GCE

Design and Technology

H405/01: Principles of fashion and textiles

A Level

Mark Scheme for June 2022

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

PREPARATION FOR MARKING
RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: RM A*ssessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to RM Assessor and mark the **required number** of practice responses ("scripts") and the **number of required** standardisation responses.

   YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or the RM Assessor messaging system, or by email.

5. **Crossed Out Responses**
   Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

   Rubric Error Responses – Optional Questions
   Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses
When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).

Contradictory Responses
When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)
Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7. Award No Response (NR) if:

- there is nothing written in the answer space.

Award Zero '0' if:

- anything is written in the answer space and is not worthy of credit (this includes text and symbols).

Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The RM Assessor **comments box** is used by your team leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
If you have any questions or comments for your team leader, use the phone, the RM Assessor messaging system, or e-mail.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:
a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
b. **To determine the mark within the level**, consider the following:

Descriptor	**Award mark**
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

11. **Annotations**

Annotation	Meaning
	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	Tick
	Cross
	Confused (replaces the question mark)
	Benefit of doubt
	AO1 – Knowledge and understanding
	AO2 – Apply knowledge and understanding
	AO3 - Analyse
	AO4 - Evaluation
	Omission
	Not answered question
	Noted but no credit given
	Too vague
	Own figure rule
	Repetition

12. Subject Specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

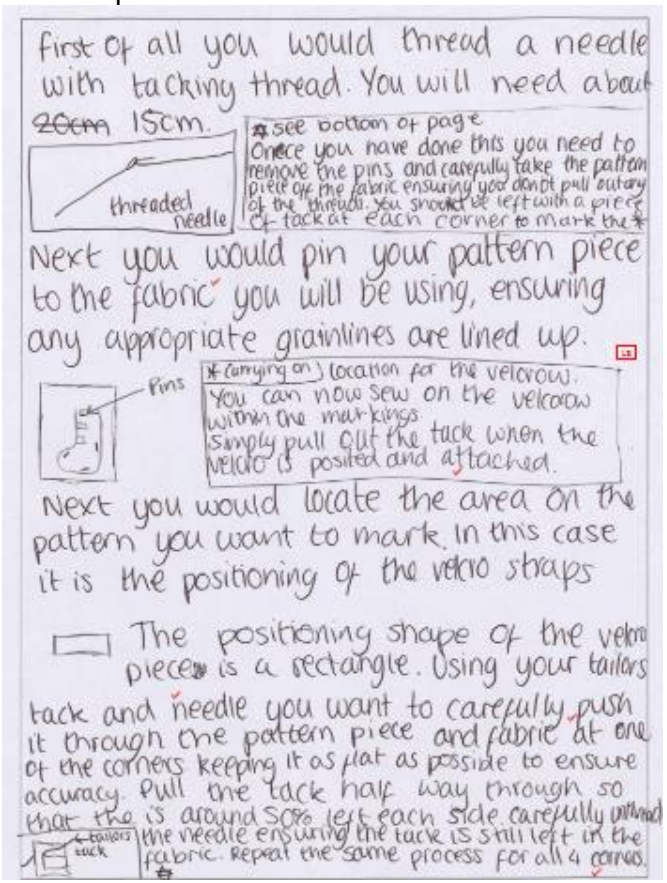
- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.
You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet Instructions for Examiners. If you are examining for the first time, please read carefully Appendix 5 Introduction to Script Marking: Notes for New Examiners.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

Question and spec links			Answer	Mark	Guidance
1	a		Possible advantages may include: • Enhanced crease recovery (1). • Better dimensional stability within the fabric (1). • Increased tensile strength (1). • Better abrasion resistance (1). • Enhanced strength (1). • Increased durability (1). • Enhanced drape ability and brightness (1). • Easy care (1). • Enhanced water absorption (1). • Better tear resistance (1). • Enhanced breathability (1). • Reduces manufacturing and processing costs (1). • Any other suitable response.	2	In each case: One mark for stating an advantage of blending polyester with cotton fibres for the fabric of the foot protectors. Specific reference to the context in the question is needed for marks to be awarded. *Blending is the technique to combine fibres which emphasises the good qualities and minimises poor qualities of the fibres.*
	b		Possible reasons may include: • Weft knitted fleece fabric is soft (1) gives wearer comfort with a non-abrasive/harsh surface (1). • Weft knitted fleece fabric has elasticity (1) which allows movement when using/wearing (1). • Weft knitted fabric enhances ease of use (1). Gives a close fit so therefore can fully reflect the shape of the foot to add security (1). • Weft knitted fleece fabric has high elastic recovery (1) which allows foot protectors to keep their shape for longer (1). • Weft knitted fleece fabric is warm to wear (1) therefore increases insulation properties of foot protectors (1). • Weft knitted fleece fabric has good moisture permeability (1) making foot protectors easy care – fabric dries easily and quickly (1).	**4**	In each case: Up to two marks for explaining why weft knitted fleece fabric would be suitable for the inner lining of foot protectors. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

			• Any other suitable response.		
	c		**The candidate is expected to demonstrate their understanding of the process involved through a series of annotated sketches and/or notes. There may be variations to the process as indicated but to get into L3 candidates must demonstrate a clear understanding of the end-to-end process.** *Tailor's tacks are loose, looped, hand sewn stitches that transfer markings from tissue patterns onto fabric. This technique uses thread as the medium for leaving visible marks on the fabric.* • Keep the tissue pattern placed on top of the fabric layers once the pieces have been cut out. Keep pinned and securely in place to allow for markings to be accurately transferred to fabric layers. • Thread a needle, using a contrasting colour to the fabric if possible, matching the two threads at the end to give a double thread. **Do not tie a knot.** • Starting from the first dot on the pattern paper near the seam edge, insert the needle through the tissue pattern and both thicknesses of fabric from one end of the dot under and through to the opposite end of the dot. Leave a sizeable thread tail of approximately 1" to 1 ½" long at both ends. • Without cutting the thread insert the needle 90 degrees and sew through the dot creating an X stitch on the bottom layer. Snip the needle off. A loop will be left, leave a long thread tail. Keep the threads loose. • Cut through the loops allowing tissue pattern to easily slip off the fabric. When all the markings are complete and all the looped stitches cut, carefully pull the tissue pattern off the fabric.	**6** All processes demonstrated must relate to the foot protectors. If candidate does not provide an analytical/evaluative response, then only L1 can be awarded.	**Level 3 [5-6 marks]** The candidate demonstrates a good level of detail of the process needed to work a tailor's tack using technical terms and considering any relevant equipment and materials. Sketches, if used will be clear and supported with relevant notes. The process includes all relevant stages. **Level 2 [3-4 marks]** The candidate will demonstrate a sound level of detail of the process needed to work a tailor's tack with some consideration of any equipment and materials required. Sketches, if used, will for the most part be clear and supported with notes most of which are relevant. The process includes some relevant stages. **Level 1 [1-2 marks]** The candidate will demonstrate a limited level of detail of the process needed to work a tailor's tack with a limited use of technical terms and there will be a basic consideration of any equipment and materials required. Sketches, if used, will be unclear with only

			• To finish the tailor's tacks, very carefully separate the two layers of fabric starting with the first set of tacks. As the layers separate it will expose the tailor's tacks threads. • Cut them in half so that a tailor's tack remains on both layers of the fabric. Keep the lengths of thread even in size, so that marking is obvious and even on all layers of fabric. This also helps to prevent the thread falling out of position L3 exemplar:  		basic notes to accompany them. Few relevant stages are included. **0 marks** No response or no response worthy of credit.

	d		Possible design features may include: • Easy wrap around/all-in-one design (1) this aids users who may have difficulty with diminished hand strength to use the foot protectors easily (1). • Removes the need to pull the boot on and off the foot (1) which requires strength and grip from the end user which may be difficult (1). • Easy touch fastening which opens to toes (1) this is important as it permits access for care/changing dressings if required (1) • Adjustable closures to fit a range of sizes snuggly (1). This increases life cycle of product (1). • The use of Velcro (1) it is easy and quick to use (1) • Addition of a fleece inner lining (1) keeps feet and lower legs warm which helps with circulation (1). • Keeps the legs cushioned (1). Important if there is a need to protect the skin (1). • Long, knee-high design (1) offers more protection and support for post-op patients (1). • Any other suitable response.	**2**	One mark for identifying a design feature which increases the functionality of the foot protectors for the user. One mark for justifying why this design feature is important for the user. Specific reference to the context in the question is needed for marks to be awarded.

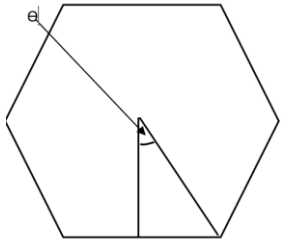
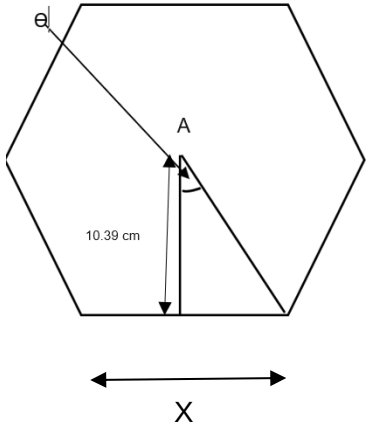
	e		Possible factors may include: *A knowledge and understanding of materials are essential for the designer to meet product performance criteria and minimise costs. When selecting materials for the foot protectors, the properties of each material must satisfy the function and the operating conditions of the structure being designed.* Factors can be summarised under the following categories: **Mechanical properties** (1) – The designer needs to consider how the material reacts to forces acting upon it. <u>Explanation points:</u> • Strength of the materials used for the foot protectors in relation to wear and tear through use (1). • Flexibility of the materials in relation to ease of use (1). • Ability of fabric to hold its shape and keep a snug/ protective fit (1). • Elasticity/movement of the materials to accommodate/stretch to different sizes (1). • Fatigue limit (1) material recovery to retain performance as long as possible (1). • Breathability (1) will the material allow ventilation to avoid making the feet too warm and odour. • Cost and size of the material, how many pieces can they get out of each length/roll (1) • Sustainability and the effect the material may have on the environment (1) LCA – life cycle analysis of materials (1) **Physical properties** (1) – The designer must consider the handling characteristics of the material. <u>Explanation points:</u> • Feel to enhance comfort when worn, particularly for post-op patients (1). • Density/durability of the materials to enhance protection/ longevity to the product (1).	**6**	In each case: Up to two marks for explaining a factor that the designer of the foot protector needs to consider when selecting materials during the product development stage. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

			• Is the material easy to care for, can it be washed (1). • Aesthetics, ability to dye the fabric a different colour (1). • Which environments will the boot be worn in by the user (1). **Conductivity properties** (1) – The designer must consider the thermal characteristics of the material. <u>Explanation point:</u> • Particularly when materials will be used for post-surgery patients/elderly patients with medical concerns who require more warmth (1). **Flammability of the materials** (1) need to be considered with regards safety standards. <u>Explanation point:</u> • Legislation -The General Product Safety Regulations 2005 (GPSR) require all products to be safe in their normal or reasonably foreseeable usage (1). **Chemical properties** (1) – The designer needs to consider how the material reacts/changes when in contact with other substances. <u>Explanation points:</u> • Material resistance/reactivity to other materials (1) which will impact on after care of the foot protectors (1). • Hygroscopic - absorption of water (1) which will impact on care/washability of foot protectors (1). **Manufacturing properties** (1) – The designer needs to consider the processing properties of the material for the conversion needed to change the material into the required shape. <u>Explanation points:</u> • Formability (1) which will impact on manufacturing of the foot protectors, translating into costs for user (1). • Machinability (1) which will impact on manufacturing of the foot protectors, translating into costs for user (1). • Fusibility (1) which will impact on manufacturing of the foot protectors, translating into costs for user (1).		

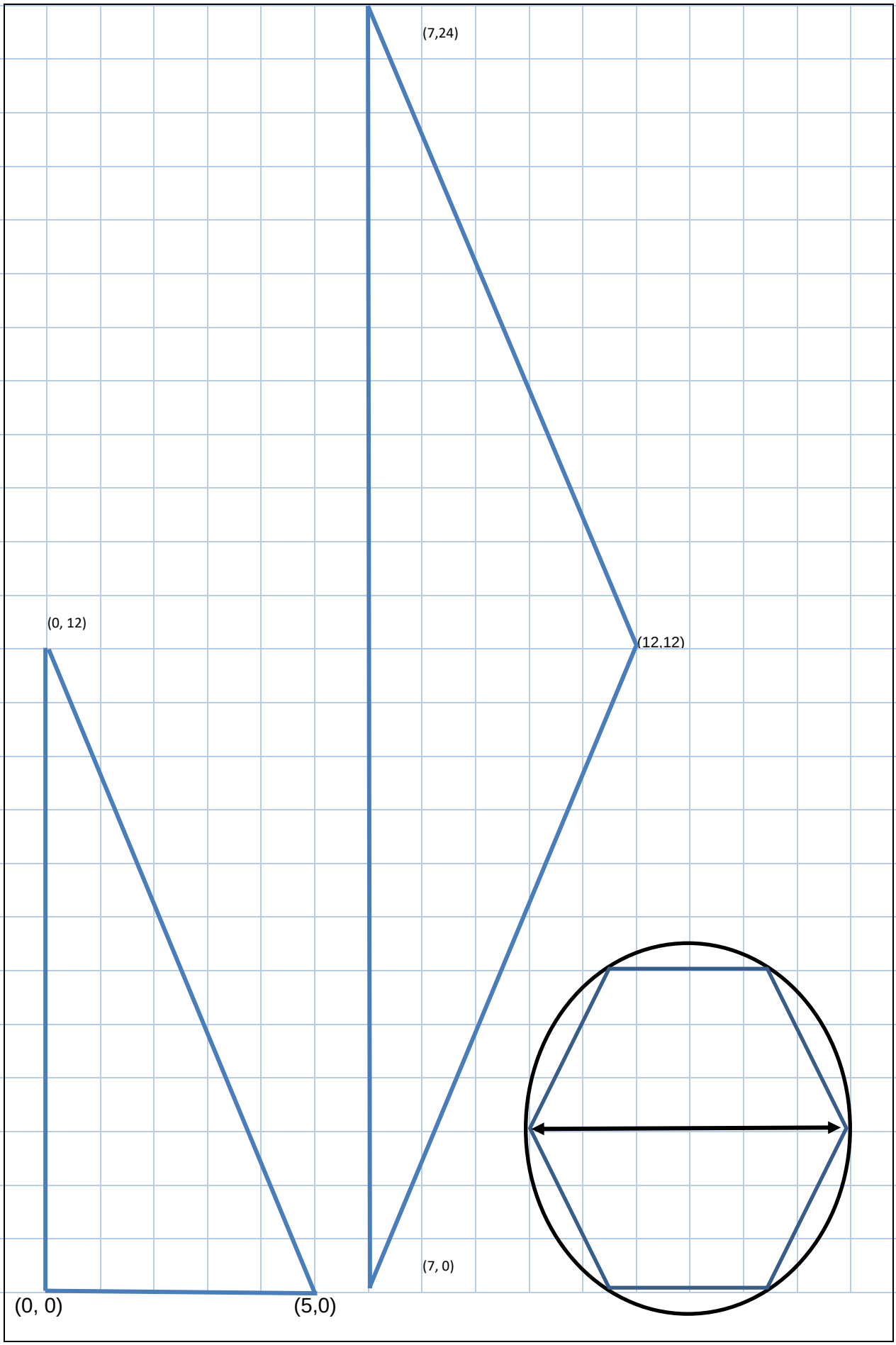
			Any other suitable response.		
	(f)		Possible ways may include: *Standards are published documents that contain technical specifications or other precise information designed to be used consistently as a rule, definition or guideline. All manufacturers need to be mindful of quality standards which are set out to protect the manufacturer alongside protecting, assuring and attracting the consumer*. As consumers become increasingly informed about their choices, conformity to recognised standards becomes a key purchasing decision issue. These standards help the manufacturer to attract and assure customers those products are safe and fit for purpose. **BSI (British Standards Institute)** (1) - • There are five types of British Standard awarded: specifications/methods/guides/vocabularies and codes of practice (1). • The standards ensure products are consistently of a high quality (1) • Standards give consumers confidence that a product will not fail or need to be recalled (1). **BSI Kitemark®** (1) - • Consumers will look for this identifying mark to ensure that products have conformed to/met certain standards (1). • Consumers will often not buy products if they do not display the Kitemark symbol (1). • This symbol assures the consumer of the products safety (1).	**6**	In each case: Up to two marks for explaining a way the manufacturer could use health and safety legislation to attract and assure customers. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points. Information may be supported with visuals/diagrams, but do not credit the same information twice.

			CE Marking (1) **–** • Certification mark that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA) (1). • British Standard EN71 covers the safety standards for all toys for children below 14 years (1). • Certification mark covers aspects of safety such as flammability, toxicity and safety labelling (1). • Consumer is assured that if any toy is found to be unsafe according to regulations, then the manufacturer can be found guilty of a criminal offence (1). • This gives the consumer peace of mind and an assurance that the products they are buying have conformed to specific standards of safety. (1). • BS EN 71-2:2011 +A1:2014 Safety of toys. Flammability. (1) • BS EN 71-1:2014 Safety of toys. Mechanical and physical properties (1). **Product/Care labelling (1)** - • Consumers are assured that products conform to British standards relating to; fibre, yarn and fabric testing (1). performance characteristics of the fabrics (1). colour fastness, finishing and aftercare (1). sewing machines and threads (1). • Consumers assured that manufacturers have conformed to regulations and guidance issued by BSI (British Standards Institute) textile labelling department (1). • Labelling **BS ISO3759 Textiles** – Care Labelling Code (1) uses symbols to ensure easy access to all (1). • Visual labelling scheme assure the consumer that certain standards/tests have been taken to ensure a safe product (1). The British Standard **BS EN ISO 3758:2012** textiles care labelling code using symbols (1) -		

			• demonstrates how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles (1). • Boosts consumer confidence, attracting consumers through specific and easy to access/understand labels (1).  • Any other suitable response.		

Question			Answer	Mark	Guidance
2	(a)(i)		 The candidates have to find the angle Θ. Identifying 12 triangles, therefore 360/12 (1) = 30 Θ = 30^0 (1)	2	Award two marks as follows: One mark for entering correct values into formula One mark for calculating the angle Θ.
	(ii)		 Tan 30^{0*} = x/10.39 (1) X = 10.39 x Tan 30^{0*} = 5.99866929688 cm (half a side length) (1) Side length = 2 x 5.99866929688* = 11.9973385938 cm = 12 cm to 0 decimal places (1)	3	Award three marks as follows: One mark for recalling the correct trigonometry formula. One mark for applying the formula correctly. One mark for calculating one of the sides of the hexagon to 0 decimal place. If correct answer is given without working out shown award full marks. Where an incorrect answer is given working out should be used to credit appropriate marks. *Allow error carried forward (ECF) where correct working out is shown.

	(b)		See later diagram.	**3**	Award up to three marks as follows: One mark for correctly plotting right angled triangle. One mark for correctly plotting isosceles triangle. One mark for accurately labelling co-ordinates. Award marks if the candidate has put the triangles in a different position on the grid but the shape and co-ordinates are correct.
	(c)		See later diagram.	**1**	One mark for accurately drawing the template for the smaller hexagon.


(7,24)
(0,12)
(0, 12)
(12,12)
(0,0)
(7, 0)
(0, 0)
(5,0)

	(d)	**(i)**	24 (1) (because it is the highest value in the graph).	**1**	One mark for identifying the modal value of the sales.
		(ii)	18 (1)	**1**	One mark for identifying the frequency.
		(iii)	There are four quilt sizes and three types of wadding. The possible choices are not mutually exclusive. The probability formula is: P(A or B) = P(A) + P(B) – P(A and B) P(A) = probability of quilt sizes. Therefore P (super king) = ¼ P(B) = probability of wadding. Therefore P(polyester) = 1/3 (1) As there are 12 possible quilt types then P(AandB). Therefore P(A) + P(B) – P(A and B) = ¼ + 1/3 - 1/12 (1) = ½ (1)	**3**	Award up to three marks as follows: One mark for calculating the probability of the quilt size and wadding. One mark for calculating that there are 12 possible quilt types. One mark for calculating the probability of super king + polyester. If correct answer is given without working out shown award full marks. Where an incorrect answer is given working out should be used to credit appropriate marks.

	(e)		Possible ways may include: *A pre-production model undergo rigorous physical testing before they are considered ready for final production. They are used in their intended environment of use, analysed and scrutinised in detail by a wide range of stakeholders and testers. Once products have successfully passed this stage, they will be considered viable and suitable to go into full production.* To test function designers and manufacturers carry our physical tests including destructive and non-destructive and user trials to assess how well products work during normal use. **Destructive testing** (1) – breaking parts or materials to confirm what will happen. <u>Justification points:</u> • Designers/manufacturers test parts/components and manufacturing systems to see what will happen when materials are subjected to stress (1). • Allows the manufacturer to understand the features and mechanical properties of the component parts and materials used (1). • Manufacturer can check the operating characteristics of the parts or materials to assess performance and suitability (1). • Gives the manufacturer the opportunity to simulate the ageing conditions of the parts/materials/fixings during their lifetime to predict behaviour (1). • Allows manufacturer to determine comparative data between different material options or part sizes (1). **Non-Destructive testing (1)** – Testing methodology to obtain data without damaging the product.	**3**	One mark for identifying a way physical testing systems are integrated into the manufacturing process to test functional feasibility. Up to two marks for justifying why chosen physical testing system is integrated into the manufacturing process to test functional feasibility. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

			Justification points: • This type of testing often saves time/ money/resources in the process (1). • Allows the manufacturer to understand the features and mechanical properties of the component parts and materials used (1). • Manufacturer can check the operating characteristics of the parts or materials to assess performance and suitability (1). • Gives the manufacturer the opportunity to simulate the ageing conditions of the parts/materials/fixings during their lifetime to predict behaviour (1). • Allows manufacturer to determine comparative data between different material options or part sizes (1). **Testing Accuracy** (1) **–** The manufacture of components and assembly of parts to the required level of accuracy. Justification points: • Tests how well components/parts function and perform (1). • Manufacturers ensure that the required standards are delivered by monitoring tolerances (1). • Manufacturers ensure that the required standards are delivered by monitoring differences in material quality (1). • Manufacturers ensure that the required standards are delivered by monitoring performance at the different stages of development and manufacture (1). • Quality control inspection checks (1) Monitor accuracy of parts and control the uniformity of production of products or components (1).		

			Testing Performance (1) **–** Physical performance tests emphasise, and are based on, measurable performance characteristics. <u>Justification points:</u> • Test functional feasibility (1). • Carried out on completed products and component parts alike to check how products/materials react to stresses encountered in expected use (1). • These tests reproduce the types of damage to products found from consumer use (1). • Quality control inspection checks are used within performance testing (1). • Performance checks look at how materials or components react to given situations or different stimulus (1). • Performance tests can include washing the quilt (1) • Performance tests can include flammability tests (1) Performance tests can include durability analysis of fabric/textile wear rates (1). • Performance tests can include stress testing of key components (1). • Any other suitable response.		

Question			Answer	Mark	Guidance
3	(a)		Possible benefits to the manufacturer may include: • Requires no human presence (1) reduces labour costs allowing manufacturer to be more competitive (1). • Ensures a rapid and consistent flow of operations with no down time (1) this increases production output for manufacturer (1). • Shorter work weeks for labour/reduced factory lead times (1) enables manufacturer to be more competitive (1). • Allows manufacturer to meet increasing demands for products (1) which means happier customers (1), therefore higher probability of re-ordering (1). • Robots play a key role in automated production. They are used for component and material handling (1) – Ensures consistency and precision, which the use of robotics can facilitate over a long period of time (1). Removes human error (1). Higher production rates and increased productivity (1). More efficient use of materials and better product quality (1). Lower operating costs as robots can perform the work of three to five people, depending on the task (1). Smaller environmental footprint (1).	4	In each case: Up to two marks for explaining a benefit to the manufacturer of using a fully automated manufacturing system. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

			Reduction of variability among products and product batches (1). As the involvement of labour is reduced, the variability of the products produced by different workers is also reduced (1). Performing jobs beyond human capability (1). • Planning software can predict and check for tool wear in real-time and make adjustments accordingly (1). Software can schedule periodic maintenance when required (1) saving time and costs, with no production shutdown for repairs etc (1). Predictive software improves workplace safety (1). • Any other suitable response.		

	(b)*		**Indicative content:** **Addition of glass, carbon and ceramic fibres to industrial/construction applications:** • **High impact resistance** – when natural mineral fibres are used in the construction of buildings, this would help to minimise any breakages and therefore impact on time and costs, which wouldn't be compromised. • The addition of high strength, natural mineral fibres to a polymer matrix in the construction industry, can greatly improve mechanical properties, such as **tensile strength** and temperature resistance. Larger buildings/more complex structures are able to be constructed because fibres withstand heavier weights. • The addition of natural mineral fibres helps improve alkalis resistance - **resistance to chemicals**, mildew and fungus. This aids long term performance and care of the structure/building; helps to maintain its' original state. • Natural mineral fibres **don't decay** - aids long term performance and care of the structure/building to maintain its' original state. Composite materials aren't prone to corrosion due to harsh chemicals, and they're resistant to many highly reactive chemicals. This also helps create reduced maintenance costs, which means that structures and buildings keep their curb appeal. • Recycled glass, ceramic can be used which has a more positive impact on the **environment**.	**8** For MB3 to be awarded a number of industrial implementations and references to glass, carbon and ceramic will be provided. If candidate does not provide an analytical/evaluative response then only L1 can be awarded.	**Level 3 [6-8 marks]** The candidate has a clear understanding of how the addition of natural mineral fibres, such as glass, ceramic and carbon, can enhance materials and components used for industrial implementation. They produce a thorough discussion in relation to the question by explaining the implications and use of natural mineral fibres in various industrial applications. The discussion is clear and a number of points are exemplified in relation to the properties and characteristics of natural mineral fibres, with relevant examples evident and in context. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated with the use of examples.* **Level 2 [3-5 marks]** The candidate has a reasonable understanding of how the addition of natural mineral fibres, such as glass, ceramic and carbon, can enhance materials and components used for industrial implementation. They produce a sound discussion in relation to the question by explaining the properties and characteristics of natural mineral fibres and how they can enhance industrial/construction applications The explanation is sufficient and either a number of points are made in relation to

			• Natural mineral fibres enhance fire/heat resistance because they have **high temperature durability** (heat and cold resistant), they are non-toxic which also impacts on safety value within structures and buildings. • Natural mineral fibres **do not shrink** or elongate, meaning that structures/buildings maintain their shape in adverse conditions when being used. Buildings/structures are also often easier to construct if fibres do not allow movement. • They are **lightweight** and easy to use, transport and work with on construction sites, making them cost effective due to materials being easier and more efficient. • Natural mineral fibres have **good forming characteristics**, are easy to mould into required shapes, flexible and versatile in the making phase. The advantage of using composites is their design flexibility: They can be made into just about any shape. • **Transparency, aesthetic qualities** of glass and ceramic and particularly their reflective properties make them a great design feature and an ideal choice for a statement structure/building. • Natural mineral fibres have **good thermal stability** and are good insulators. This means that construction in cold/hot climates is enhanced; aids in helping occupants keep warm in winter, cool in summer.		either the mineral fibre (glass or ceramic or carbon) or a single point is made in relation to the general use of natural mineral fibres with some relevant examples touched upon. *There is a line of reasoning presented with some structure. The information presented is for the most part relevant and supported by some evidence.* **Level 1 [1-2 marks]** The candidate has a basic knowledge of the addition of natural mineral fibres, such as glass, ceramic and carbon, to enhance materials and components used for industrial implementation. Any reference to the use of natural mineral fibres to enhance materials and components is limited/listed and has little appreciation of the implications and use in industrial applications. The response contains no analysis or evaluation, with few or no relevant examples. *The information has some relevance and is presented with limited structure or detail. The information is supported by limited evidence.* **0 marks** No answer or answer not worthy of credit.

			• Industrial implementation - ceramic-fibre-reinforced composites are utilised in many different commercial products such as aircraft engine components (turbine combustors, compressors, and exhaust nozzles), automotive and gas turbine elements, aerospace missiles, heat exchangers, hot gas filters, rocket nozzles, gasket, and wrapping insulations. High performance ceramic materials are great for high temperature structural applications, although their inherent brittleness and tendency to unpredictable failure can provide major technical challenges. • Carbon composite is a key material in today's launch vehicles and heat shields for the re-entry phase of spacecraft. It is widely used in solar panel substrates, antenna reflectors and yokes of spacecraft. It is also used in payload adapters, inter-stage structures and heat shields of launch vehicles. Furthermore, disk brake systems of airplanes and racing cars are using carbon/carbon material, and the composite material with carbon fibres and silicon carbide matrix has been introduced in luxury vehicles and sports cars. • Any other valid suggestion.		

Question			Answer	Mark	Guidance
4	(a)		Possible environmental benefits may include: • The use of natural enzymes in the stone-wash process reduces the consumption of chemicals for textile producers (1). This impacts on time/costs involved to dispose of chemical waste (1). • Natural enzymes are an eco-friendly alternative to toxic chemicals and are fully biodegradable (1). This removes the need to treat and dispose of toxic waste (1). • Using natural enzymes allows the manufacturer to operate under milder conditions (temperature and pH) than when using conventional process chemicals (1), this results in lower energy costs (1). • The use of natural enzymes in the stone-wash process reduces water usage up to 19,000 litres per ton of textiles bleached (1). This results in lower energy costs (1). • Reduced fabric waste due to natural enzymes being easier to control (1). They do not attack the fibre structure resulting in loss of weight (1). • Natural enzymes have a better and more uniform affinity for dyes (1), making the process faster and more secure (1). • The use of natural enzymes in the stone-wash process helps contribute to safer working conditions (1), through elimination of chemical treatments during production processes which may affect health of workers (1).	**2**	Up to two marks for explaining an environmental benefit of using natural enzymes to create the stonewash effect on the denim jeans. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

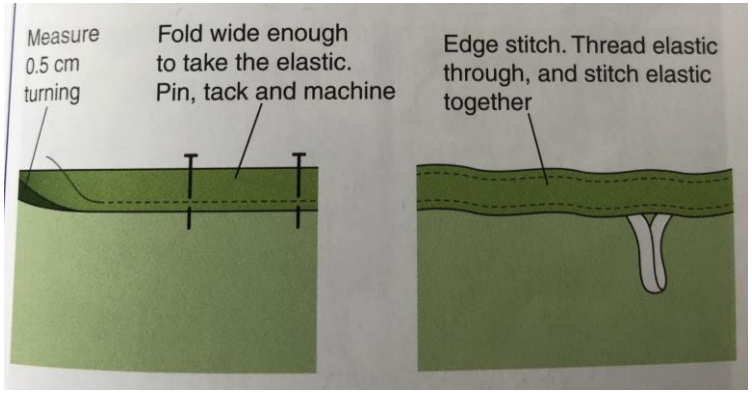
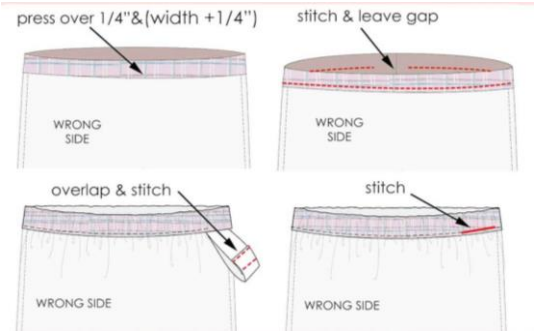
			• A small dose of enzyme can replace several kilograms of pumice stones (1) thereby not impacting on natural resources and environment through collection of pumice stone (1). • The use of less pumice stones in the stone-wash process (1) results in less damage to the garment and machines (1). • The use of less pumice stones in the stone-wash process (1) results in less pumice dust in the laundry environment which can affect workers health (1). • Any other suitable response.		
	(b)		Possible benefits may include: • When using enzymes to stone-wash garments and textiles, the enzymes break off small fibre ends on the yarn surface (1), thereby loosening the dye which causes the garments to get that vintage/faded/worn-out look which enhances aesthetic qualities (1). • Enzymes can be used in the textiles industry to remove starchy/waxy residues from raw materials (1) this gives the resulting fabric a more uniform finish by modifying the fabric surface (1). • The process can be controlled so that only the dye particles are loosened from the denim surface while the interior of the cotton fibres are left intact (1). The loosened dye particles re-deposit onto the back surface of the fabric which causes discoloration and texture (1) and/or enhances the aesthetics of the resulting fabric (1).	**4**	In each case: One mark for identifying a benefit of using biological techniques such as natural enzymes to enhance the aesthetic properties of textile products such as the denim jeans. One mark for justifying why this approach enhances aesthetic properties. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

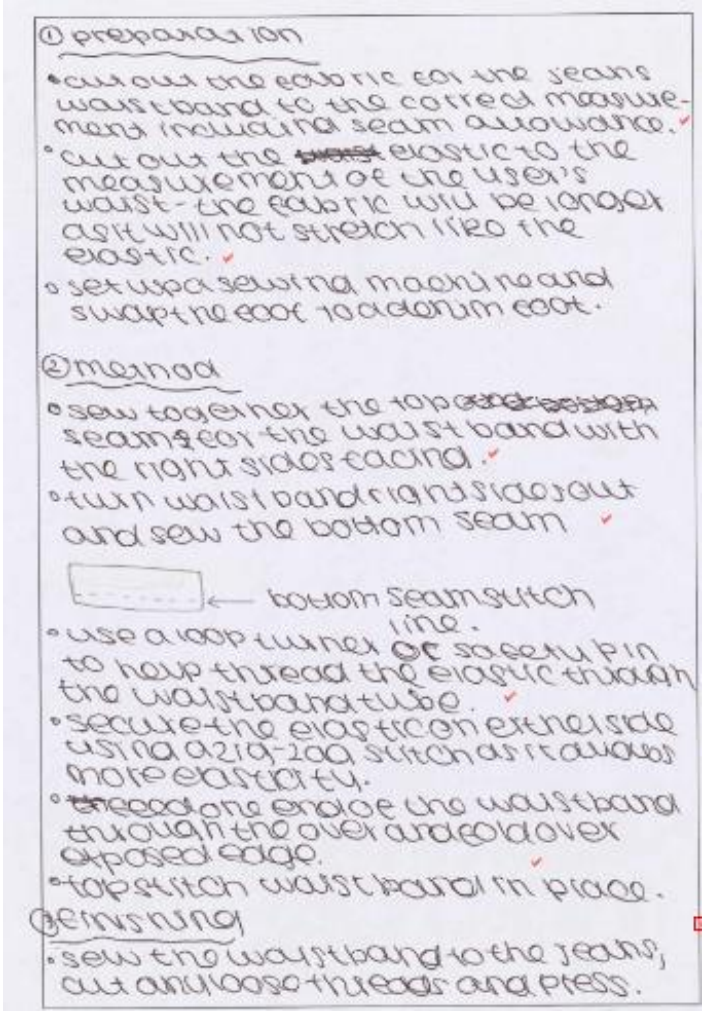
			• Cellulases and other enzymes used in the textile industry are available in a number of different varieties, each with its own special properties (1). This gives fashion designers the flexibility to create a wider range of shades/finishing effects (1). • Using biological techniques to selectively modify the surface of the fabric (e.g. denim) without damaging the fabric integrity (1) allows designers to create new fashion possibilities (1). • Colourful logos can be printed onto metal buttons or leather labels (1), which reduces fear of them being abraded away by pumice stones (1). • The use of biological techniques allows intricate designer accents to be placed on garments/textiles made from non-cellulose fibres (1) therefore giving a better surface appearance with more detailed enhancement and pattern definition (1). • Any other suitable response.		

	(c)		Possible reasons may include: • Cotton fibres are soft to handle and therefore make it a comfortable choice for the jeans (1). • Cotton is absorbent which helps make the jeans easy care (1). • Cotton is bio-degradable which enhances the environmental value of the jeans (1). • Cotton is recyclable, which enhances the environmental value of the jeans (1). • Cotton is strong/durable which makes it an excellent fabric choice for the jeans to extend wear and tear (1). • Cotton is abrasion resistant, which makes it an excellent fabric choice for the jeans to extend wear and tear (1). • Cotton is a smooth yarn that is easy to dye (Indigo dye for denim) (1). • Cotton is a smooth yarn that is easy to weave (1). • Cotton can withstand heat, enhances aftercare/ironing at high temperatures (1). • Cotton can withstand detergents/bleach (1). • Any other suitable response.	**2**	In each case: Up to one mark for stating a reason why cotton fibres are suitable for the denim jeans. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

	(d)(i)		Possible reasons may include: • Elastic waistbands are stretchable (1) and can be used in the jeans to fit a range of sizes (1). • They allow the jeans to be used for a longer period of time – grow with you! (1) - great for maternity wear (1). • Offers a comfortable fit that moves with the body due to the stretch (1) does not restrict blood flow to waist (1). • Allows wearer free movement without any constriction (1) particularly great for leisurewear/jeggings (1). • Easier to wear/use (1) which allows wearer to take item on and off easily (1). • Jeans with an elasticated waistband provide a comfortable, snug fit (1) which can enhance body shape and allow jeans to drape better (1). • Any other suitable response.	**2**	Up to two marks for explaining why an elasticated waist is a useful feature for the wearer. Specific reference to the context in the question is needed for marks to be awarded. Mix and match approach to be taken with bullet points.

	(d)(ii)		**The candidate is expected to demonstrate their understanding of the process involved through a series of annotated sketches and/or notes. There may be variations to the process as indicated but to get into L3 candidates must demonstrate a clear understanding of the end-to-end process.** **An elasticated casing:** • Make sure enough seam allowance at the top is added for the casing. The casing should be at least ¼" (6 mm) wider than the actual elastic width. • Press the top raw edge over by 1/4 inch (6mm). • Press the top edge over again by the width of the elastic plus 1/4 inch (6mm). e.g. For 3/4 inch (2cm) elastic you would press the edge by 1 inch (2.5cm). This gives the elastic a little wiggle room and allows for the stitching. • Cut to the correct length, this will prevent the elastic from becoming loose over time. *25% to 40% of the finished actual length for elastic is required to create a well elasticated waistband. • Stretch out the elastic a few times before making the final cut at the required length. This will prevent the elastic from becoming loose over time. • Using a straight stitch, machine stitch around the casing close to the edge leaving a gap on one side. Try to leave the gap somewhere inconspicuous.	**6** All processes demonstrated must relate to a textile product such as a pair of denim jeans. If candidate does not provide an analytical/evaluative response then only L1 can be awarded.	**Level 3 [5-6 marks]** The candidate demonstrates a good level of detail of the process needed to work an elasticated waist band into a textile product such as a pair of jeans using technical terms and considering any relevant equipment, materials and materials. Sketches, if used will be clear and supported with relevant notes. The process includes all relevant stages. **Level 2 [3-4 marks]** The candidate will demonstrate a sound level of detail of the process needed to work an elasticated waist band into a textile product such as a pair of jeans with some consideration of any equipment, materials and materials required. Sketches, if used, will for the most part be clear and supported with notes most of which are relevant. The process includes some relevant stages. **Level 1 [1-2 marks]** The candidate will demonstrate a limited level of detail of the process needed to work an elasticated waist band into textile product such as a pair of jeans with a limited use of technical terms and there will be a basic consideration of any equipment, materials and materials required. Sketches, if used, will be unclear with only basic notes to accompany them. Few relevant stages are included. **0 marks**

			• Thread the elastic through the gap in the casing with a safety pin. Use a large safety pin to pull the elastic through the casing. It is sturdier and won't open inside the casing messing up the whole process. Before moving to the next step, try the garment on and adjust the elastic if necessary.  • Overlap the ends of the elastic and stitch. Use the box method to join the elastic ends: Lap one elastic end over the over and anchor the edges with several lines of stitching (create a box) through all layers. Overlapping elastic ends reduces bulk and ensures that the elastic won't rip at the seam. • Push the elastic inside the gap and machine stitch the gap closed.		No response or no response worthy of credit. 

			L3 exemplar:  ① preparation • cut out the fabric for the jeans waistband to the correct measurements including seam allowance. • cut out the ~~waist~~ elastic to the measurement of the user's waist - the fabric will be longer as it will not stretch like the elastic. • set up a sewing machine and swap the foot to a edonum foot. ② method • sew together the top ~~and bottom~~ seams for the waistband with the right sides facing. • turn waistband right side out and sew the bottom seam ← bottom seam stitch line. • use a loop turner or safety pin to help thread the elastic through the waistband tube. • secure the elastic on either side using a zig-zag stitch as it allows more elasticity. • ~~thread~~ one end of the waistband through the over and fold over opposed edge. • top stitch waistband in place. ③ finishing • sew the waistband to the jeans, cut any loose threads and press.		

			Sewing a separate elasticated waistband: • Cut the waistband from fabric using the following formula. For woven fabric add ease of 1/4 inch (6mm) and for stretch fabric add 1/8 inch (3mm). Ease is added just so your elastic has a bit of wiggle room. • *Formula for fabric width* = 2 x (elastic width + seam allowance + ease) • For the length of the fabric, cut at least to the widest hip measurement. Stretch fabric will stretch so it can be cut a little shorter. • Fold the waistband in half with right sides together and straight machine stitch leaving a gap just below the middle which is the width of the elastic. • Fold the waistband lengthwise with the wrong sides together. Baste/tack the edges. • Divide the waistband into quarters and mark. • Divide the garment (jeans) into quarters and mark. For woven fabrics, the garment may be gathered already to the width of the fabric waistband. • Match the garment and waistband quarters and stitch. The hole for the elastic should be facing out. • Fold up the waistband and thread the elastic using a safety pin. • Hand stitch the gap closed with an invisible slip stitch: Choose a thread that matches the colour of the fabric. Thread a needle and tie a knot at the end. Then,		

			insert the needle into the fold of the hem at the bottom of the waistband, in between the two layers of fabric. • Pull the thread through, until the knot is hidden inside the fold and the thread is taut. The thread should only be visible from the top of the fold. • Catch the fabric - Insert the needle into the main fabric about 2cm along, keeping it level with the fold of the hem and catch a tiny amount of the fabric (creates a dot of thread). Pull the needle through, until the threads are tight (but not so tight that the fabric gathers up). • Insert the needle into the fold of the fabric, just to the left of where the dot was sewn. Pass it up a small distance inside the fold, then back out. Pull the thread firm. The dot should be centred between the spot where the threads go in and out of the hem's fold. • Keep stitching - Repeat the process by passing the needle through a very tiny amount of fabric again, keeping in line with the first dot. • Finish the stitch. When all of the stitches have been completed, pass the needle through the fold of the hem. Each stitch should be the same distance apart, so the dots are evenly spaced on the right side of the fabric. **Sewing the elastic directly onto the fabric** • Cut the elastic - the elastic is cut to fit the wearer's natural waist. Remember to add an extra 1” (2.5cm) x 2 to the waist length to allow for the overlap.		

			• Pin the ends of the elastic together overlapping one side over the other to give a flat surface. Overlap the elastic ends by 1” (2.5cm) • Use a regular straight stitch to sew the ends of the elastic together. Use the box method to join the elastic ends: Lap one elastic end over the over and anchor the edges with several lines of stitching (create a box) through all layers. Overlapping elastic ends reduces bulk and ensures that the elastic won’t rip at the seam. • Divide the elastic - Starting at the overlap spot, fold the elastic in half to find the spot opposite the overlap spot. Now place those two spots together to find the halfway point between them on either side, dividing the elastic into four equal sections. Mark each spot with a pin vertically inserted into the elastic at the quarter mark spot. • Divide the waistband - Repeat the process in Step above, this time dividing up the waistband fabric into four equal parts. Don't assume the seams will be at any of these four anchor points. Start at the centre back and divide the rest from that starting point, in the same way you did with the elastic. • Apply the elastic piece to the fabric - Place the elastic on the wrong side of the fabric, with the top of the elastic flush with the raw edge of the fabric. Place the elastic overlap in a discreet place, like at the centre back or near a side seam. • Continue around the waistband, pinning its four anchor points with the four anchor points of the elastic. The elastic will be smaller than the fabric.		

			• Start to sew - Place the top edge into your sewing machine first, with the wrong side of the fabric facing up. Use an overlock stitch , a zigzag stitch or a multi-step or 3-step zigzag stitch to sew the elastic onto the fabric. This type of stitch secures the elastic to the fabric and finishes the raw edge at the same time. A straight stitch can be used to stitch the elastic to the fabric; then raw edge will then need to be zig-zagged afterwards. • Sew around the entire waist, pulling and stretching the elastic to fit the fabric between the four anchor points. This stitch will connect the elastic to the fabric to keep it in place while wearing. If an overlock machine is used, do not cut the elastic or fabric with the machine's knife whilst sewing. • Fold and pin - Fold the elastic and fabric down into the wrong side of the garment and pin in place. Only fold the width of the elastic itself, making sure the top edge of the elastic is at the very top of the fabric fold. Stretch the elastic and waistband area as you pin, since the fabric is gathered to fit the elastic. • Sew along the bottom of the fold - Sew with the wrong side of the fabric up and go through the fabric, stitching and elastic. Make sure to stretch the elastic and fabric whilst sewing to prevent putting tucks and pinches along the way. • Once you sew all the way around, the elastic waistband will look exactly the way it would if it had been sewn into a casing. But the gathers will be evenly distributed, and the elastic will never flip or twist since it has been sewn directly to the fabric.		

			• Any other suitable response.		
	(e)		Size 14 = 80 cm (taken from the chart above) (1) Length of elastic = size of waist x 84% = 80 x 84% = 67.2 cm (1) Length of elastic + overlap = 67.2*cm + 2.5cm = 69.7 cm = 70 cm (nearest whole number) (1)	**3**	Award three marks as follows: One mark for analysing the graph and taking the correct information. One mark for calculating the length of elastic required. One mark for adding on the overlap and rounding the answer to the nearest whole number. If correct answer is given without working out shown award full marks. Where an incorrect answer is given working out should be used to credit appropriate marks. *Allow error carried forward (ECF) where correct working out is shown.

	(f)		Possible impacts may include: **Manufacturer:** • Use of bought in components/embellishments, such as gems, beads, threads (1) need to be reliably sourced through reliable suppliers (1). • More storage space may be required for the components/embellishments, (1) which may impact on costs for further storage. (1). • Longer wait time may be required for ordering and supplying of new components/embellishments. (1) Down time increased and therefore costs increased. (1). • Specialist companies for components may offer cost benefits through economy of scale. (1) Choice of suppliers offering cost benefits through price negotiations and loyalty contracts will provide manufacturer with a more cost-effective product(s). (1) • Increased costs (1) – embellished garments are usually made using high-tech machinery or handwork; embellishing jeans is time consuming when worked by hand using bespoke method. (1) Specialist workers may be needed to complete task, which incurs extra costs through higher pay. (1) • Increased time to produce (1) if hand-embellishing using bespoke/ small batches. • Environmental impact of using heavily embellished materials/garments must be considered (1)	**6** If candidate does not provide an analytical/evaluative response then only L1 can be awarded.	**Level 3 [5-6 marks]** The candidate has a clear understanding of the impact this additional form of luxury embellishment would have on both the manufacturer and the consumer. They produce a thorough discussion in relation to the question by explaining impacts on the manufacturer and consumer. The explanation is clear, and a number of points are used to exemplify the points made. **Level 2 [3-4 marks]** The candidate has a reasonable understanding of the impact this additional form of luxury embellishment would have on the manufacturer and/or the consumer. They produce a sound discussion in relation to the question by explaining benefits and/or drawbacks to both/either stakeholder. The explanation is sufficient although a number of opportunities to exemplify the points made are missed. **Level 1 [1-2 marks]** The candidate has a basic knowledge of the impact of adding embellishment to products. Any reference to benefits to the manufacturer or consumer is limited. The response contains no analysis or evaluation, with few or no relevant points to exemplify the points being made.

			Manufacture could consider using embroidery/beads/embellishment from off-cuts (1) consider upcycling and the recycling of products that have been heavily embellished rather than leaving as production waste. (1) Alexander McQueen brand donated fabric/embellishment archive to fashion students across the UK in Feb 2020 rather than transfer as production waste. (1) In donating leftover fabrics, Alexander McQueen provides another small way for brands to shift towards a more sustainable future. (1) **Consumer:** • Difficult to handle (1) - Some forms of embellishment cannot be washed/ironed by the same method as the jean fabric (1). • Consumers can be deterred from buying, if item requires dry cleaning (1) due to application of gems, sequins etc that cannot be washed. (1) • Cost implications to consumer (1) - Many fabrics that have beads, gems and sequins attached need to be dry cleaner therefore increased cost and hassle to consumer. (1) • It is expensive to buy/purchase a bespoke/limited item (1) which may deter some consumers. • Loss of embellishment through wear and tear not easy to replace, (1) impacts on appearance which may deter consumer from buying. (1) Garment less durable. (1) • Quality components/embellishments are usually sourced and used for luxury goods which extends shelf life. (1)		**0 marks** No response or no response worthy of credit.

			Add elegance and individuality which consumers may like. (Not off the peg fashion). (1) • Any other suitable response.		

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on

01223 553998

Alternatively, you can email us on

support@ocr.org.uk

For more information visit

ocr.org.uk/qualifications/resource-finder

ocr.org.uk

Twitter/ocrexams

/ocrexams

/company/ocr

/ocrexams

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT

OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up-to-date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please contact us.

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our Expression of Interest form.

Please get in touch if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.