

Mark Scheme (Results)

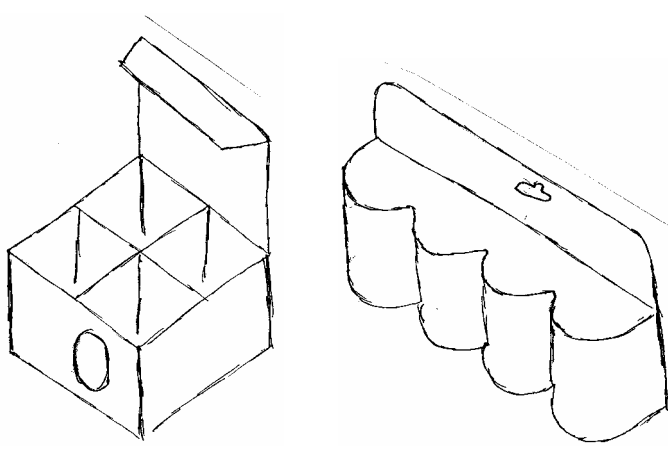
Summer 2008

GCE

GCE Design and Technology (6147) Paper 1

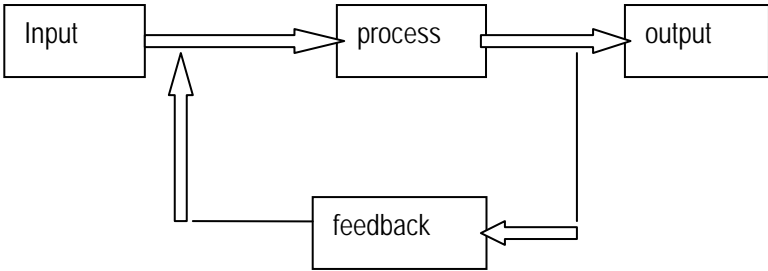
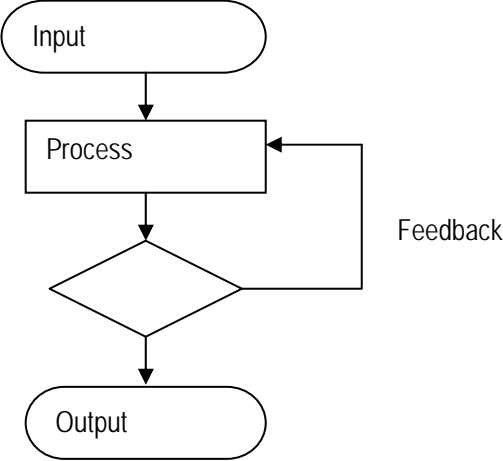
Unit 6147/01 Further Study of Product Design

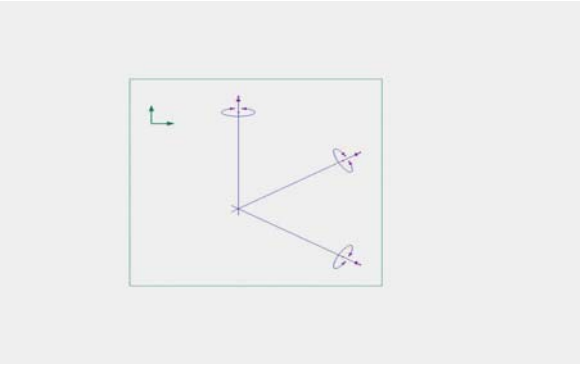
Question Number	Answer	Mark
1(a)	<ul style="list-style-type: none"> • It softens / melts in hot water (1) Can be moulded by hand (1) • Can be reused / reshaped many times (1) Therefore more economical (1) • Easily moulded (1) without wastage (1) • Develops shapes quickly (1) So save time / fast(er)(1) • Testing designs (1) ergonomic (1) • Can be shaped (1) to get a feel for what it would look like (1) <p style="text-align: right;">(2x1)</p>	2
1(b)	<ul style="list-style-type: none"> • Glows in the dark (1) • Without additional illumination (1) • Do not require external power sources (1) • Can emit light naturally because the crystals have absorbed light energy (1) • Luminescent (1) • Easily applied (1) <p style="text-align: right;">(2x1)</p>	2
1(c)	<ul style="list-style-type: none"> • Biopol is biodegradable / disintergrate (1) therefore it rots down / reduces landfill / less visual pollution (1) • Biopol is made from food stuffs (1) does not rely on finite resources (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
1(d)	<ul style="list-style-type: none"> • Paper & card can be strengthened by putting folds / crease lines into the design (1) to prevent collapse (1) • Hollow panels (1) such as doors can be strengthened by making a card honeycomb between the outer panels. (1) • Cardboard tubes can be strengthened by multiple layers of spirally wound paper plies (1) glued together with PVA (1) • Paper & card plies must be allowed to dry before use in construction (1) to avoid deflection or sagging (1) • Paper & card can be treated with / sprayed with fire retardant liquids (1) to prevent /restrict flames spreading or charring (1) • To avoid water / moisture absorption from the air (1) specially coated over / sprayed layers can be used (1) • Up to 22 plies can be combined (1) giving thickness of up to 16mm (1) • Layers of board (1) with corrugated layer (1) • Combined with polythene layer (1) to ensure impermeability to water (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
Total for question		12

Question Number	Answer	Mark
2(a)	<p>Marks awarded for the following points shown in diagram</p> <ul style="list-style-type: none"> • Able to see at least one of the light bulbs when the package is closed and on display (1) • The light bulbs safely held in position so that they do not break in transit (1) • The package hold four light bulbs (1) • The packaging suitable for display in shops safely (1) <div style="text-align: center;">  </div> <p style="text-align: right;">(4x1)</p>	4
2(b)	<p>Marks awarded for the following points shown in diagram</p> <ul style="list-style-type: none"> • The poster shows a relevant imagery such as energy conservation or lighting (1) • The poster include suitable text for promoting lifestyle aligned to energy conservation i.e. saving the planet / reduce carbon footprint (1) • The poster promote energy efficient light bulbs with a competitive edge i.e. saving money / longer lasting light bulbs (1) <p style="text-align: right;">(3x1)</p>	3

Question Number	Answer	Mark
2(c)	<p>The adverts must be</p> <ul style="list-style-type: none"> • Legal (1) • Decent (1) • Honest (1) • Truthful (1) • Socially responsible / non offensive to all cultures / age related (1) • Respectful of the principles of fair competition generally accepted in business (1) <p style="text-align: right;">(3x1)</p>	3
2(d)	<p>Any of the following</p> <ul style="list-style-type: none"> • When buying goods the consumer is protected by various laws (such as The Sale Of Goods Act 1979 / 1994 and Sale of Goods to Consumer Regulations 2002) (1) • The goods are of satisfactory quality / meet standards that a reasonable person would expect (1) • The goods correspond to the description given (1) • Fit for purpose / Free from defects / The goods are suitably durable (1) • Goods are safe to use (1) • If a product is faulty when bought, a customer can use their statutory rights to get their money returned (1) <p style="text-align: right;">(2x1)</p>	2
	Total for question	12

Question Number	Answer	Mark
3(a)	<ul style="list-style-type: none"> • The scanner is linked directly to a central computer which relays the price of the product back to the till (1) so reduces errors at the check out. (1) • it records the sale of an item (1) so keeps track of the stock level (1) • Automatically checks the price of an item (1) and allows for immediate price changes in all stores from central office (1) • Automatically deducts the item from stock (1) allows for immediate knowledge of stock balance (1) • Allows for quicker reordering / can reduce costs / increase profit margins / more efficient (1) by monitoring stock more closely (1) • Can carry out stock check (1) to see if stock is available (1) • Save labour cost / time (1) by customer self scanning items (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
3(b)	<ul style="list-style-type: none"> • Bar codes are read only (1) and cannot send out information / scan product codes for price and stock (1) • RFID tags send out information (1) which enables the company to track the product (1) • RFID tags allow the product to be traced (1) from manufacture right through to disposal (1) • RFID are intelligent bar codes (1) connected to a larger network of information (1) • Bar codes are printed visually (1) RFID are electronic devices, sending out signals (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
3(c)	<ul style="list-style-type: none"> • Schools do not have to spend money on expensive capital equipment (1) It gives pupils the opportunity to use industry standard manufacturing equipment (1) • It allows pupils the opportunity to use professional expertise (1) without leaving school (1) • It allows pupils the opportunity to view industrial processes in action (1) without leaving school (1) • Allows interaction with manufacturers (1) to make changes (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
Total for question		12

Question Number	Answer	Mark
4(a)	<p>Any from the following diagrams below:</p> <ul style="list-style-type: none"> • Correct positioning of feedback (1) • Correct positioning of input / start (1) • Correct positioning of output / end / finish (1) • Correct positioning of process (1)  <p style="text-align: right;">(4x1)</p>	
	 <p><i>Candidates do not have to use the correct shapes but must indicate the stages.</i></p> <p style="text-align: right;">(4x1)</p>	4

Question Number	Answer	Mark
4(b)	<ul style="list-style-type: none"> • A closed loop system has feedback built into the system (1) so that the output can be regulated (1) • Allows for a degree of checking / control over the process (1) to obtain the desired output (1) • An open lop system, cannot use feedback (1) so system can run away (1) <p style="text-align: right;">(2x1)</p>	2
4(c)	<p>Any two of the following</p> <ul style="list-style-type: none"> • The amount of robotic linear movement in 3 axes (1) • The amount of robotic rotational movement in three axes (1) • The end effector on a robot can be positioned to give up to 6 degrees of freedom within the work volume (1) • Three linear and three rotational.(1) • Three degrees of freedom are provided by the operating mechanism (1) • The other two or three by the end effector, depending on how it is configured.(1) • Diagram / pictures e.g. see below. <div style="text-align: center; margin: 10px 0;">  </div> <p><i>If diagram drawn shown above to award maximum mark</i></p> <p style="text-align: right;">(2x1)</p>	2

Question Number	Answer	Mark
4(d)	<ul style="list-style-type: none"> • All the people involved in the design, planning and manufacture (1) get together at the same time to resolve design, planning and manufacture problems (1) • Decisions about quality are made at every stage (1) to ensure that a high quality product is manufactured (1) • Appropriate and realistic specifications are set (1) leading to appropriate quality indicators at both design and manufacturing stages (1) • It also encourages manufacturers and designers to consider the product life cycle (1) by looking at sourcing materials through to disposal (1) • Whole team able to access information at the same time (1) through use of electronic information systems (1) • Gantt charts used to show activities that can run concurrently (1) ensuring time to market can be reduced / ensuring deadlines are met (1) • Different tasks started (1) to come together at the same time (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
	Total for question	12

Question Number	Answer	Mark
5(a)	<ul style="list-style-type: none"> • Unit price is lowered (1) because inputs can be utilised more efficiently (1) • The work is divided up be into small basic units (1) so less skilled workforce can be used (1) • Equipment cost can be spread over more units of production (1) which reduces the fixed costs (1) • Raw materials purchased at lower costs (1) through bulk buying (1) • The concentration of an industry in one area will attract a pool of labour (1) that can be trained to have specialisms needed (1) • A large group of companies in one area can attract a large network of suppliers (1) whose own costs will be lower because of their own economies of scale (1) • Less skilled workers (1) lower cost (1) <p style="text-align: right;">(2x1) (2x1) (2x1)</p>	6
5(b)(i)	<p><u>Start / completion</u></p> <ul style="list-style-type: none"> • What materials are available (1) • What type of production method will be used (mass, batch etc) / quantity needed (1) • When production must start (1) • How much time is needed for each operation (1) • The latest date that the production must be completed by (1) <p><u>Machinery / processes</u></p> <ul style="list-style-type: none"> • The machinery needed for the tasks available (1) • Any specialist machinery needed (1) • Any specialist manufacturing processes needed? (1) • Where quality control should occur (1) • How will quality be checked (1) <p><u>Scope / labour</u></p> <ul style="list-style-type: none"> • Identifying the scope and detail of the work to be done.(1) • Identifying what labour capacity is required (1) • The required level of skills in the labour available (1) <p style="text-align: right;">(4x1)</p>	4

Question Number	Answer	Mark
5(b)(ii)	<ul style="list-style-type: none"> • A measuring probe / sensors / lasers determines coordinates of points on a work piece surface (1) in all 3 axes / X,Y & Z axes (1) / to check that the work is within tolerance (1) • A measuring probe / sensors / lasers determines coordinates of points on a work piece surface (1) to check measuring the size / alignment (1) <p style="text-align: right;">(2x1)</p>	2
	Total for question	12

Question Number	Answer	Mark
6(a)	<ul style="list-style-type: none"> • Safer disposal of waste (1) reuse / recycle waste generated by the production process (1) • Pollution caused by their manufacturing processes (1) such as harmful gases / such as noise (1) • More efficient use of energy in the production process (1) use of alternative power sources / use of more environmentally friendly power sources • Consideration of materials used (1) / sustainable resourced materials (1) <p style="text-align: right;">(2x1) (2x1)</p>	4
6(b)	<ul style="list-style-type: none"> • There is a limit to the quality (1) that can be achieved with recycled paper (1) • Recycled paper will not be bright white (1) and may contain flecks (1) • Reduction in strength / may be weaker (1) every time a fibre is recycled it loses strength (1) • It is not possible to recover all types of paper (1) i.e. laminated paper or glossy surface finish (1) • It can take more energy to collect and process recycled paper (1) than filling traditional land fill sites (1) • Reluctance of people to separate out rubbish / paper (1) for collection (1) • Recycling creates very low skilled jobs (1) poorly paid and dirty (1) • Expensive processes (1) as paper has to be sorted and collected (1) • Virgin fibres often have to be added (1) to increase strength and quality (1) • Expensive processes (1) as paper has to be bleached and treated (1) <p style="text-align: right;">(2x1) (2x1)</p>	4

Question Number	Answer	Mark
6(c)	<p>References will be made to the following</p> <ul style="list-style-type: none"> • The environment should be seen as an asset, a stock of wealth (1) • Resources are scarce and will run out one day / spaceship earth (1) • If each generation squanders resources without investing in the future, they will run out one day (1) • Reduce over consumption to protect stocks, for example fishing, forestry (1) • Developed countries need to reduce their use of scarce resources (1) • Developed countries need to reduce their production of pollution (1) • Polluting the atmosphere creates global warming (1) • Polluting the atmosphere can create acid rain (1) • Managing sustainable resources (1) • Developing countries need to reduce / reuse / renew / recycle (1) • Reduce levels of energy used / invest in renewable energy sources (1) • Moral responsibilities of developed countries (1) <p style="text-align: right;">(4x1)</p>	4
	Total for question	12

Question Number	Answer	Mark
7	<p>NOTE Many points can be argued for and against so read the answer supplied and take this into account.</p> <p>N.B less people needed for manufacturing could be an advantage or a disadvantage. A candidate could argue this in the same answer and must be credited IF the argument makes sense.</p> <p>If only one side of argument used then a maximum of 7 marks available.</p> <p>Advantages</p> <ul style="list-style-type: none"> • It provides employment and higher living standards (1) • It could improve the expertise of the work force (1) • Widens the country's economic base (1) • It enables the transfer of technology (1) • Less people needed for manufacturing (1) • Must be able to multi task (1) • Greater efficiency / can work continuously / no need for rest breaks (1) <p>Disadvantages</p> <ul style="list-style-type: none"> • Less people needed for manufacturing (1) • More highly skilled labour force needed (1) • Be more flexible in the way they operate (1) • Higher levels of training, education & ICT skills (1) • Chronic shortage in UK with technician skills (1) • Wider range of basic skills needed (1) • Ability to transfer knowledge (1) • Job for life no longer an option (1) • Must be able to multi task (1) • Shorter working week may lead to less earnings (1) • Machines can break down (1) • Higher start up cost (1) • Initial set up must be accurate (1) <p style="text-align: right;">(8x1)</p>	8
Total mark for question		8
Total for paper		80