

Design and Technology

Advanced GCE

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

Mark Scheme for January 2011

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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.

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1. Built Environment and Construction					
Question		Expected answers	Rationale		Marks
1	(a)	<p>Give four design requirements for the foundation shown in Fig.1. Justify each requirement.</p> <ul style="list-style-type: none"> • The foundation must provide a level base on which the building can be built. • The foundation must prevent the building from being lifted out of or off the ground. • The foundation must satisfy the requirements of the current Building Regulations. • The foundation must resist dead loads or the constant weight of the structure eg. walls, floors, roof etc. • The foundation must resist live or imposed loads eg. furniture, goods, people etc. • The foundation must resist variable loads caused by the weather eg snow, rain etc. • The foundation must resist any contaminants present in the sub-soil. • The depth of the foundation below ground level must be sufficient to overcome soil movements due to freeze/thaw action. • The thickness/depth of the foundation must be greater than the projection of the wall face unless it is reinforced. 	<p>Clear statement and justification required for a mark.</p> <p>Give one mark if two valid points given but not fully justified.</p> <p>Must be related to the foundation – no marks for generic responses.</p> <p>Must be a full response – no marks for ‘to resists loads’ etc.</p> <p>Four justified design requirements.</p>	4x1	[4]

1. Built Environment and Construction						
Question		Expected answers	Rationale		Marks	
	(b)	<p>Describe two ways in which CAD can be used in the designing of a foundation.</p> <ul style="list-style-type: none"> • CAD model to apply/check the magnitude of compressive and tensile loads • 3D CAD to generate and explore ideas • 2D CAD design software to generate dimensioned working drawings • simulations/animations of moving parts library of components • provides digital format to forward to CAM 	<p>Brief description Detailed description with clear indication and description of example</p> <p>must be different uses of CAD - not generic/benefits of ICT - not same use on different parts</p> <p>Two examples clearly explained. Allow reference to given product.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	[4]
	(c)	<p>Explain two disadvantages of using computerised stock control systems in the Construction Industry.</p> <ul style="list-style-type: none"> • Initial set up cost/training costs • Software failure/Virus attack • Breakdown impact • Input errors • Loss of jobs 	<p>Brief explanation Detailed explanation</p> <p>Two examples clearly explained. Allow reference to given product.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	[4]
	(d)	<p>Explain what is meant by the term 'Intellectual Property' in relation to the Built Environment. Use two examples to support your answer.</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – designs, music, art etc <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs • Patents • Trade marks/copyright 	<p>Brief explanation Detailed explanation</p> <p>Two examples clearly explained.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	[4]

1. Built Environment and Construction						
Question		Expected answers	Rationale		Marks	
	(e)	(i)	<p>State a suitable specific material used in the construction of a foundation.</p> <p>Give two properties or characteristics that make the material suitable for this use.</p> <p>Material</p> <ul style="list-style-type: none"> • Insitu/ready mixed concrete • Pre-cast concrete • Portland cement/sulphate resistant cement • Coarse aggregate • Fine aggregate or sand • Steel if reinforcement required <p>Properties or characteristics</p> <ul style="list-style-type: none"> • Compressive strength • Tensile strength when reinforced with steel • Easily formed to the required shape • Frost resistance when at an appropriate depth • Fire resistance • Durability • Impermeable to water 	<p>Award 1 mark for other appropriate material not listed 1x1 mark</p> <p>Award 1 mark for other appropriate property/characteristic 2x1 mark</p>	1	[3]
				2x1		

1. Built Environment and Construction				
Question	Expected answers		Rationale	Marks
	(ii)	<p>Describe, in detail, the Site Preparation procedure used to aid the design and construction of a building. Use a flowchart and/or annotated diagrams to support your answer.</p> <p>Desk-top study Provides a guide about the site prior to a site visit</p> <ul style="list-style-type: none"> Local Authority records Libraries Ordnance Survey maps Geological Survey maps Mining records Environment Agency Floodplain maps Previous Site Investigation reports <p>Walk-over survey Confirms and supplements the information collected during the Desk-top study</p> <ul style="list-style-type: none"> Signs of landslip, local subsidence or erosion of slopes Evidence of highly compressible soil eg, peat or silt Species, height, spread and condition of trees on or near the site Ponds, streams, wells etc. signs of flooding Signs of existing foundations, basements, sewers or mains services Signs of a high water table ie bounciness underfoot Signs of ground contamination ie. chemicals, petrol, gas etc <p>Sub-surface investigation Method used would depend on the size of the project and its cost</p> <ul style="list-style-type: none"> Aerial photography using digital and thermal imaging cameras Trial pits Bore holes 	<p>Level 1 (0 – 2 marks) Some stages outlined (up to 2), very limited description.</p> <p>Level 2 (3 – 4 marks) Key stages presented, reasonably well described with key features identified.</p> <p>Level 3 (5 – 6 marks) Procedure fully described, key features and technical details identified, Answer must include details of all 3 stages for full marks.</p> <p>Quality of description and communication</p> <p>Basic sketch/chart of trial pit or borehole method with limited annotation 1 mark Good sketch/chart with main features identified and labelled 2 marks Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 mark if no sketch used. Award credit where possible if response doesn't link to chosen material.</p>	<p>[9]</p> <p>6</p> <p>3</p>

1. Built Environment and Construction				
Question	Expected answers		Rationale	Marks
(f)	<p>Discuss the implications of product testing in the Built Environment and Construction Industry.</p> <p>Issues</p> <ul style="list-style-type: none"> • Risk management of health and safety with legal implications. • Economic factors/specialist department. • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. <p>Examples</p> <ul style="list-style-type: none"> • Destructive • Casting a sacrificial pile foundation. • Beam/lintel/column/trussed rafter. • Compression testing of concrete cube samples. • Masonry wall mock ups. • Doors/floor and wall panels for fire resistance ie, integrity and stability. • Any other suitable example • Non-destructive • Any building component eg. door/window for size, square, twist etc, • Air tightness of the completed building. • Heat loss of various building elements eg. external walls, roof, floor etc. • Any other suitable answer. 		<p>Level 1 (0 – 2 marks) Some factors outlined, bullet points (usually focussed on one factor) no further or very limited explanation, limited use of examples.</p> <p>Level 2 (3 – 5 marks) One or two factors described with some explanation. Appropriate use of technical vocabulary demonstrating a good understanding of the issues. Introduction of one example.</p> <p>Level 3 (6 – 8 marks) Clear, cogent and well-structured answer with two or three factors well explained. Good use of examples to support discussion. Good use of technical vocabulary.</p>	[8]
			Question 1 Total [36]	

2. Engineering					
Question		Expected answers	Additional Guidance		Marks
2	(a)	<p>Give four design requirements for the parasol base shown in Fig. 2. Justify each requirement.</p> <ul style="list-style-type: none"> • Large surface area for stability • Weather resistant to prevent corrosion/degrading • Heavy to prevent toppling • Method of securing parasol in tube • Easy to fit/remove parasol as required • Suitable for a range of sizes to enable wider use • No 'trip hazards' to ensure safety in use • Easy to 'flat pack' and assemble to reduce packaging • Aesthetically pleasing – not look out of place 	<p>Clear statement and justification required for a mark.</p> <p>Must be related to product – no marks for generic responses.</p> <p>Must be a full response – no marks for 'strong – carry weights'.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>	4x1	[4]
	(b)	<p>Describe two ways in which CAD can be used in the designing of a parasol base.</p> <ul style="list-style-type: none"> • 3D CAD to generate and explore ideas • 2D CAD design software to generate dimensioned working drawings • simulations/animations of moving parts • access library of components • repetition of design features(copy & paste) • provides digital format to forward to CAM 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <ul style="list-style-type: none"> - must be different uses of CAD - not generic/benefits of ICT - not same use on different parts <p>Two examples clearly described. Allow reference to given product.</p>	2x2	[4]

2. Engineering					
Question		Expected answers	Additional Guidance		Marks
	(c)	<p>Explain two disadvantages of using computerised stock control systems in the Engineering Industry.</p> <ul style="list-style-type: none"> • Initial set up cost/training costs • Software failure/Virus attack • Breakdown impact • Input errors • Loss of jobs 	brief description detailed description	1 mark 2 marks	[4] 2x2
	(d)	<p>Explain what is meant by the term 'Intellectual Property' in relation to engineered products. Use two examples to support your answer.</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – designs, music, art etc <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs • Patents • Trade marks • Copyright 	brief explanation with example detailed explanation with example	1 mark 2 marks	[4] 2x2

2. Engineering							
Question		Expected answers	Additional Guidance		Marks		
	(e)	(i)	<p>State a suitable specific material for the connector shown in Fig. 3.</p> <p>Give two properties or characteristics that make the material suitable for this use.</p> <p>Material</p> <ul style="list-style-type: none"> • steel (mild; stainless; low/medium carbon) • aluminium alloy (not simply aluminium) • composite (carbon/glass/epoxy) • brass <p>Properties or characteristics will include</p> <ul style="list-style-type: none"> • machinability • relative cost • strength • corrosion resistance • ease of joining 	<p>'Composite' material must be specified/accurately described.</p> <p>1 mark</p> <p>Properties must relate to the material stated and be justified. eg not relative cost if brass or stainless steel.</p> <p>2x1 mark</p>	1	2x1	[3]

2. Engineering				
Question	Expected answers	Additional Guidance		Marks
	<p>(ii) Describe, in detail, how the connector shown in Fig. 3 would be manufactured and fixed into the support tube. Include details of quality control checks that you would use. Use a flowchart and/or annotated diagrams to support your answer.</p> <ul style="list-style-type: none"> • Face off end of bar on centre lathe • Turn to thread diameter up to shoulder - right-hand knife tool (QC diameter checked with micrometer/vernier caliper. Shoulder length-steel rule/vernier caliper) • Square-off underside of shoulder – right-hand knife tool • Cut M12 thread with die in holder (or by screwcutting) (QC check initial alignment of die before cutting; check fit of finished thread with standard nut) • Part-off to length and chamfer(chamfering could be done as second setting operation or with form tool) • (QC check length with vernier/steel rule before final parting-off) • Remove sharp corners / deburr • Fix into tube – braze; weld; pin; drill and tap for screw (QC check firmness of joint; method must prevent turning of connector in tube) <p>Clear description of CNC produced connector acceptable, but must include details of stages</p>	<p>Level 1 (0 – 2 marks) Some stages outlined (up to 2),very limited description, limited.</p> <p>Level 2 (3 – 4 marks) Key stages presented, reasonably well described with key features identified.</p> <p>Level 3 (5 – 6 marks) Process fully described, key features and technical details identified, Answer must include detail of quality control checks for full marks.</p> <p>Quality of description and communication</p> <p>Basic diagrams/chart with limited annotation 1 mark Good diagrams/chart with main features identified and labelled 2 marks Detailed diagrams/chart with clear annotation 3 marks</p> <p>Max 1 mark in this strand if no diagrams or flowchart used. Award credit where possible if response doesn't link to chosen material.</p>	6	[9]
			3	

2. Engineering					
Question		Expected answers	Additional Guidance		Marks
	(f)	<p>Discuss the implications of product testing in the Engineering Industry.</p> <p>Possible issues:</p> <ul style="list-style-type: none"> • Safety for end-user of engineered product • Legal implications / responsibilities • BSI/ISO standards • Cost implications of specialist department / equipment • Destructive / non-destructive testing • Quality control • Marketing / advertising / PR / brand loyalty • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. <p>Examples / evidence:</p> <ul style="list-style-type: none"> • Testing procedures • Testing of specific product • Potential outcomes of not testing – product failure • Effects on company of product failure – examples 	<p>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.</p> <p>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.</p> <p>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.</p>		[8]
Question 2 Total [36]					

3. Food					
Question		Expected answers	Rationale		Marks
3	(a)	<p>Give four design requirements for the frozen fish product shown in Fig.4. Justify each requirement.</p> <ul style="list-style-type: none"> • Portions of cod in single serving weights to be able to give a nutritionally balanced portion • Have a tasty sauce to add moisture to the product as well as flavour • Be frozen to ensure a long shelf life for manufacturers <ul style="list-style-type: none"> Storage time for consumers Prevent bacterial growth • Be suitable for microwave cooking for speedy serving/ • Oven cooking for those without a microwave • Be able to be boiled /cooked in individual portions for people living alone. • Appeal to a wide consumer group eg suitable for all age ranges as it is easy to digest 	<p>Clear statement and justification required for a mark.</p> <p>Must be related to product – no marks for generic responses.</p> <p>Must be a full response – no marks for ‘ low cost – value for money or frozen.</p> <p>Aesthetic/ response must have example for mark.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>	4x1	[4]
	(b)	<p>Describe two ways in which computers could be used in the designing of a food product.</p> <ul style="list-style-type: none"> • 2D to produce inspirational mood board • CAD package for modelling product ideas • Clip art or design package to design the packaging and labelling • Nutritional software to calculate nutritional model • Sensory testing results recorded and analysed • Development of a HACCP system • Excel for coating and scaling up 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <p>must be different uses of computers</p> <p>Two examples clearly described.</p> <p>Allow reference to given product.</p>	2x2	[4]

3. Food						
Question		Expected answers	Rationale		Marks	
	(c)	<p>Explain two disadvantages of using computerised stock control systems in the Food Industry.</p> <ul style="list-style-type: none"> • Materials and components need to be high quality when delivered to ensure consistent quality • Suppliers must be able to deliver fresh ingredients as required. Deadlines cannot be met if not. Food safety issue • Initial computer system set up costs/training costs have to be met • Software failure/Virus attack will cause the system to fail • Breakdown of machinery means failure to deliver goods as they have no back up stock • Input errors can occur at all stages • Difficult to vary production to meet seasonal demand 	<p>brief description detailed description</p> <p>Two ways clearly explained. Allow reference to given product.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	<p>[4]</p>
	(d)	<p>Explain what is meant by the term 'Intellectual Property' in relation to the Food Industry. Use two examples to support your answer.</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – recipes/product ranges eg 'Finest' <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs/Recipes • Patents • Trade marks • Copyright for packaging 	<p>brief explanation with example detailed explanation with example</p> <p>Two examples clearly explained.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	<p>[4]</p>

3. Food						
Question		Expected answers	Rationale		Marks	
	(e)	(i)	<p>Give three reasons why the UK Government recommend that we should include more fish in our diet.</p> <ul style="list-style-type: none"> • Good source omega 3 fatty acids and Omega 6 lowers the risk of cardiovascular disease • Provides us with a good range of vitamins(A and D and B group) • Minerals Iodine, Flouride and Calcium in fish bones. • Does not contain high amounts of sodium or chloride • Easily digested form of HBV protein • Fat is unsaturated therefore lower in cholesterol 	<p>3x1 mark</p> <p>Award mark for other appropriate reason.</p> <p>Must give named minerals or vitamins. Do not accept just protein/minerals or vitamins unless names.</p>	3	[3]

3. Food					
Question		Expected answers	Rationale		Marks
	(ii)	<p>Plate freezing</p> <ul style="list-style-type: none"> The fish is put into contact with freezing metal plates. Most common way of freezing fish and fish products <p>Air Blast freezing</p> <ul style="list-style-type: none"> Air is circulated around the food at temperatures of -30°C to -40°C <p>Parsley Sauce</p> <ul style="list-style-type: none"> Parsley sauce is either bought in as a component or made as a starch thickened sauce. The frozen fish blocks are packed with a small amount of parsley sauce into sealed plastic bags. 			

3. Food				
Question	Expected answers	Rationale		Marks
(f)	<p>Discuss the implications of product testing in the Food Industry.</p> <p>Issues</p> <ul style="list-style-type: none"> • Importance in product development • Evaluate new and established food products • Analyse food products for improvements to ensure continued sales • Establish consumer response • Quality/reliability ensure it meets the specification • Maintain product quality • Assess save shelf life to avoid food poisoning • Cost to set up/time taken to set up BSI procedures • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. <p>Examples/evidence</p> <ul style="list-style-type: none"> • <u>Preference tests</u> – a tester is given 2 examples and asked which they prefer. • <u>Hedonic ranking</u> – allow the consumer to rank in order of preference. Used to determine the best 6 sample from a group. • <u>Difference tests</u> – used to highlight specific changes to a product, eg reduced sugar. The information is objective. • <u>Triangle tests</u> – used to demonstrate small differences between products. Uses 3 coded samples with one the odd one out. 	<p>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.</p> <p>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.</p> <p>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.</p> <p>Note: Candidates may concentrate on sensory testing and gain up to full marks, other may include other test procedures carried out during production.</p>		[8]

3. Food					
Question		Expected answers	Rationale		Marks
		<ul style="list-style-type: none"> • <u>Paired comparisons</u> – these help confirm what they can predict from a product eg a reduced fat content will make a biscuit harder. Also used are: Duo-trio tests/Two out of five tests/Taste Threshold test. • <u>Grading Tests</u> – Used to produce a ranking, rating and profiling of a product. A set of sensory descriptors may be given that represent the ideal profile of the product. The tests can assess the intensity of specific sensory qualities. • <u>Ranking</u> – used to sort a variety of foods into popularity order eg by taste. • <u>Rating</u> – Allows people to rate the extent to which they like or dislike a variety of products. • <u>Star profile</u> – used to describe the appearance, taste, and texture of a food product. • Importance of carrying out tests in quiet isolation/range and sample size of testers/samples coded/water in between samples. • Products may be tested for shelf life/deterioration • Microbiological testing. • Temperature control testing to prevent microbial growth. 			
Question 3 Total [36]					

4. Graphic Products					
Question		Expected answers		Rationale	
4	(a)	<p>Give four design requirements for the drinks carton shown in Fig. 5. Justify each requirement.</p> <ul style="list-style-type: none"> • It must be easy to hold to, must be secure so it is not dropped. • It must be easy to open without spilling the drink. • It must be hygienic and easily wipe able if spilt. • It must be rigid so it maintains its shape when used. • It must be durable, if it is dropped it will not shatter but absorb the impact protecting the contents. • It must be re-sealable allowing the product to remain fresh. • It must be able to fit in a milk compartment in a fridge, suitable for the environment. 	<p>Clear statement and justification required for a mark.</p> <p>Must be related to product – no marks for generic responses.</p> <p>Must be a full response – no marks for ‘low cost – value for money.</p> <p>Aesthetic/environment response must have example for mark.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>	4x1	[4]
	(b)	<p>Describe two ways in which CAD can be used in the designing of a drinks carton.</p> <ul style="list-style-type: none"> • 3D CAD to generate and explore ideas • 2D CAD design software to generate dimensioned working drawings • simulations/animations of moving parts • access library of components • provides digital format to send to CAM 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <p>must be different uses of CAD</p> <ul style="list-style-type: none"> - not generic/benefits of ICT - not same use on different parts <p>Two examples clearly described.</p> <p>Allow reference to given product.</p>	2x2	[4]

4. Graphic Products						
Question		Expected answers	Rationale			Marks
	(c)	<p>Explain two disadvantages of using computerised stock control systems in the Graphics Industry</p> <ul style="list-style-type: none"> • Initial set up cost/training costs • Software failure/Virus attack • Breakdown impact • Input errors • Loss of jobs 	<p>brief description detailed description</p> <p>Allow reference to given product.</p>	<p>1 mark 2 mark</p>	2x2	[4]
	(d)	<p>Explain what is meant by the term 'Intellectual Property' in relation to the Graphic Products Industry. Use two examples to support your answer.</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – designs, music, art etc <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs • Patents • Trade marks • Copyright 	<p>brief explanation with example detailed explanation with example</p> <p>Two examples clearly explained.</p>	<p>1 mark 2 mark</p>	2x2	[4]
	(e)	(i)	<p>State a suitable specific material for the drinks carton shown in Fig. 5. Give two properties or characteristics that make the material suitable for this use.</p> <ul style="list-style-type: none"> • Foil laminated board • Hygenic • Waterproof • Good surface finish 	<p>award mark for other appropriate material not listed 1x1 mark</p> <p>Award mark for other appropriate property/characteristic 2x1 mark</p>	<p>1x1 2x2 2x1</p>	[3]

4. Graphic Products				
Question	Expected answers	Rationale		Marks
(ii)	<p>Describe, in detail, how the drinks cartons shown in Fig. 5 would be manufactured as a batch of 500 000. Do not include the plastic cap. Use a flowchart and/or annotated diagrams to support your answer.</p> <p>Printing Accept gravure and other appropriate print methods</p> <ul style="list-style-type: none"> • Suitable for high production runs, similar to flexo as it can print onto a variety of substrates. • Origination of artwork using a suitable/relevant software package. • These are usually made from steel and plated with copper, any imperfections are removed then it is laser etched with small holes. The deeper the hole the darker the colour. • The substrate passes between an impression cylinder and etched gravure cylinder. • cylinder applies pressure, ink applied. • The substrate is completely dried before moving on to the next colour, cylinder is wiped clean. <p>Presse forme cutting</p> <ul style="list-style-type: none"> • Net detail • Presse forme described (cut blade, crease blade). <p>Folding</p> <ul style="list-style-type: none"> • Automatic folding , assembly system described 	<p>Level 1 (0 – 2 marks) Some stages outlined (up to 2), very limited description.</p> <p>Level 2 (3 – 4 marks) Key stages presented, reasonably well described with key features identified.</p> <p>Level 3 (5 – 6 marks) Process fully described, key features and technical details identified. Answer must include correct terminology and an understanding of the difference between this type of printing and litho.</p> <p>Quality of description and communication</p> <p>Basic sketch/chart with limited annotation 1 mark Good sketch /chartwith main features identified and labelled 2 marks Detailed sketch/chart with clear annotation 3 marks</p> <p>Max 1 if no sketch used. Award credit where possible if response doesn't link to chosen material.</p>	6	[9]
			3	

4. Graphic Products					
Question		Expected answers	Rationale		Marks
	(f)	<p>Discuss the implications of product testing in the Graphic Products Industry.</p> <p>Issues</p> <ul style="list-style-type: none"> • safety-legal implications • economic factors/specialist department • quality/reliability • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. <p>Examples/evidence</p> <ul style="list-style-type: none"> • specific product – display stand graphics • Product disasters – UV failure, quality of information, proof reading. Durability and resistance. 	<p>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.</p> <p>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.</p> <p>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.</p>		[8]
				Question 4 Total [36]	

5. Manufacturing					
Question		Expected answers	Additional Guidance		Marks
5	(a)	<p>Give four design requirements for the picnic table shown in Fig. 6. Justify each requirement.</p> <ul style="list-style-type: none"> • Able to be locked in position to prevent collapse • Large enough for 2 or more people to use • Strong enough to support weight of items • Weather resistant finish for outdoor use • Easy to fold/unfold for quick assembly • No 'pinch points' when assembling • Compact when folded for ease of carrying/storing • Lightweight for carrying • Stable when in use 	<p>Clear statement and justification required for a mark</p> <p>Must be related to product – no marks for generic responses</p> <p>Must be a full response – no marks for 'strong – carry weights'</p> <p>Four justified design requirements. Give one mark if two valid points given but not fully justified.</p>	4x1	[4]
	(b)	<p>Describe two ways in which CAD can be used in the designing of a picnic table.</p> <ul style="list-style-type: none"> • 3D CAD to generate and explore ideas • 2D CAD design software to generate dimensioned working drawings • simulations/animations of moving parts • access library of components • strength testing simulation • provides format to send to CAM system 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <p>must be different uses of CAD</p> <ul style="list-style-type: none"> - not generic/benefits of ICT - not same use on different parts <p>Two ways clearly described. Allow reference to given product.</p>	2x2	[4]

5. Manufacturing					
Question		Expected answers	Additional Guidance		Marks
	(c)	<p>Explain two disadvantages of using computerised stock control systems in Manufacturing.</p> <ul style="list-style-type: none"> • Initial set up cost/training costs • Software failure/Virus attack • Breakdown impact • Input errors • Loss of jobs 	<p>brief explanation detailed explanation with example</p> <p>Two examples clearly explained. Allow reference to given product.</p>	<p>1 mark 2 marks</p>	<p>2x2</p> <p>[4]</p>
	(d)	<p>Explain what is meant by the term 'Intellectual Property' in relation to Manufacturing. Use two examples to support your answer.</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – designs, music, art etc <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs • Patents • Trade marks • Copyright 	<p>brief explanation with example detailed explanation with example</p> <p>Two examples clearly explained.</p>	<p>1 mark 2 marks</p>	<p>2x2</p> <p>[4]</p>

5. Manufacturing						
Question		Expected answers	Additional Guidance		Marks	
	(e)	(i)	<p>State a suitable specific material for the leg shown in Fig. 7.</p> <p>Give two properties or characteristics that make the material suitable for this use.</p> <p>Material</p> <ul style="list-style-type: none"> • Steel tubing (low carbon/mild/galvanised/stainless) • aluminium alloy tubing (accept aluminium) • brass tubing • composite(GRP/carbon fibre) <p>Properties or characteristics will include</p> <ul style="list-style-type: none"> • Strength to weight ratio • Ease of forming/machining • Relative cost • Corrosion resistance • Durability 	<p>1 mark</p> <p>Properties must relate to the material stated and be justified. eg not relative cost if brass or composite given.</p> <p>2x1 mark</p>	<p>1</p> <p>2x1</p>	<p>[3]</p>

5. Manufacturing				
Question	Expected answers	Additional Guidance		Marks
	<p>(ii) Describe, in detail, how the leg shown in Fig. 7 would be manufactured as a batch of 10 000. Include details of any special equipment and quality control checks that would be used. Use a flowchart and/or annotated diagrams to support your answer.</p> <ul style="list-style-type: none"> • Cut tubing to required length (QC – end stop on cut-off machine or gauge to ensure accuracy) • Drill 2 holes in each end of tube (QC – use of jig) • De-burr drilled holes (QC check alignment of all holes to ensure ease of assembly) • Produce bends using formers/hydraulic benders • (QC check position and angle of bends against template/gauge) • Degrease finished leg (remove lubricant used during bending) • Final QC check <p>Description to relate to ‘moulding’ not ‘bending’ if composite material (GRP/carbon fibre) used in (i)</p> <p>Bends may be formed before drilling</p> <p>Description of semi-automated machine must include details of stages and suitably annotated diagrams</p>	<p>Level 1 (0 – 2 marks) Some stages outlined (up to 2), very limited description, limited.</p> <p>Level 2 (3 – 4 marks) Key stages presented, reasonably well described with key features identified.</p> <p>Level 3 (5 – 6 marks) Process fully described, key features and technical details identified, Answer must include detail of quality control checks for full marks.</p> <p>Mark at lower end of scale if one-off manufacture described.</p> <p>Do not award marks for preparation of raw materials.</p> <p>Quality of description and communication</p> <p>Basic diagrams/chart with limited annotation 1 mark Good diagrams/chart with main features identified and labelled 2 marks Detailed diagrams/chart with clear annotation 3 marks</p> <p>Max 1 mark in this strand if no diagrams or flowchart used. Award credit where possible if response doesn't link to chosen material.</p>	6	[9]
			3	

5. Manufacturing				
Question	Expected answers	Additional Guidance		Marks
(f)	<p>Discuss the implications of product testing in Manufacturing.</p> <p>Issues:</p> <ul style="list-style-type: none"> • safety for end-user of product • legal implications/responsibilities • cost implications of specialist department/equipment • quality control/product reliability • BSI/ISO standards • batch sampling procedures • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. • destructive/non-destructive testing. <p>Examples/evidence:</p> <ul style="list-style-type: none"> • testing procedures • testing of specific product • effects on company of product failure – examples • Potential outcomes of not testing – product failure 	<p>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.</p> <p>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.</p> <p>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.</p>		[8]
Question 5 Total				[36]

6. Resistant materials					
Question		Expected answers	Rationale	Mark	
6	(a)	<p>Give <u>four</u> design requirements for the desk lamp shown in Fig. 8 Justify each requirement.</p> <ul style="list-style-type: none"> • The desk lamp must have a soft or polished base to prevent damage to table surface. • The desk lamp must have an easily accessible power switch to enable easy usage when dark • The desk lamp design must be suit the environment in which it is designed eg aesthetically suitable for office • The desk lamp must have an (adjustable) shade to illuminate specified area and not give glare. • The desk lamp must be robust/stable so as not to fall over in any set position • The desk lamp must allow ease of access to bulb to facilitate changing. 	<p>Clear statement and justification required for a mark.</p> <p>Must be related to product – no marks for generic responses.</p> <p>Must be a full response – no marks for ‘low cost – value for money.</p> <p>Aesthetic/environment response must have example for mark.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>	4x1	[4]
	(b)	<p>Describe two ways in which CAD can be used in the designing of a desk lamp.</p> <ul style="list-style-type: none"> • 3D CAD to generate and explore ideas • 2D CAD design software to generate dimensioned working drawings • simulations/animations of moving parts • access library of components • provides digital format to send to CAM 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <p>must be different uses of CAD</p> <p>- not generic/benefits of ICT – not same use on different parts eg 2D design for shade, 2D design for base</p> <p>Two examples clearly described. Allow reference to given product.</p>	2x2	[4]

6. Resistant materials							
Question		Expected answers		Rationale		Mark	
	(c)		<p>Explain two disadvantages of using computerised stock control systems in the manufacture of resistant material products.</p> <ul style="list-style-type: none"> • Initial set up cost/training costs • Software failure/Virus attack • Breakdown impact • Input errors • Loss of jobs 	<p>brief description detailed description</p> <p>Two ways clearly explained. Allow reference to given product.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	[4]
	(d)		<p>Explain what is meant by the term 'Intellectual Property' in relation to resistant material products. Use two examples to support your answer</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – designs, music, art etc <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs • Patents • Trade marks • Copyright 	<p>brief explanation with example detailed explanation with example</p> <p>Two examples clearly explained.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	[4]

6. Resistant materials						
Question		Expected answers	Rationale		Marks	
	(e)	(i)	<p>State a suitable specific material for the part you have chosen.</p> <p>Give two properties or characteristics that make the material suitable for this use</p> <p>Part A shade Material</p> <ul style="list-style-type: none"> • acrylic; • abs; • polypropylene; • aluminium; • chromed (or plastic coated) mild steel; • copper; <p>Properties or characteristics</p> <ul style="list-style-type: none"> • high quality finish; • easily formed to required shape; • produces rigid structure; • in-keeping with rest of desk lamp design <p>Part B Frame</p> <ul style="list-style-type: none"> • laminated beech/birch/maple • solid ash/ chestnut/ maple • aluminium; • chromed (or plastic coated) mild steel; <p>Properties or characteristics</p> <ul style="list-style-type: none"> • high quality finish; • easily bent to required shape; • rigid structure (allows flex); • in-keeping with rest of desk lamp design 	<p>award mark for other appropriate material not listed. 1x1 mark</p> <p>Award mark for other appropriate property/characteristic. 2x1 mark</p>	<p>1</p> <p>2x1</p>	[3]

6. Resistant materials					
Question		Expected answers		Rationale	Marks
	(e)	(i)	<p>Part C Base</p> <ul style="list-style-type: none"> • aluminium • turned hardwood beech/maple/ash • zinc • chromed (or plastic coated) mild steel; <p>Properties or characteristics</p> <ul style="list-style-type: none"> • easily turned; • can have finish from cast; • suitable weight for stability; • in-keeping with rest of desk lamp design. 		

6. Resistant materials				
Question	Expected answers	Rationale		Marks
(ii)	<p>Describe, in detail, how the part you have chosen would be manufactured as a batch of 50. Include details of jigs, presses or formers. Use a flowchart and/or annotated diagrams to support your answer.</p> <p>Part A Vacuum forming</p> <ul style="list-style-type: none"> • Before carrying out the vacuum forming process, a quality mould, identical to the finished product, has to be produced • The mould is placed on the bed or platen of the machine. The platen is then lowered and a piece of thermoplastic sheet is clamped into position onto an air-tight gasket • The heater is switched on until the plastic becomes soft. Once the plastic is soft the platen is raised and the mould pushes into the plastic • The heat is then removed and the vacuum pump switched on to remove the air. The plastic is forced against the mould by atmospheric pressure. Where a deep draw is required a top 'plug' may be used to push material into the mould during the forming process • The material is allowed to cool. The cooling process may be shortened with blown air or a fine water spray • The component is then released from the mould by introducing a small air pressure • After moulding, mould finishing may be performed (trimming, cutting, drilling, polishing) 	<p>Level 1 (0 – 2 marks) Some stages outlined (up to 2), very limited description.</p> <p>Level 2 (3 – 4 marks) Key stages presented, reasonably well described with key features identified.</p> <p>Level 3 (5 – 6 marks) Process fully described, key features and technical details identified. Answer must include detail of specialist tooling and reference to template/system of checking batch of 10 for full marks.</p> <p>Quality of description and communication</p> <p>Basic sketch/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</p> <p>Max 1 if no sketch used. Award credit where possible if response doesn't link to chosen material.</p>	6	[9]
			3	

6. Resistant materials				
Question	Expected answers		Rationale	Marks
	(ii)	<p>Part B Frame</p> <p>Laminated</p> <ul style="list-style-type: none"> • male/female former prepared (suitable material for 50 units) • veneers pre cut • automatic glue spreading (one side) • silicon release on former (prevent glue damage) • veneers inserted into former • former closed – pressure applied • shape released • edge shaping • finish applied <p>Steam Bending</p> <ul style="list-style-type: none"> • prepare steam chamber – heat up water • insert hardwood length • steam for approx 3 minutes for each mm thickness • prepare former to hold hardwood in desired shape, high quality finish, • remove from steam chamber, insert in former • secure for period (min 4 hours) • remove and use abrasive paper, drill hole • apply finish 		

6. Resistant materials				
Question	Expected answers		Rationale	Marks
	(ii)	<p>Part C Base</p> <p>Casting (sand)</p> <ul style="list-style-type: none"> • prepare high quality pattern • pattern face down on turnover board, drag placed around it • parting powder sprinkled over pattern • sand added, building up and tapping down until firm and levelled • turned over – cope added • runners positioned – parting powder • sand added, building up and tapping down until firm and levelled • mould taken apart – gates for runners cut • mould completed – pouring area cut, aluminium poured • mould left to cool – remove and shape/finish <p>Turned in wood</p> <ul style="list-style-type: none"> • prepare block • attach to faceplate • bring guide as close as possible to work • set speed, use gouge for first cuts – rough shape • use scrapers then chisels to exact shape – template to check • drill hole using tailstock • glasspaper for final finish • add finish 		

6. Resistant materials				
Question		Expected answers	Rationale	Marks
	(f)	<p>Discuss the implications of product testing for a manufacturer of resistant material products.</p> <p>issues</p> <ul style="list-style-type: none"> • safety – legal implications • economic factors/specialist department • quality/reliability • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. <p>examples/evidence</p> <ul style="list-style-type: none"> • destructive/non destructive • specific product – car, rucksack • Product disasters – colour TVs, safety helmets etc 	<p>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.</p> <p>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.</p> <p>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.</p>	[8]
Question 6 Total [36]				

7. Systems and Control				
Question	Expected answers	Rationale		Mark
7 (a)	<p>Give four design requirements for the electronic car tyre inflator shown in Fig. 10. Justify each requirement.</p> <ul style="list-style-type: none"> • The inflator must be rugged enough to withstand knocks and drops so that it does not break during normal use • The inflator should be able to be powered from a car battery or have a self-contained power supply as there will be no mains supply available • It should be able to inflate a car tyre within a few minutes so that the driver can quickly correct a flat tyre problem • The inflator should be able to reach the pressure levels needed for typical car tyres • The inflator should not occupy too much space so it can be carried in the car boot • It should have a facility to set the required inflation pressure so that the user cannot over-inflate a tyre • There should be a compartment for storing the leads and pipes so that the product can be stowed away neatly • The product should pose no dangers to the user so that it is safe to use even by inexperienced users • The connector should be compatible with common tyre valves to make the product fit for use and reliable • The power connector should fit a standard 12V car power socket to make the product fit for use • There should be a built-in lamp to assist the user to inflate a tyre in the dark • All controls should be clear and instruction labels should be provided for ease of use. 	<p>Clear statement and justification required for a mark.</p> <p>Must be related to product – no marks for generic responses.</p> <p>Must be a full response – no marks for ‘low cost – value for money.</p> <p>Aesthetic/environment response must have example for mark.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>	4x1	[4]

7. Systems and Control					
Question	Expected answers	Rationale			Mark
(b)	<p>Describe two ways in which CAD can be used in the designing of an electronic car tyre inflator.</p> <ul style="list-style-type: none"> • 3D CAD (eg Solid Works, ProDesktop, Solid Edge, AutoCAD 3D etc) can be used to generate and explore design ideas and to help develop the product to contain all the internal components. • 2D CAD design software (eg AutoCAD, Techsoft 2D Design Tools etc) can be used to generate dimensioned working drawings and to produce models through CNC machines. • Mechanical and Physics CAD can provide simulations/animations of moving parts and calculations of air flow, air pressure, weight of unit etc. • Electronics CAD can be used to simulate the electronic control circuit and help to develop PCB designs and produce costings, component lists etc. • Provides digital format to send to CAM 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <p>must be different uses of CAD</p> <ul style="list-style-type: none"> - not generic/benefits of ICT - not same use on different parts eg. Circuit simulation for lamp, circuit simulation for pressure meter <p>Two examples clearly described. Allow reference to given product.</p>	2x2	[4]	
(c)	<p>Explain two disadvantages of using computerised stock control systems in the Systems and Control industry.</p> <ul style="list-style-type: none"> • Initial set up cost/training costs • Software failure/Virus attack • Breakdown impact • Input errors • Loss of jobs 	<p>brief description 1 mark</p> <p>detailed description 2 marks</p> <p>Two ways clearly described. Allow reference to given product.</p>	2x2	[4]	

7. Systems and Control						
Question		Expected answers	Rationale		Mark	
	(d)	<p>Explain what is meant by the term 'Intellectual Property' in products relating to systems and control. Use <u>two</u> examples to support your answer.</p> <ul style="list-style-type: none"> • Must refer to ownership/control of creative outcomes of mind – designs, technical innovation, music, art etc <p>Examples</p> <ul style="list-style-type: none"> • Design rights – eg product names, innovative product functions, innovative use of technology, • Registered designs – could refer to product logos, distinctive product shapes, product music or sound effects, • Patents – the legal protection of a new, inventive and useful claim after its public disclosure. • Trade marks – eg a product logo or name or a unique icon related to a product during its use. • Copyright – the rights granted to an author or creator of an original work, including drawings and software. 	<p>brief explanation with example detailed explanation with example</p> <p>Two examples clearly explained.</p>	<p>1 mark 2 marks</p>	<p>2x2</p>	[4]

7. Systems and Control						
Question		Expected answers	Rationale		Mark	
	(e)	(i)	<p>The electronic car tyre inflator contains a DC motor. Sketch a diagram to show how a DC motor could be used along with other components to pump air under pressure into a tyre.</p> <p>Diagram to contain the following information:</p> <ul style="list-style-type: none"> • Method of pumping air – possibly labelled ‘air pump’. Candidates may show outline details of how this operates, including ‘piston’ and ‘cylinder’ to pump air, ‘fan’, ‘vanes’ or ‘paddles’ etc. • Method of attaching motor shaft to air pump – may be a direct link, or may involve use of a coupling or belt/pulleys or gears etc. • Air inlet and outlet connections shown – inlet connection may not be a port, but may just pull air from the surroundings. 	<p>Labelled air pump unit (details of operation not required, but award mark if candidate demonstrates understanding of an air pump) 1 mark</p> <p>Clear indication of motor shaft attached to air pump 1 mark</p> <p>Indication of air inlet and outlet (air inlet may not be specifically labelled) 1 mark</p>	3x1	[3]

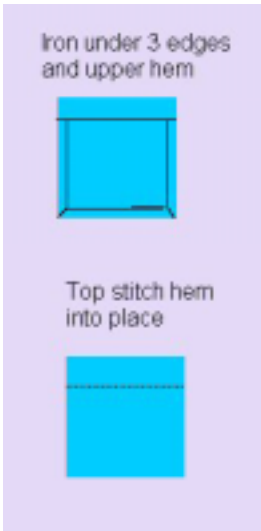
7. Systems and Control											
Question	Expected answers		Rationale	Mark							
	(ii)	<p>The electronic car tyre inflator monitors the pressure of the air in the tyre and cuts off the motor when the pressure reaches a preset level. Design an electronic system that will achieve this function. Use annotated diagrams to support your answer. Your answer should include a circuit diagram.</p> <p>Sketches and notes to convey the following information:</p> <ul style="list-style-type: none"> The component used to measure the pressure of the air. This could be a 'pressure sensing transducer', or 'resistive pressure transducer', or 'pressure sensor'. 'Pressure switch' demonstrates less understanding. The means of physically attaching the transducer to the air line – this would need to involve a T-connector in the air line connected to the car tyre. Circuit diagram to show how the output signal from the transducer is compared to a preset value (eg a voltage comparator with preset reference voltage). There is no need for candidates to accurately show how the transducer is interfaced to the circuit as different transducers have different requirements. There is also no need to ensure that the correct +/- inputs of the voltage comparator have been selected. The means of adjusting the preset reference level – probably achieved through a potential divider with a variable resistor, but could use a zener diode or a variable voltage regulator. Circuit diagram to show how the output from the comparator is used to cut off the motor – for full credit candidates will need to make use of a current buffer such as a transistor, MOSFET or relay. 	<p>Level 1 (0 – 2 marks) Some understanding of how to measure the air pressure – very limited description.</p> <p>Level 2 (3 – 4 marks) Understanding of how to convert air pressure into an electronic signal – pressure transducer identified. Attempt to process the signal and provide an output to the motor. Circuit schematic symbols correct.</p> <p>Level 3 (5 – 6 marks) Process fully described. Full circuit diagram with correct method of referencing the air pressure signal to a preset level.</p> <p>Quality of description and communication</p> <table border="0"> <tr> <td>Basic sketch with limited annotation</td> <td>1 mark</td> </tr> <tr> <td>Good sketch with main features identified – correct circuit schematics used</td> <td>2 marks</td> </tr> <tr> <td>Detailed sketch with clear annotation and competent circuit schematic layout</td> <td>3 marks</td> </tr> </table> <p>Max 1 if no sketch used. Award credit where possible if response doesn't link to chosen material.</p>	Basic sketch with limited annotation	1 mark	Good sketch with main features identified – correct circuit schematics used	2 marks	Detailed sketch with clear annotation and competent circuit schematic layout	3 marks	6	[9]
Basic sketch with limited annotation	1 mark										
Good sketch with main features identified – correct circuit schematics used	2 marks										
Detailed sketch with clear annotation and competent circuit schematic layout	3 marks										
				3							



7. Systems and Control				
Question	Expected answers	Rationale		Mark
(f)	<p>Discuss the implications of product testing in the Systems and Control Industry.</p> <p>Issues:</p> <ul style="list-style-type: none"> • Products may need to be calibrated before they leave the factory, • Product testing is required to ensure that all subsystems have been interconnected properly after assembly, • Water/air products need to be tested for leaks, • Products are tested for quality assurance, • Accelerated lifetime testing can be carried out, • Safety tests may be carried out, eg electrical insulation tests, pressure tests, temperature tests, • During the design phases, prototypes are tested for design, function and durability with target user groups before manufacturing in quantity, • Software tests are carried out to reveal bugs – the latest products are designed to receive software upgrades via the internet, • Testing can be time intensive but may prove beneficial to avoid costly product recalls or law suits, • The effects of ineffective testing and subsequent product failures can be devastating for a company's image and their financial survival. • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. 	<p>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.</p> <p>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.</p> <p>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.</p>		[8]
Question 7 Total [36]				

8. Textiles						
Question		Expected answers		Rationale		
8	(a)		<p>Give four design requirements for the children's dungarees shown in Fig. 11. Justify each requirement.</p> <p>The dungarees must have</p> <ul style="list-style-type: none"> • Adjustable shoulder straps to fit a range of sizes • Side fastenings to allow easy dressing and undressing • Button fastenings must be buttons to avoid accidents with zips. • Wide shoulder straps so that they stay in place • Adjustable shoulder straps to allow for different sizes • Closed pockets so that children do not lose the contents • Decoration to give child appeal. • Plenty of room to move/for a nappy • Durable/hardwearing fabric to last • Secure components for child safety 	<p>Clear statement and justification required for a mark.</p> <p>Must be related to product – no marks for generic responses.</p> <p>Must be a full response – no marks for 'low cost – value for money.</p> <p>Aesthetic/ response must have example for mark.</p> <p>Four justified design requirements.</p> <p>Give one mark if two valid points given but not fully justified.</p>	4x1	[4]
	(b)		<p>Describe two ways in which CAD can be used in the designing of dungarees.</p> <ul style="list-style-type: none"> • 2D to produce inspirational mood board • Clip art or design package to generate the embellishment • 2D CAD design software to generate dimensioned pattern pieces • pattern pieces can be quickly adapted • access library of components/buttons • Grading done easily and quickly • Lay plan can be quickly and accurately generated • Designs can be quickly sent by e mail to factories for mock ups to trialled 	<p>brief description 1 mark</p> <p>detailed description with clear indication and description of example 2 marks</p> <p>must be different uses of CAD related to the textile industry</p> <p>- not generic/benefits of ICT</p> <p>Two examples clearly described.</p> <p>Allow reference to given product.</p>	2x2	[4]

8. Textiles					
Question	Expected answers	Rationale			Mark
(c)	<p>Explain two disadvantages of using computerised stock control systems in the Textiles Industry.</p> <ul style="list-style-type: none"> • Materials and components need to be fault free when delivered • Suppliers must be able to deliver fabrics and components as required. Deadlines cannot be met if not. • Initial computer system set up costs/training costs have to be met • Software failure/Virus attack will cause the system to fail • Breakdown of machinery means failure to deliver goods as they have no back up stock • Input errors can occur at all stages resulting in faulty products 	<p>brief description detailed description</p> <p>Two ways clearly explained. Allow reference to given product.</p>	<p>1 mark 2 marks</p>	2x2	[4]
(d)	<p>Explain what is meant by the term 'Intellectual Property' in relation to textile products. Use two examples to support your answer.</p> <p>Must refer to ownership/control of creative outcomes of mind – designs, music, art etc</p> <p>Examples</p> <ul style="list-style-type: none"> • Design rights • Registered designs • Patents • Trade marks • Copyright 	<p>brief explanation with example detailed explanation with example</p> <p>Two examples clearly explained. Candidates may refer to the catwalk designs that are copied and sold in a slightly varied style within 2 to 3 weeks of the fashion shows. Performance garments made with registered fabrics eg Gortex. 'Designer names and brands'.</p>	<p>1 mark 2 marks</p>	2x2	[4]

8. Textiles						
Question		Expected answers	Rationale		Mark	
	(e)	(i)	<p>State a suitable specific fabric for the children's dungarees as shown in Fig. 11. Give two performance characteristics that make the fabric suitable for this use.</p> <p>Fabric</p> <ul style="list-style-type: none"> • Denim • Cotton twill/drill • Polyester twill <p>Properties or characteristics</p> <p>Cotton fabrics</p> <ul style="list-style-type: none"> • hard wearing • comfortable non irritant • washable • Absorbent • Biodegradable and recyclable • Dyes well <p>Polyester or polyamide fabrics</p> <ul style="list-style-type: none"> • Easy to wash and dry • Very strong/durable • Abrasion resistant • Good elasticity so does not crease • Dyes well • Lightweight and comfortable 	<p>1x1 mark award mark for other appropriate fabric not listed.</p> <p>2x1 mark Note that the performance relates directly to the fibres used.</p>	<p>1</p> <p>2</p>	[3]

8. Textiles				
Question	Expected answers	Rationale		Mark
(ii)	<p>The children’s dungarees shown in Fig.11 have patch pockets with an embroidered design. Describe, in detail, how the pockets would be manufactured and attached to the dungarees in a batch of 500. Use a flowchart and/or annotated diagrams to support your answer.</p> <p>1. Cut pocket piece Cut a rectangular piece that is the size you want your pocket to be plus 2cm for upper hem and 1 cm seam allowances on the other three sides.</p> <p>2. Produce design using appropriate software Transfer design to computer controlled machine. Apply interfacing/stitch and tear to the reverse of the pocket to reinforce it. Insert pocket into a frame right side uppermost. Attach frame to machine Set machine to stitch the design. Remove pocket from frame when complete and trim away any excess thread.</p> <p>Press edges under Iron under the three lower edges. Iron under the hem.</p> <p>3. Topstitch upper hem Turn pocket to right side. Topstitch upper hem into place.</p>	<p>Level 1 (0 – 2 marks) Some stages outlined (up to 2), very limited description.</p> <p>Level 2 (3 – 4 marks) Key stages presented, reasonably well described with key features identified.</p> <p>Level 3 (5 – 6 marks) Process fully described, key features and technical details identified.</p> <p>Quality of description and communication</p> <p>Basic sketch/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</p> <p>Max 1 if no sketch used.</p> <p>Award credit where possible if response doesn’t link to chosen material.</p>	6	[9]
			3	

8. Textiles				
Question	Expected answers		Rationale	Mark
	(ii)	<p>4. Sew pocket to dungaree front Place your pocket on the dungaree front (pocket is right side up) and stitch onto leg piece around the lower three sides. Leave pocket top open. Reinforce the corners of the shirt pocket as shown on the right. Reinforcement stitching has been enhanced in the photo on the right.</p> <p>5. Fold flap fabric in half and machine seam on both sides.</p> <p>6. Turn to Right Side, trim seam and press.</p> <p>7. Place the flap to the garment, right sides together matching the edges of the flap to the pocket position. Machine in place over the stitching line. Reduce the seam allowance by half and trim. Press. Topstitch in place on the top edge of the right side.</p>	<p>Reinforce the top of the pocket</p>  <p>Trim</p> 	

8. Textiles				
Question	Expected answers	Rationale		Mark
(f)	<p>Discuss the implications of product testing in the Textile Industry.</p> <p>Issues</p> <ul style="list-style-type: none"> • safety – legal implications .Must comply with BSI • economic factors/specialist department • quality/reliability • Customer confidence through quality and reliability. • Marketing/advertising/public relations to imply product differentiation/superiority from competitors. • Start-up costs and time. • Determination of how and when a product will fail. • Sale of goods act claims–waterproof must be waterproof relies on proper testing <p>Examples/evidence</p> <ul style="list-style-type: none"> • specific product – rucksack, pushchairs, carpet fading • Product disasters – dyes transferring to other items in the wash • Directly linked with quality of any named products <p>Candidates may refer to testing for – Resistance Stretch Insulation Water absorption Water repellence Colour fastness Shrinkage Pilling Laundering/ stain removal</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>Equipment may be referred to: Sense and Control or the Logit box use temperature, movement and light sensors. Abrasion and pilling tester use mechanical means to fluff up the surface of the fabric to find out easily it pills. To test for colourfastness the fabrics are washed with a multifibre strip at a higher temperature than specified. The multifibre strip is tested for any transfer of colour from the fabric. The Elmatear machine measures the strength of the fabric.</p>		[8]
Question 8 Total				[36]

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