

# Mark Scheme (Results)

## Summer 2010

GCE

GCE Design and Technology (A2)  
6GR03  
Paper 01 Designing for the  
Future

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark
1(a)	<p>Mix and match the statements but second statement MUST qualify first statement.</p> <ul style="list-style-type: none"> <li>• People vary so much in size (1) it can be difficult to produce a design that suits everybody. (1)</li> <li>• Needs to fit the majority / reject extremes (1) to make it user friendly. (1)</li> <li>• Difficult to meet everybody needs / range of people (1) from bottom / 5% to top / 95% (1)</li> </ul> <p>Do not accept average as a statement.</p> <p style="text-align: right;">(2x1)</p>	(2)

Question Number	Answer	Mark
1(b)	<p><i>Any six of the following points:</i></p> <ul style="list-style-type: none"> <li>• People come in all shapes and sizes. (1)</li> <li>• Ergonomics takes into account people's wide range of sizes / takes account of human measurements. (1)</li> <li>• Designers make products usable for the majority of people. (1)</li> <li>• Ergonomic design makes the product safer / comfortable to use. (1)</li> <li>• Ergonomic design can improve health by reducing back pain. (1)</li> <li>• Ignoring ergonomic design can affect users' health. (1)</li> <li>• Poor ergonomic design can affect productivity / affect efficiency. (1)</li> <li>• Ergonomic design can affect the sales / success of products. (1)</li> <li>• Fit for purpose / interacts with the customer. (1)</li> <li>• <i>If they may make a -ve statement ie not fit for purpose in context is acceptable.</i></li> <li>• Product is made user friendly / easy to use. (1)</li> </ul> <p>Do not accept statements that refer to "designed for the majority"</p> <p style="text-align: right;">(6x1)</p>	(6)

Question Number	Answer	Mark
1(c) (i)	<p>School chair Ignore statements referring to <b>aesthetics</b> for this part of the question.</p> <ul style="list-style-type: none"> <li>• An example of function over form. (1) <i>Read answer given carefully. They can word this in many ways!!</i></li> <li>• It has no decoration / simple / basic design. (1) It is ergonomically designed to accommodate a wide range of users / target market. (1)</li> <li>• The form allows for mass production methods. (1)</li> <li>• The form allows for easy / stacked storage / easily moved. (1)</li> <li>• Purely functional as something to sit on (<i>comfortably may be added</i>). (1)</li> <li>• It is easy to manufacture by injection moulding. (1)</li> <li>• Ergonomically designed to suit stated age range. (1)</li> <li>• Materials used suit mass production techniques. (1) Materials used are durable / hard wearing / strong / support load / sturdy. (1)</li> </ul> <p style="text-align: right;">(4x1)</p>	(4)
1(c) (ii)	<p>Mackintosh chair</p> <ul style="list-style-type: none"> <li>• An example of form over function. (1)</li> <li>• Its form makes it a lifestyle statement / product. (1)</li> <li>• The form not necessarily ergonomically designed / not comfortable. (1)</li> <li>• Very decorative / stylised / Art Nouveau. (1)</li> <li>• Form means that it will probably be small batch produced. (1)</li> <li>• Materials used are less functional but enhance the form. (1)</li> <li>• Designed for low manufacturing numbers. (1)</li> <li>• Its function is to be aesthetically pleasing / looks good. (1)</li> <li>• Appearance is its main function. (1)</li> <li>• Designed to fit in with the whole room design / appearance. (1)</li> <li>• Fits a niche market. (1)</li> <li>• Can be sat on. (1)</li> </ul> <p style="text-align: right;">(4x1)</p>	(4)
<b>Total for question</b>		<b>16</b>

Question Number	Answer	Mark
2(a)	<p>Mix and match the statements but second statement MUST qualify first statement.</p> <ul style="list-style-type: none"> <li>• Statement identifying reduction in CO2 emissions (1) followed by a valid way to achieve this. (1)</li> <li>• The carbon footprint is the total amount of carbon dioxide / CO2 / greenhouse gases (1) emitted over the life cycle of a product / service. (1)</li> <li>• Reducing fossil fuel consumption (1) by not flying/ saving energy/ Turning lights off. (1)</li> <li>• The amount / measure of CO2 emitted (1) from using daily items such as cars, transport, food etc. (1)</li> <li>• Impact on the environment (1) caused by carbon emissions. (1)</li> <li>• Carbon emissions (1) impact on environment / way of life.(1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)

Question Number	Answer	Mark
2(b)	<p>Mix and match the statements but second statement MUST qualify first statement.</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> <li>• Biofuels give significant net benefits to the environment (1) by reducing greenhouse gas emissions. (1)</li> <li>• Reduces dependency on fossil fuels (1) creating a sustainable / renewable fuel supply for the future. (1)</li> <li>• Biofuels give no net emissions of carbon dioxide, (1) and burn more cleanly and efficiently than fossil fuels. (1)</li> <li>• Improve national security (1) as reduced dependence on imported fuels. (1)</li> </ul> <p style="text-align: right;">(2x1) (2x1)</p> <p>DISADVANTAGES</p> <ul style="list-style-type: none"> <li>• Biofuel supplies only a small amount of our energy requirements (1) sustainably. (1)</li> <li>• Farmers getting economic incentives to grow crops for biofuel production (1) instead of food production. (1)</li> <li>• Reduced food production (1) leading to increased food prices. (1)</li> <li>• Could affect poorer countries (1) that rely on imported food for their subsistence. (1)</li> <li>• Biofuel production can threaten the environment (1) if it is not done sustainably. (1)</li> <li>• The increased manufacture of biofuels (1) will require increasing land areas to be used for agriculture. (1)</li> <li>• Morally inappropriate (1) as long as there are people in the world starving. (1)</li> <li>• Increased demand has led to deforestation (1) which increases climate change / has led to decline in biodiversity. (1)</li> <li>• Some countries rely on sales of fossil fuels (1) to sustain their economy. (1)</li> <li>• Making biofuels could be less eco friendly (1) followed by valid reason. (1)</li> </ul> <p><i>Research indicates that there is no difference in costs. Any reference to less/ more expensive is to be ignored. Also reference to being less powerful not true.</i></p> <p style="text-align: right;">(2x1) (2x1)</p>	(8)

Question Number	Answer	Mark
2(c)	<p>Mix and match the statements but second statement MUST qualify first statement.</p> <ul style="list-style-type: none"> <li>• The Kyoto Protocol defines / outlines / explains (1) legally binding targets / limits on emissions. (1)</li> <li>• Kyoto set flexible mechanisms / made people aware (1) to reduce atmospheric pollution CO2 emissions. (1)</li> <li>• Timetables set (1) for emission targets to be met. (1)</li> <li>• Cutting greenhouse-gas emissions (1) agreed by many countries. (1)</li> <li>• Different targets set (1) for different countries (1)</li> <li>• To reach the goals / targets markets made for (1) emissions trading / Clean Development (CDM) /cleaner energy supplies or technologies / joint Implementation (1)</li> </ul> <p style="text-align: right;">(2x1) (2x1)</p>	(4)



Question Number	Answer	Mark
2(d)	<p>Mix and match the statements but second statement MUST qualify first statement.</p> <ul style="list-style-type: none"> <li>• Recycled paper does not have the quality (1) does not look as good / perform at the same level as virgin paper. (1)</li> <li>• Takes more energy to produce recycled products (1) than it does to dispose of them in traditional landfill methods. (1)</li> <li>• Curb side collection of recyclables done by a second waste truck (1) plus the truck that picks up the regular waste. (1)</li> <li>• Recycling may create jobs, (1) but are often jobs with low wages and working conditions. (1)</li> <li>• Costs more money to recycle waste (1) than to dispose of in landfill (1)</li> <li>• Not all types of paper can be recycled (1) such as laminated paper / glossy finish. (1)</li> <li>• Virgin pulp added (1) as cellulose / fibres become weaker / contaminated. (1)</li> <li>• The more paper gets recycled / can only be recycled a limited number of times (1) the lower the quality. (1)</li> <li>• Chemicals used to bleach / breakdown paper (1) causing pollution / environmental issues. (1) <i>(This must refer back to chemical usage, not energy consumption/ greenhouse gases.)</i></li> </ul> <p>Any statement of recycling uses (a lot of) energy (1) BUT must give a valid reason of in what way.</p> <p style="text-align: right;">(2x1) (2x1)</p>	(4)
	Total for question	18

Question Number	Answer	Mark
3	<p data-bbox="256 300 1246 333"><i>A response that makes reference to any six of the following points:</i></p> <ul data-bbox="256 376 1230 1066" style="list-style-type: none"> <li>• Process is known as compositing. (1)</li> <li>• Background filmed or created on computer / background plate created. (1)</li> <li>• Actor / model filmed against blue / green background. (1)</li> <li>• This film is passed through a red filter to make background appear black. (1)</li> <li>• Silhouettes created of actor / model from blue / green screen footage. (1)</li> <li>• One is black on white background; the other is white on black background. (1)</li> <li>• There are now four pieces of film. (1)</li> <li>• The pieces of film are layered to make a composite. (1)</li> <li>• Two matte screens created. (1)</li> <li>• Matte screen removes foreground object. (1)</li> <li>• Computer removes blue / green background and replaces with realistic background. (1)</li> <li>• Computer imposes CGI. (1)</li> <li>• Black silhouette created (1) for actor to be placed in. (1)</li> </ul> <p data-bbox="1118 1137 1198 1171" style="text-align: right;">(6x1)</p>	(6)
	<b>Total for question</b>	<b>6</b>

Question Number	Answer	Mark
4(a)(i)	<ul style="list-style-type: none"> <li>• Closed loop control system. (1)</li> </ul> <p style="text-align: right;">(1X1)</p>	(1)
4(a)(ii)	<ul style="list-style-type: none"> <li>• Process box. (1)</li> <li>• Instruction box / command box. (1)</li> <li>• Stage in production. (1)</li> </ul> <p style="text-align: right;">(1X1)</p>	(1)
4(a)(iii)	<p>Any one from:</p> <ul style="list-style-type: none"> <li>• To monitor process (1) feedback system. (1)</li> <li>• Quality control (1) to ensure accuracy / within tolerance. (1)</li> <li>• Monitors quality (1) accept or reject / if output correct loop ends / if not returns back to box A. (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
4(b)	<p>Any three from:</p> <ul style="list-style-type: none"> <li>• The development of computers systems / robots. (1)</li> <li>• With enhanced sensory feedback systems. (1)</li> <li>• Do tasks like humans. (1)</li> <li>• Learns / adapts without human input. (1)</li> <li>• Make decisions / act / think for themselves. (1)</li> <li>• Expert / autonomous systems mentioned. (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)
4(c)	<p>Any five from:</p> <ul style="list-style-type: none"> <li>• Allows for 100% sampling. (1)</li> <li>• Can give immediate feedback on errors. (1)</li> <li>• More efficient. (1)</li> <li>• The computer in the system can make adjustments to correct errors. (1)</li> <li>• Can be a closed loop feedback system. (1)</li> <li>• Far quicker than humans. (1)</li> <li>• Removes human error. (1)</li> <li>• Can carry out checks that humans cannot do. ( eg densitometer) (1)</li> <li>• Can check quality without having rest breaks. (1)</li> <li>• Check several aspects simultaneously. (1)</li> </ul> <p><i>Do not accept accuracy for a mark.</i></p> <p style="text-align: right;">(5x1)</p>	(5)

Question Number	Answer	Mark
4(d)	<ol style="list-style-type: none"> <li>1. A companywide strategy (1) to cut lead times. (1)</li> <li>2. Aims to reduce production times for small batches (1) such as promotional gifts. (1)</li> <li>3. It will increase profitability by reducing non-value-added time (1) cutting inventory and increasing return on investment. (1)</li> <li>4. Responds to demand / a pull system (1) not producing in advance of an order / or forecast orders. (1)</li> <li>5. Successful implementation of QRM results in high quality (1) and low cost products. (1)</li> <li>6. Uses JIT (1) to reduce storage space. (1)</li> <li>7. Increased flexibility (1) to improve responsiveness. (1)</li> <li>8. Finished product shipped out immediately (1) so no storage needed / quicker to market. (1)</li> <li>9. Uses flow production (1) instead of batch / mass production. (1)</li> <li>10. KANBAN / KAIZAN / TQM / flexible manufacturing cells (1) followed by a valid / relevant point relating to QRM / CIM (1) <i>(must not be a description of the said system.)</i></li> <li>11. Small batches often produced / cannot react to mass production efficiently (1) large variations in demand causes problem. (1)</li> </ol> <p style="text-align: right;">(2x1) (2x1) (2x1)</p>	(6)
	<b>Total for question</b>	<b>18</b>

Question Number	Answer	Mark
5(a)	<p>Any six from BUT both advantages and disadvantages must be considered for full marks. If only one side discussed then a maximum of 5 marks allowed.</p> <ul style="list-style-type: none"> <li>• <u>Advantages</u> <ol style="list-style-type: none"> <li>1. Paperless society / supports sustainability. (1)</li> <li>2. Documents can be attached electronically. (1)</li> <li>3. Documents can be saved / edited easily. (1)</li> <li>4. Convenient / easy way of communicating. (1)</li> <li>5. Efficient / received almost immediately. (1)</li> <li>6. Email messages less formal and they are also usually shorter and more to the point. (1)</li> <li>7. Correspondence can be managed on screen. (1)</li> <li>8. Proposal can be answered / revised / stored / sent to others without reams of paper involved. (1)</li> <li>9. The reader can identify critical correspondence quickly and dealt with it immediately. (1)</li> <li>10. Quicker than posting. (1) <i>(Do not accept quicker/cheaper/faster as a single word answer, it MUST be qualified.)</i></li> <li>11. Minimum running costs (1) but high set up costs. (1)</li> <li>12. Cheap to send (1) only <i>accept if qualified by bulk posting.</i></li> <li>13. Allows rapid billing. (1)</li> </ol> </li> </ul> <p style="text-align: right;">(6X1)</p> <ul style="list-style-type: none"> <li>• <u>Disadvantages</u> <ol style="list-style-type: none"> <li>1. Privacy / security issues as messages can be intercepted &amp; read. (1)</li> <li>2. Data can get lost. (1)</li> <li>3. Impersonal &amp; some messages can be misinterpreted / misread / misunderstood. (1)</li> <li>4. Limitations on size of attachments. (1)</li> <li>5. Possible virus infection. (1)</li> <li>6. Time wasting / spam / unsolicited junk mail. (1)</li> <li>7. Not always suitable for serious business documents or transactions requiring signatures. (1)</li> <li>8. E mails can easily be ignored / allows for misunderstanding. (1)</li> <li>9. Too many e-mails can lead to management problems / in-box being overwhelmed by mail. (1)</li> <li>10. Removes face to face meeting/ impersonal contact. (1)</li> <li>11. Software used must be compatible between users. (1)</li> </ol> </li> </ul> <p style="text-align: right;">(6x1)</p>	<p>(6)</p> <p>(6)</p>

5(b)	<p>Any six from:</p> <ol style="list-style-type: none"> <li>1. Allows face to face communication. (1)</li> <li>2. Brings people at different sites together for a meeting. (1)</li> <li>3. Saves time / money because people do not have to travel to a central meeting point. (1)</li> <li>4. Quicker to set up meetings because travel not necessary. (1)</li> <li>5. Visual information easily communicated. (1)</li> <li>6. Speeds up decision making as presentations can be made to several people in different locations simultaneously. (1)</li> <li>7. Remote diagnostics available with technicians in different countries. (1)</li> <li>8. Allows for corporate training on a world wide basis. (1)</li> <li>9. Teams can work together even if in different locations. (1)</li> <li>10. Synchronising time of meeting in different time zones across the world can be a problem. (1)</li> <li>11. Connections can often fail. (1)</li> <li>12. Lack of eye contact with others can hinder conversation or intent. (1)</li> <li>13. Camera shyness can hinder presentations due to be filmed often recorded. (1)</li> <li>14. More environmentally friendly. (1)</li> <li>15. Less chance of misunderstanding between members. (1)</li> </ol> <p style="text-align: right;">(6x1)</p>	(6)
	Total for question	12

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