RECOGNISING ACHIEVEMENT

GCE

Design and Technology

Advanced GCE

Unit **F524/01:** Product Design: Component 1

Mark Scheme for June 2012

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

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Question			Answer	Mark	Guidance
1	(a)		• The height and location of the building with possible reference to any unusual wind conditions. • The profile of the trussed rafter. • The span of the trussed rafter indicated by the distance between the outer faces of the wallplates or the overall length of the ceiling tie. • The pitch of the roof. • The method and position of all supports. • The type and weight of the roof tiles/slates or covering. • The size and position of any water storage tanks etc. to be supported by the trussed rafter. • The position of any access hatches, chimneys and other openings. • The type of preservative treatment if required. • The spacing of the trussed rafters.	4	Clear statement and justification required for a mark Must be related to the trussed rafter – no marks for generic responses Must be a full response – no marks for identification only. **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example. The hazards and control measures would generally relate to people working at height together with people and materials falling from height.

Question			Answer	Mark	Guidance
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. • The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
	(d)		• Test appropriateness/function/safety of materials • Test working features of product • Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. • Tensile and compressive testing of the structural integrity of the trussed rafter including the metal gang nail jointing plates on a full size rig. • 'Non-destructive tests' include visual or machine grading of the timber prior to incorporation into the trussed rafter frame.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

Question			Answer	Mark	Guidance
	(e)	(i)	• The material could be a softwood eg. Redwood, Whitewood or Fir. • Durable • Can be easily cut and fixed • Economic in use • Strength (defined and justified) • Usually sourced from a sustainable source. ***An alternative material for the trussed rafter.*** • The material could be galvanised cold-rolled steel. • Durable • Strength (defined and justified) • Resistance to corrosion • Resistance to insect attack • Resistance to fire	3	award mark for other appropriate material not listed 1x1 mark Award mark for other appropriate property/characteristic 2x1 mark
		(ii)	The incorporation of different types of bracing ie. members fixed to the same web in successive trussed rafters to form a beam like effect. The bracing should conform to the requirements of BS EN 1991-1-5. Types of bracing to be considered: • Temporary bracing • Lateral web bracing • Longitudinal bracing at node points • Chevron bracing for longer spans Other processes to be considered include: • Ceiling binders ie. longitudinal members fixed at node points to each successive trussed rafter to maintain the correct spacing • Galvanised steel trussed rafter clips to secure the trussed rafter to the wallplate • Galvanised steel restraint straps used vertically at the wallplate to prevent the roof from lifting and laterally along the top and bottom chords of at least the last two trussed rafters to transmit wind loads on gable walls into the roof structure. The spacing of the restraint straps should not be greater than 2 metres.	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified, Answer must include detail of bracing, binders and restraint for full marks **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks

Question			Answer	Mark	Guidance
			• Conforms to Approved Document A of the Building Regulations • Conforms to the manufacturer's recommendations • Trussed rafters have not been modified in site		Detailed sketch/chart with clear annotation **3** marks Max 1 if no sketch/chart used Award credit where possible if response doesn't link to chosen material.
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
			Total	**36**	

Question			Answer	Mark	Guidance
2	(a)		• Must be sized to suit a wide range of cycle sizes • Must support the cycle securely to prevent it falling • Support the cycle without causing any damage to it • Be strong enough to withstand rough treatment in use • Be relatively inexpensive to produce • Have a durable finish to withstand harsh weather conditions • Allow easy and safe fitting and removal of cycles • Enable cycles to be locked in place if needed • Sections must fit together easily and securely when used in multiples • Be able to be fixed to the ground/other sections for security	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses Must be a full response – no marks for ‘ lightweight – carry easy’ **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example.

Question	Answer	Mark	Guidance
(c)	• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. • The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
(d)	• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

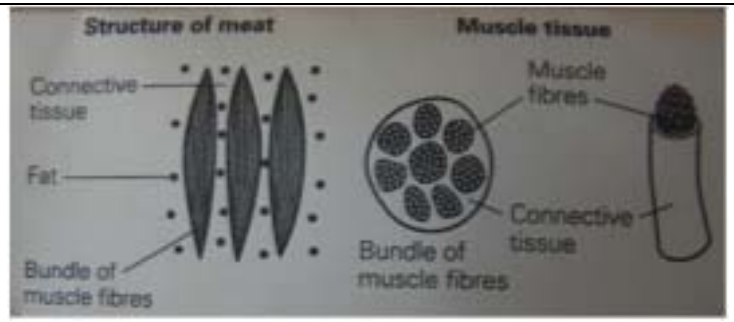
Question			Answer	Mark	Guidance
	(e)	(i)	**Material** • Mild steel (accept 'black' or 'bright drawn') • Medium carbon steel • Stainless steel Accept aluminium alloy, but care needed with reference to properties or characteristics. **Properties or characteristics** • readily available and inexpensive • good strength (defined) properties • easily welded/fabricated • produces rigid structure • readily accepts surface treatment to prevent corrosion • Corrosion resistant (only if stainless steel or aluminium alloy given)	3	award mark for other appropriate material not listed 1x1 mark Properties to be directly relevant to material given. e.g not 'inexpensive' if stainless steel given. Good strength properties for Al. Alloy only if qualified by thickness of material. Award mark for other appropriate property/characteristic 2x1 mark
		(ii)	• Cut length of strip steel for backplate. • QC – check length and remove 'burrs' • Cut lengths of round bar for the support 'hoops' • Bend 'hoops' to shape round metal bending jig/former or in a mechanical or hydraulic press Metal to be heated (red hot) unless reference made to use of hydraulics in forming machine/press • QC – check shape and size of bent 'hoop' • Drill holes in backplate to take ends of 'hoops' (this stage may be omitted, but emphasis will then need to be placed on supporting 'hoops' when fixing/welding) • QC – remove 'burrs' from drilled holes • Countersink back of holes to ensure penetration when welding (the presence of this stage in the process description will indicate a high level response) • Position 'hoops' in/on backplate and support in correct position (angle) using jig/template • Weld 'hoops' in position – arc/MIG/TIG/laser welding • Clean off weld before final QC check	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified, **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks Detailed sketch/chart with clear annotation **3** marks Max 1 if no sketch/chart used

Question			Answer	Mark	Guidance
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
			Total	**36**	

Question			Answer	Mark	Guidance
3	(a)		• Must be suitable to be reheated in a microwave- most people require a meal to be heated quickly • Uses less fuel energy • Must be numbered portion size – family portion/suit single person/couple • Packaging must be biodegradable/recyclable/made from recycled materials (any sustainable design reference) • Ready cooked and chilled to store in a refrigerator – this will reheat quickly • Have a shelf life of 5/6 days – so the consumer can shop weekly • Be able to be oven cooked in the container –not everyone has a microwave cooker • Contain one of the five day portions of vegetables- to meet dietary guidelines • Use polyunsaturated fats to assist ijn lowering cholesterol in the diet • Be lower in salt – use herbs/spices instead to assist in lowering salt targets.	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses Must be a full response **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review Specific examples could include: Storage cooking temperatures re preventing bacterial growth Measures to avoid cross contamination Hygiene of staff/ equipment	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example.

Question			Answer	Mark	Guidance
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. • The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
	(d)		• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product. • Non destructive tests in the food industry would include: Metal detection/microbial detection/ physical contaminants	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

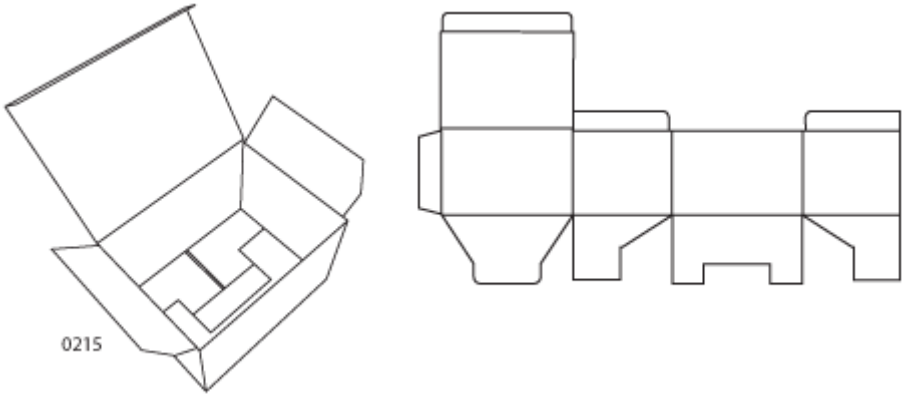
Question			Answer	Mark	Guidance
	(e)	(i)	• E.g. Spinach, iron fortified cereals, liver, whole grains (Give credit for any other source of iron) • Needed for the formation of haemoglobin in red blood cells • Needed to transport oxygen around the body • For normal energy metabolism and for the metabolism of drugs and foreign substances that need to be removed from the body • The immune system needs iron for normal functioning • Prevention of anaemia. Deficiency of iron leads to anaemia	3	1x1 mark Do not accept: iron/vitamin C /vitamin D/protein 2x1 mark
		(ii)	1.Meat is cooked to make it safe to eat, to develop flavour, to make it easier to chew, swallow and digest. 2. Meat is made of bundles of muscle fibres. If the fibres are big the muscle will be tough . Meat from older animals or from parts of the animal that have done a lot of work (the legs and the neck) tends to be tough. Meat from younger animals or parts of the animal that have done little work is usually tender because the fibre length of the muscle fibres is reduced by mincing/cutting in to chunks or hitting with a meat hammer 3. <u>Cooking:</u> Stewing: a long slow moist method of cooking .The connective tissue (collagen) surrounding the bundles of fibres forms gelatine when cooked by a slow moist method. 4. <u>Mechanical action</u> The length of the muscle fibres is reduced by mincing/cutting in to chunks or hitting with a meat hammer 5. <u>Chemical action</u> Meat tenderisers can be added to the surface of meat. These contain proteolytic enzymes which break down the muscle fibre and connective tissue 6. <u>Marinating</u> An acidic, alkaline or salt solution can increase the amount of water meat can hold and make it more tender. Wine or lemon juice are often used as marinades prior to cooking	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified. Answer must include detail of bracing, binders and restraint for full marks **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks Detailed sketch/chart with clear annotation **3** marks Max 1 if no sketch/chart used

Question			Answer	Mark	Guidance
					
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion- taste samples etc • Placement **Examples** • Specific product promotions • Specific market research / sensory testing	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
			Total	**36**	

Question			Answer	Mark	Guidance
4	(a)		• The carrier should hold up to 6 bottles, any more would be too heavy • The carrier should have a robust base to prevent collapse and damage • The carrier should be produced flat pack for ease of storage/transport/distribution • The carrier should be quick and easy to assemble by a range of adult customers or shop staff • The carrier should have appropriate details printed on eg advertising opportunities, careful usage of product = bottles inside • The carrier should have a comfortable handle, carrying 6 bottles could be heavy • The side construction and top connector should be well constructed to avoid collapse and damage. • There should be dividers to stop the bottles hitting each other	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses Must be a full response – no marks for ' lightweight – carry easy' **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks –** ...and the candidate refers to a relevant example.
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark

Question			Answer	Mark	Guidance
			• The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. • The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.		Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
	(d)		• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

Question			Answer	Mark	Guidance
	(e)	(i)	***Material*** Corrugated card Strong cardboard with a specified weight Laminated card Solid white board Polypropylene Corroflute ***Properties – corrugated card*** • Protective quality/mild impact • Inexpensive/available • Can be printed on • Easily folded. ***Properties – board*** • High quality finish • Cuts/folds easily • Available in gloss, matt or silk ***Properties – polypropylene*** • Can be printed on • Easily cut/folded. • Can be reused	3	award mark for other appropriate material not listed 1x1 mark Award mark for other appropriate property/characteristic 2x1 mark

Question			Answer	Mark	Guidance
		(ii)	• Appropriate development showing clear crash base  • Show cut/crease lines • If candidates include print method – outline of flexography or screen printing • Presse forme created • Test run • Cut / crease– check at intervals • Pack ready for despatch as flat pack to be assembled at store	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified, **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description. **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks Detailed sketch/chart with clear annotation **3** marks Max 1 if no sketch/chart used Award credit where possible if response doesn't link to chosen material.

Question			Answer	Mark	Guidance
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
			Total	**36**	

Question			Answer	Mark	Guidance
5	(a)		• Give protection to bottles to prevent breakages in transit • Take up minimum amount of space for economy in delivery • Allow easy fitting and removal of perfume bottles • Use a minimum of material to save weight / cost • Give sufficient spacing between bottles for fingers to grip • Simple design / form to allow easy and cheap manufacture • Be aesthetically pleasing for use as POS display • Be stackable for storage prior to and after use • Be coloured to suit the bottles on display • Strong/stable enough to support the weight of full perfume bottles	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses Must be a full response – no marks for ‘ lightweight – carry easy’ **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example.

Question			Answer	Mark	Guidance
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. • The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
	(d)		• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

Question			Answer	Mark	Guidance
	(e)	(i)	**Material** • Polystyrene (HIPS) • ABS • Polyethylene (HDPE) • PET • Acrylic **Properties or characteristics** • high quality finish • available in different colours • easily formed to required shape • recyclable after use • readily accepts printing on surface • adequate strength when formed	3	award mark for other appropriate thermoplastic not listed 1x1 mark Properties must relate to material stated. Award mark for other appropriate property/characteristic 2x1 mark
		(ii)	• Selection and quality check of material • Preparation of mould/plug used to form desired shape – indication of mould requirements (smooth surface; draft angle, fillet radii; suction/vent holes) • Vacuum forming shape – clamping of sheet material on machine. Description of process must include reference to the heating stage to soften (not melt) the plastic sheet. Introduction of mould/plug and application of vacuum to form softened plastic. (reference to a 'blowing ' stage may be made prior to the vacuum) Remove heat source and allow to cool/set before lowering mould Removal of formed sheet from machine A higher level response will make reference to the use of a 'multi-impression' mould to speed up the manufacture in batch production quantities such as those given. • Separation of moulding from sheet / waste material. Reference to band-saw / 'gerbil' cutter acceptable; higher level response will suggest pressing / die-cutting	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified, **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description. **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks Detailed sketch/chart with clear annotation **3** marks

Question			Answer	Mark	Guidance
			• QC check on quality of moulding following cutting moulding from sheet • Removal of any sharp edges produced by cutting process		Max 1 if no sketch/chart used Award credit where possible if response doesn't link to chosen material.
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
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Question			Answer	Mark	Guidance
6	(a)		• The scoop handle must be easy to hold and not discomfort the user • The scoop must be easily cleaned as it is to be used with food items • The scoop must hold sufficient sweets without becoming overbalanced/heavy • The scoop must be rigid and in order to effectively slide under a number of sweets • The scoop must have reasonably high sides to prevent sweets falling off when being transported	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses Must be a full response – no marks for ' lightweight – carry easy' **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example.
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. • The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.

Question			Answer	Mark	Guidance
	(d)		• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.
	(e)	(i)	**Material** • acrylic; • abs; • polypropylene; • HIPS (polystyrene); • laminated birch/beech/maple; • aluminium; • chromed (or plastic coated) mild steel; • Stainless steel **Properties or characteristics** • high quality finish; • cleaned easily; • easily formed to required shape; • produces rigid structure;	3	Award mark for other appropriate material not listed 1x1 mark Award mark for other appropriate property/characteristic 2x1 mark

Question			Answer	Mark	Guidance
		(ii)	Heat forming of plastic materials • net produced • shaped plastic, fine toothed saw, • edge finished • jigs/formers used to shape after strip heating • or – male female mould Laser cutting/thermoforming • design created CAD • print details setup/speed, thickness of material • laser cutter set up, auto focus • laser cut • auto removal/replacement • thermoformed using line bend system • held until shape set. • edges may be flame polished Laminated • male/female former prepared • veneers cut • glue spreading (one side) • silicon release on former • veneers inserted into former • former closed – clamped • shape released • edge shaping • ends glued into shape • finish applied Metal forming • net produced, • metal shaped, guillotine, nibbler • edges checked, sharp edges ground • folding bars / jig to bend to shape	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified. **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks Detailed sketch/chart with clear annotation **3** marks Max 1 if no sketch/chart used Award credit where possible if response doesn't link to chosen material. Injection moulding not appropriate for batch of 250

Question			Answer	Mark	Guidance
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
			Total	**36**	

Question			Answer	Mark	Guidance
7	(a)		• The torch must emit a bright light so that it is effective in the dark. • The light level should be adjustable so that the user can dim the light to conserve the battery. • It should be possible to operate and adjust the torch with one hand so that the user has the other hand free to hold other objects. • The torch must be able to be angled so that the user can direct the light in the most useful direction. • The battery should last a significant number of hours so that the torch will last the duration of a camp or expedition. • It must be easy to change the battery so that the user can do this with cold hands and without needing tools. • The torch should be water resistant because it may be used in the rain. • The strap should be adjustable for a range of head sizes so that the product is suitable for a full range of users. • The product should fit securely on the users head so that they don't need to keep on repositioning it whilst walking.	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses Must be a full response – no marks for ' lightweight – carry easy' **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example.

Question			Answer	Mark	Guidance
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
	(d)		• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

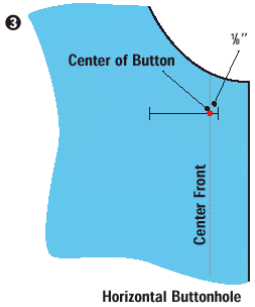
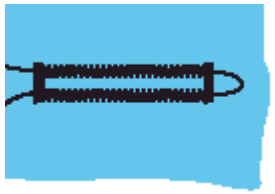
Question			Answer	Mark	Guidance
	(e)	(i)	• SMT involves soldering lead-less electronic components directly onto the tracks of the PCB rather than feeding component leads through holes before soldering. Reasons for SMT: • SMT component sizes are much smaller than conventional 'through hole' components so the product can be made as small as possible. • SMT is assembled by placement machines at very high speeds, lowering production costs. • SMT boards are soldered automatically in a reflow oven, lowering production costs. • SMT boards are inspected automatically during manufacture so that faults are rapidly found. • SMT components are cheaper than 'through hole' components. • SMT components can be placed on both sides of the PCB.	3	Explanation of SMT 1x1 mark Two reasons for using SMT 2x1 mark

Question			Answer	Mark	Guidance
		(ii)	• Circuit diagram of astable (e.g. 555 astable or NAND gate astable) • Correct identification of connections on 555 or on NAND gates. • Power supply clear. • Output LED clear. • Use of resistor and capacitor to control flash rate. • Indication of how to adjust the flash rate.	9	**Level 3 (5-6 marks)** Indication of how the flash rate can be adjusted. **Level 2 (3-4 marks)** Accurate astable circuit. Output LED clear. **Level 1 (0-2 marks)** Attempt at an astable circuit diagram, very limited description **Quality of description and communication** Detailed diagram with clear annotation **3** marks Good diagram with main features identified and labelled **2** marks Basic diagram with limited annotation **1** mark Max 1 if no diagram used
	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
			Total	**36**	

Question			Answer	Mark	Guidance
8	(a)		• Be constructed from a fabric that provides warmth- it will be worn in temperatures below freezing • It must be easy to get on and off – needs to be front fastening • It must have pockets- user will need to put items in pockets for easy access • Pockets must be able to be fastened/protected- so that items do not fall out of the pockets. • Must be lined – to finish. Neaten the insides of the coat/ or to add extra warmth • Fitted styled garment to suit a full range of sizes/to follow fashion trends • Collar to provide protection to the neck area/ add style/provide additional warmth to back of head.	4	Clear statement and justification required for a mark Must be related to product – no marks for generic responses **Four** justified design requirements. Give one mark if two valid points given but not justified.
	(b)		• Identify hazard • Identify who may be harmed • Evaluate the risks • Record findings and put in place control measures • Periodically review	4	Credit the answer as follows: **2 marks** – Candidate states the two steps of a risk assessment. **3 marks** – ...and the candidate more fully describes/explains the steps **4 marks** – ...and the candidate refers to a relevant example.

Question			Answer	Mark	Guidance
	(c)		• Product labelling is covered under the Trades Descriptions Act. Labels must include accurate information to ensure that products can be used safely and correctly • Safety: motorcycle helmets must have a label attached to them informing you not to paint them or apply any kind of solvent. These may damage and weaken the helmet, giving less protection in an accident. • Aerosol cans must have a label warning the user to keep them away from heat for obvious safety reasons. • The Food Labelling Regulations 1996 relate to the labelling of food products. All ingredients of a food product must be listed in weight order. The BS 2747 code of practice for textile care labelling recommends how information can be passed to the consumer on the washing, bleaching, ironing, dry cleaning and drying of textiles.	4	**First** example – 1 mark Example described and relevance identified – 1 mark **Second** example – 1 mark Example described and relevance identified – 1 mark Award credit if candidate gives examples of actual labels, e.g. kitemark – displayed on a product which has been designed/manufactured to meet a set of agreed standards.
	(d)		• Test appropriateness/function/safety of materials • Test working features of product Common mechanical tests applied to materials: 'destructive tests' as the samples used are damaged during the test process. Tensile, Hardness, Impact, Abrasion Some large samples of material are either too large to move, too expensive or may have hidden defects within them: 'non-destructive tests' are then used: X-ray, Ultrasonics, Shore scleroscope • Sensory testing of food samples are undertaken during development or on a final product.	4	Quality of explanation of why non-destructive testing is used, including relevance of the given example – 3 marks Example given – 1 mark Do not credit responses relating to quality control checks. Non-destructive testing does not take place during the production line.

Question			Answer	Mark	Guidance
	(e)	(i)	**Wool** • Good insulator – the scales/crimp and length of fibre • Highly absorbent without feeling wet • Fibres are hydrophobic causing liquid to run into droplets while allowing water vapour to pass through • Softness gives a comfortable feel next to skin • Elasticity and springiness good allowing creases to drop out **Acrylic** • Wrinkle resistant • Voluminous , very soft and warm with a wool like feel • Dry quickly **Cotton** • Strong, hardwearing • Ability to be died • Can be waterproofed	3	award mark for other appropriate material not listed 1x1 mark Award mark for other appropriate property/characteristic 2x1 mark

Question			Answer	Mark	Guidance
		(ii)	*Diagrams should show the edge of the coat either folded back or with a front facing. It should include an interfacing.* 1. Positioning of the buttonholes as indicated by the pattern. Should be at right angles to the front edge and equally spaced 2. Tailor tacks / tailor pencil used to mark the position of the buttonholes 3. Length of buttonhole should be the diameter of the button plus 2mm depending on the thickness of the fabric and the depth of the button. 6mm for thick fabric 4. Computer controlled machines will 'remember the buttonhole settings and produce identical button holes. 5. A close zig-zag stitch should be used to satin stitch the buttonhole. The width needs to be adjusted during the stitching for the ends of the buttonhole. A wide zig zag is used for the ends. 6. The fabric between the rows of stitching can be cut using an unpicker 7. The buttons should be sewn on after the buttonhole has been worked 8. A 'shank' will be needed to allow for the thickness of the coat fabric  	9	**Level 3 (5-6 marks)** Processes fully described, key features and technical details identified, **Level 2 (3-4 marks)** Key processes presented, reasonably well described with key features identified **Level 1 (0-2 marks)** Some processes outlined (up to 2), very limited description **Quality of description and communication** Basic sketch or chart with limited annotation **1** mark Good sketch/chart with main features identified and labelled **2** marks Detailed sketch/chart with clear annotation **3** marks Max 1 if no sketch/chart used Award credit where possible if response doesn't link to chosen material.

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	(f)		**Issues** • Target market • Cost of product • Budget available • Scope/type of consumer info collection • Type of promotion • Placement **Examples** • Specific product promotions • Specific market research	8	**Level 3 (6-8 marks)** Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary **Level 2 (3-5 marks)** One or two issues described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of concept. Introduction of one example or supporting evidence **Level 1 (0-2 marks)** Some issues outlined, bullet points (usually focussed on one issue) no further or very limited explanation, limited use of examples or supporting evidence
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