming the correct material.
		(ii)	Correct **responses for <u>ABS</u>** are likely to include reference to: • strong • durability • waterproof/weatherproof • resistance to wear • suitable for injection moulding • easy to mould • readily available • available in a range of colours/built in colour • easy to clean • scratch resistant. **Any other suitable response.**	**1**	**1 mark** for correct statement. Different answers/reasons must be given in parts (a) (ii) and (b) (ii). To gain marks candidates must refer to the suitability for the tap of the **plastic they selected** in part (b)(i).

Question			Expected response	Max mark	Additional guidance
	(c)		State any two identifying features of injection moulding: • injection mark • ejector pin marks • split lines • good surface finish • complex/detailed shapes • accuracy • webs • bosses. **Any other suitable response.**	**2**	**1 mark** for each identification feature of injection moulding up to **a maximum of 2 marks**. *Candidates must give different responses in (b) and (c).* 'A*ccuracy.'* **(1 mark)** '*Complexity.'* **(1 mark)** '*Good surface finish.'* **(1 mark)** '*Flat circles'* scores **1 mark** as this infers ejector pin marks. 'L*ines from the mould'* scores **1 mark** as this infers split lines. '*Made from plastic'* **(0 marks).** This is a repeat of the question.

Question			Expected response	Max mark	Additional guidance
	(d)		Outline including any **two** of the following: • fully automated • accuracy • consistency of product • high quality of finish • quicker than sand casting • mould can be reused • complexity of shape/thread • less wasteful • economies of scale. **Any other suitable response.**	**2**	**1 mark** for each correct statement up to **a maximum of 2 marks.** Unqualified *'quick'*, *'cheap'* or *'easy'* **on their own** score **0 marks.** Candidates must give different responses in (c) and (d). *'Suitable for mass production'* scores **0 marks** as this is a repeat of the question**.**
	(e)		Rotational moulding. Typical statements are likely to include reference to: • hollow • closed shape • good surface finish • consistent wall thickness • little wastage • surface detail • large scale item • repeatability. **Any other suitable response.**	**2**	**1 mark** for correct process. *'Blow moulding'* scores **1 mark**. Unqualified *'quick'*, *'cheap'* or *'easy'* **on their own** score **0 marks.** **1 mark** for correct statement. *'Can be used for large, hollow shapes'*. **(1 mark)**

Section 2

Question			Expected response	Max mark	Additional guidance
9.	(a)		An explanation that includes three of the following: • has a faster production rate than traditional methods • less labour intensive • reduction in work related injuries • 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 • increased efficiency • machines can run 24 hours a day • provides consistency as each part is manufactured identically • processes are flexible in the manufacture of products. **Any other suitable response.**	**3**	To be awarded marks candidates must provide an explanation when answering this question. **1 mark** for each valid point leading to a clear explanation, up to **a maximum of 3 marks.** Example answer: *'The increase of automation in mass manufacture has led to a reduction in the number of workers, saving money on wages.'* **(1 mark)** *'Products can be made faster to meet consumer demand.'* (**1 mark)** *'The process is fully automated.'* **(1 mark)** *'More efficient.'* **(1 mark)**
	(b)		An explanation that includes **one** of the following: • require specialist hand crafting skills • require specialist hand crafting equipment • large scale items • bespoke products/personalisation • low volume of product needed/batch production. **Any other suitable response.**	**1**	**1 mark** for correct response. To be awarded a mark, candidates must provide an explanation when answering this question.

Question			Expected response	Max mark	Additional guidance
10.			Outline of benefits to the **manufacturer** of using standard components including any of the following: • 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 in-house • 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. **Any other suitable response.**	**3**	**1 mark** for each valid point leading to a clear description, up to a maximum of three marks. Unqualified *'quick', 'cheap'* or *'easy'* **on their own** score **0 marks.** Candidates do not need to refer to the wheel to gain marks. *'Speeds up production process.'* **(1 mark)** *'Will fit common tools.'* **(1 mark)** *'Easy to source.'* **(1 mark)** Responses that refer to the consumer do not attract marks. *'Easy to take apart and move house.'* **(0 marks)**
11.			An outline that includes **three** of the following: • easy to access replacement parts • finishes • appropriate quality of materials • limit the amount of product being produced to meet demand • improve the manufacturing quality • improve the assembly quality • quality assurance during the manufacturing process. **Any other suitable response.**	**3**	To be awarded marks candidates must provide an outline when answering this question. **1 mark** for each valid point leading to a clear outline, up to **a maximum of 3 marks.** *'Use more expensive materials.'* **(1 mark).** *'Reduce the number of parts.'* (**1 mark)**

[END OF MARKING INSRUCTION]