

Mark Scheme (Results) Summer 2008

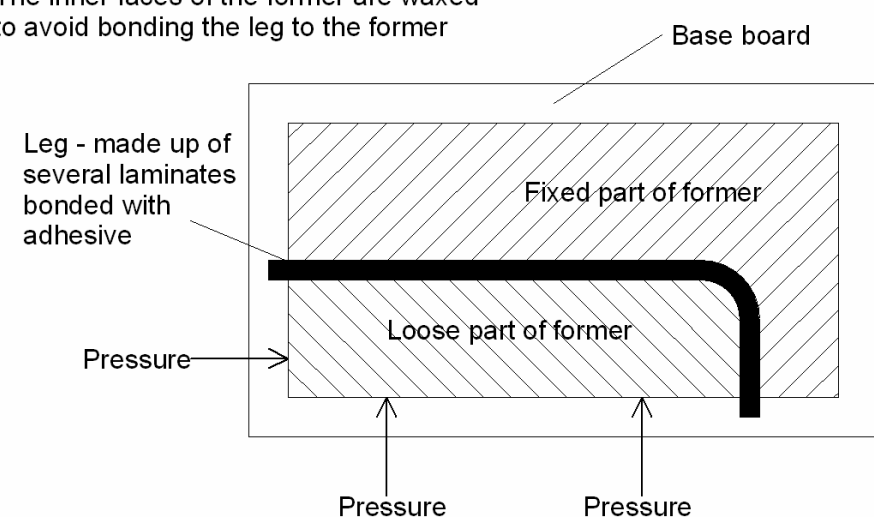
GCE Design and Technology (6143) Paper 1

GCE

Unit 6143/01 Further Study of Product Design

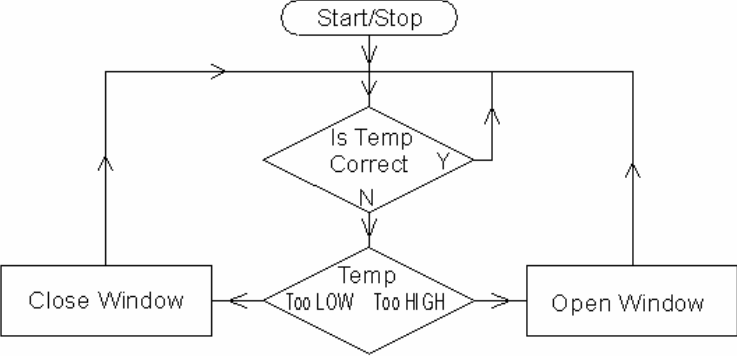
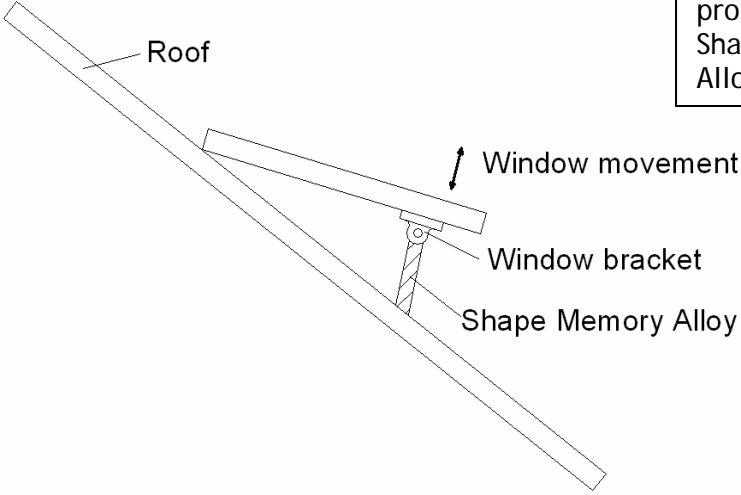
Question Number	Answer	Mark
1(a)	<p>No marks for packaging</p> <ul style="list-style-type: none"> • Redesign products / manufacturing / moulds (1) so that they require less material to manufacture (1) • Reclaim surplus material (1) so that it can be reused in the same manufacturing process where possible (1) • Recycle materials (1) so that materials can be used in different manufacturing processes where possible (1) • Buy in only what material is required (1) so there is no surplus to dispose of (1) • Assemble / machine carefully / accurately (1) so there are fewer damaged components (1) • Quality control e.g. CMM/CNC (1) therefore reducing the number of faulty / waste items (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
1(b)	<ul style="list-style-type: none"> • Specialisation (1) the work processes are given to a workforce with the specific skills to match the job (1) • Bulk buying of raw materials (1) at a lower unit cost (1) • Lower cost of capital (1) charged by providers of finance (1) • The spread of fixed costs (1) e.g. equipment (1) transport (1) between a larger number of units of production (1) • The concentration of an industry in one area (1) therefore attracting a pool of labour that can be retrained (1) • A large group of companies in one area (1) therefore attracting a larger network of suppliers whose costs are low due to their economies of scale (1) • Use of standard components (1) therefore limited need for specialist (expensive) parts to be manufactured (1) • Purpose built production lines (1) which speed up production (1) / reduce labour costs (1) <p style="text-align: right;">(2x1) (2x1) (2x1)</p>	6
Total for question		10

Question Number	Answer	Mark
2(a)	<p>Brand loyalty</p> <ul style="list-style-type: none"> • Purchasing out of preference (1) • Repeat purchasing (1) • Expectation of quality (1) • Group identity (1) • Familiarity (1) <p>Lifestyle marketing</p> <ul style="list-style-type: none"> • The purchasing characteristics of a particular market group based on their lifestyles (1) • Companies base their marketing on geographic / demographic characteristics of population e.g. young professional, retired, affluent etc (1) • Match the needs of the individuals to particular products (1) <p>Target market groups</p> <ul style="list-style-type: none"> • Companies decide that they cannot supply all the potential market (1) • Companies limit the market that they market their products to (1) • Market research identifies the customers a company should target (market segment) (1) • Information based on geographic or demographic factors e.g. young professional, retired, affluent etc (1) <p>Consumer demand</p> <ul style="list-style-type: none"> • There is a gap in the market created by consumers • The rate of sale • Popularity / increased desire / fashion / trends • Suppliers need to keep existing customers supplied to meet the demand (1) • Suppliers must react to the 'pull' (demand) from customers and try to get new customers to change their brand loyalty (1) <p style="text-align: right;">(2x1) (2x1) (2x1)</p>	6
2(b)	<ul style="list-style-type: none"> • It gives an accurate account of transactions (1), therefore reducing human errors (1) • It provides data which can be loaded into spreadsheets (1), therefore allowing financial analysis (1) • It gives the means to monitor on a daily basis, the performance / popularity of all products (1), which gives the company the information necessary to react to demand fluctuations (1) • It allows for a full and responsive stock control system (1), therefore giving the company the information to carry just what is needed minimum storage facilities / minimum capital tied up (1) <p style="text-align: right;">(2x1) (2x1) (2x1)</p>	6
Total for question		12

Question Number	Answer	Mark
3(a)	<ul style="list-style-type: none"> • Once the former has been created (1) it can be used over and over again as required (1) to produce identical products (1) • Increased structural strength (1) as grain in one direction (1) / increased glue surface (1) / reduced short grain (1) • The thin laminates can be bent to a greater degree than solid timber (1) therefore allowing a wider range of shapes to be created (1) / less wood to be used (1) • The laminated leg has great dimensional stability (1) there is less likely to deform (twist / warp) (1) • The shape is not cut from solid material (1) therefore less wastage (1) • Solid wood varies naturally (aesthetically and structurally) (1) therefore lamination gives greater uniformity (1) • Only the surface laminates need to be of a high quality (1) therefore reducing the cost of material used (1) <p style="text-align: right;">(2x1) (2x1) (2x1)</p>	6
3(b)	<p>The inner faces of the former are waxed to avoid bonding the leg to the former</p>  <ul style="list-style-type: none"> • The former / jig is designed and made (1) • The laminates are cut to the required thickness (1) • Part of the former can be fixed to a baseboard to aid clamping (1) • The inner faces of the former are waxed (or protected with paper / plastic) (1) in order to avoid the adhesive bonding the leg to the former (1) • Adhesive is applied to the inner faces of all laminates (1) • The loose part of the former is offered up to the laminates and clamped (1) in both directions to ensure correct shape (1) • Surplus glue is removed before it sets (1) <p style="text-align: right;">(6x1)</p>	6
Total for question		12

Question Number	Answer	Mark
4(a)i	<p>Manufacturer</p> <ul style="list-style-type: none"> • Speed of transfer of data (1) • No need to travel to consumer (1) • Ideas can be saved / backed up / secured electronically (1) • A wide range of media is available (1) • Reduced chance of human error in data handling (1) • Real-time data is available (1) • Access to company data from anywhere in the world (1) • Manufacturing data can be transferred from the design office directly to CNC machinery (1) <p style="text-align: right;">(2x1)</p>	2
4(a)ii	<p>Consumer</p> <ul style="list-style-type: none"> • Ability to have interactive websites therefore allowing customisation (1) • Ability to surf the web therefore getting access to a wider range of options (1) • Data is updated more frequently therefore the 'latest' information is always available (1) • Video conferencing enhances communication - face to face (1) • Speed of transfer of data (1) • Reduces the need to travel (cost implications) (1) • Security of data (1) • On-line order tracking is available (1) <p style="text-align: right;">(2x1)</p>	2

Question Number	Answer	Mark
4(b)i	<ul style="list-style-type: none"> • It is the branch of computer science concerned with developing computers that 'think and act like humans' (1) • Therefore intelligent systems should be able to consider large amounts of information simultaneously • Process them quickly in order to make rational, logical or expert judgements (1) <p><i>Any combination of two marks</i></p> <p style="text-align: right;">(2x1)</p>	2
4(b)ii	<p>Voice recognition systems</p> <ul style="list-style-type: none"> • These are computers that can recognise spoken words (1) An example e.g. Dictation / Sat Nav systems / Phones / Security systems (1) <p>Natural language processing</p> <ul style="list-style-type: none"> • If successfully developed, NLP will allow computers to 'understand' human languages (1) and be able to respond accordingly (1) <p style="text-align: right;">(2x1)</p>	2
	Total for question	8

Question Number	Answer	Mark
5(a)	 <pre> graph TD Start([Start/Stop]) --> IsTemp{Is Temp Correct} IsTemp -- Y --> IsTemp IsTemp -- N --> Temp{Temp Too LOW Too HIGH} Temp -- Too LOW --> Close[Close Window] Temp -- Too HIGH --> Open[Open Window] Close --> IsTemp Open --> IsTemp </pre> <p style="text-align: right;">(4x1)</p>	4
5(b)	<p>A Shape Memory Alloy is an alloy that, after being deformed, can recover its original shape (1) when it is heated/electric current (1)</p> <p style="text-align: right;">(2x1)</p>	2
5(c)	<ul style="list-style-type: none"> • Opens with heat (1) • Close by spring / gravity (1) • Work in conjunction with window (1) <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> Any diagram which demonstrates the property of the Shape Memory Alloy </div>  <p style="text-align: right;">(3x1)</p>	3
5(d)	<ul style="list-style-type: none"> • Some materials are more common than others (1) • Some materials require less / more processing / transport (which costs money) before they can be used (1) • Some materials cost less / more to produce / extract (1) • The availability of a material will drive the cost up / down (1) <p style="text-align: right;">(3x1)</p>	3
Total for question		12

Question Number	Answer	Mark
6(a)	<ul style="list-style-type: none"> • Carbon fibres are very strong in comparison to other materials (1) therefore affecting a greater protection for the wearer (1) • The increased strength to weight ratio of carbon fibre (1) means the body armour is significantly lighter and easier to wear (1) • Carbon fibre can be easily moulded into intricate shapes (1) therefore producing 'ergonomic' mouldings (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
6(b)i	<p>Advantages</p> <ul style="list-style-type: none"> • Once installed (1) the running costs are relatively low (1) • Little if any maintenance is required (1) therefore saving on servicing costs (1) • If a surplus of energy is produced it can be sold to the central grid (1) therefore lowering energy bills still further(1) • No waste products (1) therefore reduced damage to the environment (1) • Renewable / plentiful supply (1) so there is a reduced risk of price fluctuation (1) • Provides power where other sources may not be available (1) therefore more areas accessible / useable (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
6(b)ii	<p>Disadvantages</p> <ul style="list-style-type: none"> • The appearance may be considered to be unsightly (1) therefore not passing planning regulations (1) • The initial cost of purchase and installation is relatively high (1) therefore consumers must remain in their house for several years in order to recoup their outlay (1) • Storage e.g. batteries may be necessary (1) which takes up room / is a high initial expense / increases maintenance (1) • It is only as effective as the local climate (1) therefore often not at its best when most needed • A large set-up is needed to produce enough electricity (1) therefore high set-up costs (1) <p style="text-align: right;">(2x1)</p>	2
Total for question		10

Question Number	Answer	Mark
7(a)	<p>Use of product</p> <ul style="list-style-type: none"> • Explain that a product could give off less pollution (1) e.g. the more a car is used the greater the emissions (1) therefore it is better to produce cars which are more fuel efficient (1) • Extending the life of the product should be considered (1) e.g. the product should be manufactured from suitable materials for the environment it will be in (1) • Explain how the product can be designed so that it uses minimum energy (1) e.g. so that a car can be designed to fulfil its intended use without 'surplus' power / size / weight (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
7(b)	<p>Recycle / disposal</p> <ul style="list-style-type: none"> • Explain that it is necessary to reduce the environmental impact of a product on disposal (1) e.g. limit the use of toxic materials to a minimum (1) use biodegradable materials where possible (1) arrange for the collection of none disposable materials / items (1) • Explain that it is necessary to have a strategy for recycling (1) e.g. there are so many different materials used to produce a car that it is important to design in such a way that the recyclable materials / components can be extracted more easily at the end of the product's usable life (1) • Explain that some essential materials / components used are not an economically viable option to recycle (1) but these should be kept to a minimum (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
Total for question		8

Question Number	Answer	Mark
8(a)	<p>Marketing</p> <ul style="list-style-type: none"> • The use of EPOS (1) allows manufacturers to monitor / analyse current trends (1) and respond to market demand (1) • Electronic market research (1) gives a far faster and more widespread sample of consumer preferences (1) <p>Designing</p> <ul style="list-style-type: none"> • Electronic designs can be transferred quickly and easily (1) which reduces the need to travel (1) / store large physical designs (1) • Designs can be changed / edited / tested / modelled quickly (1) which enables companies to respond to changing consumer demand (1) <p>Manufacture</p> <ul style="list-style-type: none"> • Designs can be electronically downloaded to CNC machines (1) which reduces the need have the manufacturing on the same site as the design process (1) • Computers have the ability to integrate automatic storage and retrieval systems (1) with the manufacturing process (1) therefore allowing more efficient production (1) • Quality control (1) to ensure that all items are within tolerance (1) <p>Distribution</p> <ul style="list-style-type: none"> • The consumer can use on-line tracking (1) to see when their product will be ready for collection / completion (1) • Distribution can be organised electronically (1) therefore the efficiency and reduced cost of transport increases profitability (1) <p><i>Candidates must address all stages, maximum seven marks if only three stages addressed.</i></p> <p style="text-align: right;">(2x1) (2x1) (2x1) (2x1)</p>	8
Total mark for question		8
Total for paper		80