

# Mark Scheme (Results)

Summer 2014

Pearson Edexcel  
GCE in Design & Technology Product  
Design Graphic Products  
6GR03 01  
(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
<b>1(a)</b>	<p>Any four of the following statements in a sentence, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> <li>• Used as a safety indicator in products that might be used in the kitchen <b>(1)</b></li> <li>• Used as a safety indicator in products such as cutlery used by children <b>(1)</b></li> <li>• Used as a safety indicator in products used in the bathroom e.g. bath toys <b>(1)</b></li> <li>• Used on containers to register correct temperatures for the storage of foods <b>(1)</b></li> <li>• Used as a thermometer e.g. forehead thermometer/room thermometer/fish tank thermometer <b>(1)</b></li> <li>• Used for novelty effect e.g. décor/children's toys / mugs / cups <b>(1)</b></li> <li>• Used in food storage / fridges to indicate correct/safe temperature <b>(1)</b></li> <li>• Radiator warning label / sticker <b>(1)</b></li> </ul> <p style="text-align: right;">(4 x 1)</p>	<b>(4)</b>
<b>1(b)</b>	<p>Any four of the following statements in a sentence, up to a maximum of 4 marks.</p> <p>Advantages</p> <ul style="list-style-type: none"> <li>• Colour change give an indication of safe temperature <b>(1)</b></li> <li>• Removes need for external thermometer <b>(1)</b></li> <li>• Encourages children to make safety checks <b>(1)</b></li> <li>• Gives novelty value <b>(1)</b></li> <li>• Clear visual warning / indication of temperature <b>(1)</b></li> <li>• Ease of use <b>(1)</b></li> <li>• Thermochromic temperature indicators are cheaper than conventional thermometers <b>(1)</b></li> </ul> <p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Difficult to achieve a precise temperature reading <b>(1)</b></li> <li>• Limited range of colours <b>(1)</b></li> <li>• Become less effective over time <b>(1)</b></li> <li>• Can lead to complacency <b>(1)</b></li> <li>• Can be slow to react for some applications <b>(1)</b></li> <li>• Products can be more expensive than conventional products <b>(1)</b></li> </ul> <p>Do not accept answers that state 'cheaper' or 'more expensive' unless qualified</p> <p><i>[Max 3 marks if only one side of discussion put forward.]</i></p> <p style="text-align: right;">(4 x 1)</p>	<b>(4)</b>
<b>Total for question</b>		<b>(8)</b>

<p><b>2(a)</b></p>	<p>Any three of the following statements in a sentence, up to a maximum of 3 marks.</p> <ul style="list-style-type: none"> <li>• The environment should be seen as an asset that should be protected <b>(1)</b></li> <li>• The environment must meet present and future needs <b>(1)</b></li> <li>• Development must not compromise needs of future generations <b>(1)</b></li> <li>• Safeguarding the world's resources / minimising the depletion of resources / deforestation <b>(1)</b></li> <li>• Ensuring the quality of life for future generations <b>(1)</b></li> <li>• Finding better environmental ways of extraction / mining / manufacturing / producing energy <b>(1)</b></li> <li>• To ensure worldwide impact of environmental policies / all countries need to contribute <b>(1)</b></li> <li>• To allow developing countries to expand their economies and manufacturing base <b>(1)</b></li> <li>• Protection of wildlife, their habitats and environments <b>(1)</b></li> <li>• Reduces atmospheric pollution / CO<sup>2</sup> emissions / global warming <b>(1)</b></li> </ul> <p style="text-align: right;">(3 x 1)</p> <p>Example: The environment must meet present day demands <b>(1)</b> and safeguard resources <b>(1)</b> for future generations. <b>(1)</b></p>	<p><b>(3)</b></p>
<p><b>2(b)</b></p>	<p>Any five of the following statements in a sentence, up to a maximum of 5 marks.</p> <ul style="list-style-type: none"> <li>• They take a long time to break down / decompose /they fill landfill sites <b>(1)</b></li> <li>• Polymers are a fire hazard <b>(1)</b></li> <li>• Burning polymers is not a good way to dispose of them as this causes air pollution <b>(1)</b></li> <li>• Polymers produce toxic materials / gases when burnt <b>(1)</b></li> <li>• Difficult to dispose of/recycle some non organic polymers <b>(1)</b></li> <li>• Increased demand for oil, consumes energy during transportation / utilises land at extraction facilities and refineries / produces pollution during transportation and extraction <b>(1)</b></li> <li>• Increased exploration of wilderness environments <b>(1)</b></li> <li>• Environmental issues / accidents / loss of wildlife habitat / other impacts on wildlife <b>(1)</b></li> </ul> <ul style="list-style-type: none"> <li>• Emissions resulting from polymer production/recycling <b>(1)</b></li> <li>• Visual/ground pollution of landfill sites <b>(1)</b></li> <li>• Polymers are manufactured from non-renewable fossil fuels <b>(1)</b></li> </ul> <p style="text-align: right;">(5 x 1)</p>	<p><b>(5)</b></p>
<p><b>Total for question</b></p>		<p><b>8</b></p>

Question Number	Answer	Mark
3(a)	<p>Any three of the following statements in a sentence.</p> <ul style="list-style-type: none"> <li>• Manufacturing on a much larger scale <b>(1)</b></li> <li>• Coal / natural gas is often in plentiful supply meeting the demand for increased energy <b>(1)</b></li> <li>• Increased demand for fossil fuels used in electricity production <b>(1)</b></li> <li>• Mechanisation/new manufacturing technologies use energy <b>(1)</b></li> <li>• Greater mobility / use of transport requires fuel and energy <b>(1)</b></li> <li>• More centralised production increases transportation to market <b>(1)</b></li> <li>• Factories operate 24/7 / mass production producing a continuous need for energy <b>(1)</b></li> <li>• Advanced technologies require industrial production <b>(1)</b></li> </ul> <p style="text-align: right;">(3 x 1)</p>	<b>(3)</b>
3(b)	<p>Advantages</p> <ul style="list-style-type: none"> <li>• Hydroelectric, tidal and wave power can be harnessed <b>(1)</b></li> <li>• Fossil fuels are not required/preserved for future generations <b>(1)</b></li> <li>• Does not produce carbon dioxide/greenhouse gases/air pollution <b>(1)</b></li> <li>• Hydroelectric plants are highly efficient <b>(1)</b></li> <li>• Hydroelectric plants have longer economic lives than fuel fired plants <b>(1)</b></li> <li>• High initial setup cost quickly recovered after a few years <b>(1)</b></li> <li>• Reservoirs used for leisure/tourism and recreation <b>(1)</b></li> <li>• Large dams protect towns down stream and control flooding <b>(1)</b></li> <li>• Can provide off grid power in isolated locations <b>(1)</b></li> <li>• Reliable/free source of energy/inexpensive in comparison to fossil fuels <b>(1)</b></li> <li>• Water can be pumped using off peak power <b>(1)</b></li> <li>• No start-up time/instant power <b>(1)</b></li> <li>• Water is in abundant/unlimited supply and readily available <b>(1)</b></li> <li>• Reduced risk of environmental accident <b>(1)</b></li> <li>• low running costs <b>(1)</b></li> </ul> <p>Disadvantages</p> <ul style="list-style-type: none"> <li>• High set-up costs <b>(1)</b></li> <li>• Reservoirs use large land area/footprint <b>(1)</b></li> <li>• Communities may be displaced <b>(1)</b></li> <li>• Rivers maybe diverted / cause problems for people who rely on the river economically <b>(1)</b></li> <li>• Dam failures have the potential for disasters <b>(1)</b></li> <li>• Greenhouse gasses produced can be high in tropical regions due to decay of plant life in reservoirs producing methane <b>(1)</b></li> <li>• Disruptive to surrounding ecosystems <b>(1)</b></li> <li>• Cause changes to the downstream river environment <b>(1)</b></li> <li>• Visually intrusive <b>(1)</b></li> <li>• High maintenance costs <b>(1)</b></li> <li>• Difficult environment for maintenance <b>(1)</b></li> <li>• Not suitable for all locations <b>(1)</b></li> </ul> <p>Maximum 4 marks if all advantages or all disadvantages</p> <p style="text-align: right;">(5x1)</p>	<b>(5)</b>
<b>Total for question</b>		<b>8</b>

Question Number	Answer	Mark
4	<p>Any six of the following statements in a sentence, up to a maximum of 6 marks.</p> <ul style="list-style-type: none"> <li>• Reduces need to cut down trees / deforestation (1)</li> <li>• saves resources for future generations <b>(1)</b></li> <li>• Reduces chemical contamination <b>(1)</b></li> <li>• Maintains existing natural habitats <b>(1)</b></li> <li>• Allows timber to be used for other sustainable uses <b>(1)</b></li> <li>• Reduces soil erosion/landslides <b>(1)</b></li> <li>• Maintains existing ecosystems <b>(1)</b></li> <li>• Reduction of chemicals required <b>(1)</b></li> <li>• Maintains CO<sub>2</sub> oxygen conversion <b>(1)</b></li> <li>• Less space in landfill / less waste produced <b>(1)</b></li> <li>• Reduce CO<sub>2</sub> emissions / pollution that would happen when extracting / transporting / processing raw materials <b>(1)</b></li> <li>• Reduced energy required for recycling compared to using virgin fibres (1)</li> </ul> <p style="text-align: right;">(6 x 1)</p>	<b>(6)</b>
<b>Total for question</b>		<b>6</b>

Question Number	Answer	Mark
5(a)	<ul style="list-style-type: none"> <li>• Sequential product development is where each stage of development is completed before moving on to the next stage <b>(1)</b></li> <li>• Concurrent manufacturing is where the stages of development / manufacture overlap / involve a team approach <b>(1)</b></li> </ul> <p style="text-align: right;">(2 x 1 )</p>	<b>(2)</b>
5(b)	<ul style="list-style-type: none"> <li>• Helps reduce time to market <b>(1)</b></li> <li>• Reduces the need to make design modifications later/right first time <b>(1)</b></li> <li>• Can reduce design / manufacturing costs <b>(1)</b></li> <li>• Improves product quality <b>(1)</b></li> <li>• Can improve customer satisfaction <b>(1)</b></li> </ul> <p style="text-align: right;">(2 x 1 )</p>	<b>(2)</b>
5(c)	<p>Any four of the following statements in a sentence, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> <li>• An integrated system linking a group of manufacturing cells <b>(1)</b></li> <li>• An automatic material handling system is linked to a central computer <b>(1)</b></li> <li>• Capable of producing a variety of parts <b>(1)</b></li> <li>• Machine flexibility can switch from the machining of one component to another <b>(1)</b></li> <li>• Routing flexibility allows several machines/cells to be used at the same time <b>(1)</b></li> <li>• Can be used even when only small quantities are to be made/suitable for small or large batch production <b>(1)</b></li> <li>• Can be linked to integrated computer systems to match production to sales demand <b>(1)</b></li> <li>• Highly automated can be reprogrammed <b>(1)</b></li> <li>• Staff trained to work on different machines and processes <b>(1)</b></li> </ul> <p style="text-align: right;">(4 x 1 )</p>	<b>(4)</b>
<b>Total for question</b>		<b>8</b>



Question Number	Answer	Mark
<b>6(a)</b>	<p>Any two of the following statements in a sentence, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"> <li>• A system designed to coordinate processes / resources / information / activities / shared database <b>(1)</b></li> <li>• Integrates software from all departments into one system <b>(1)</b></li> <li>• Provides a software road map for fulfilling customer orders <b>(1)</b></li> <li>• Information required to fulfil an order is instantly accessible to all staff <b>(1)</b></li> <li>• Instant updating of information <b>(1)</b></li> <li>• Easy tracking of customer orders through to invoicing <b>(1)</b></li> </ul> <p style="text-align: right;">(2 x 1)</p>	<b>(2)</b>
<b>6(b)</b>	<p>There <b>MUST</b> be advantages and disadvantages discussed. At least one from either side for full marks</p> <p>Advantages</p> <ul style="list-style-type: none"> <li>• All elements in the supply and production chain easily accessed <b>(1)</b></li> <li>• All the workforce can see the same information <b>(1)</b></li> <li>• Information concerning order can be updated instantly/team members are updated <b>(1)</b></li> <li>• Allows for greater time/efficiency in customer management <b>(1)</b></li> <li>• Perceived company effectiveness improved <b>(1)</b></li> <li>• Improved customer satisfaction <b>(1)</b></li> <li>• Improves communication within the business <b>(1)</b></li> <li>• Customer orders easily tracked <b>(1)</b></li> <li>• Customer orders processed quicker <b>(1)</b></li> </ul> <p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Expensive to install <b>(1)</b></li> <li>• Success depends on skill / experience of workforce <b>(1)</b></li> <li>• High quality on-going training needed <b>(1)</b></li> <li>• System failure affects all areas of the business <b>(1)</b></li> <li>• Maybe teething problems with system introduction <b>(1)</b></li> <li>• 24/7 operation maybe interrupted by down-time <b>(1)</b></li> </ul> <p>Maximum of 5 marks if only advantages or only disadvantages are discussed.</p> <p style="text-align: right;">(6 x 1)</p>	<b>(6)</b>

<b>6(c)</b>	<p>Any four of the following statements in a sentence, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> <li>• Security of financial or personal details/hackers obtaining details <b>(1)</b></li> <li>• Is it what I want/correct size/no hands on experience of product <b>(1)</b></li> <li>• How do I return it/cost of returns <b>(1)</b></li> <li>• Delivery/who will be in to receive it/length of delivery / Not knowing when it will be delivered <b>(1)</b></li> <li>• Damage in transit (1)</li> <li>• Does the photograph correctly represent the product/misleading product description <b>(1)</b></li> <li>• Personal information can be shared with other companies <b>(1)</b></li> <li>• Possible increase in junk mail / scams / phishing / viruses <b>(1)</b></li> <li>• Time needed to trawl for the correct item <b>(1)</b></li> <li>• Slow broadband access/loss of connection/technical faults <b>(1)</b></li> <li>• Difficulty in navigating web pages <b>(1)</b></li> <li>• Added on costs such as VAT / postage <b>(1)</b></li> <li>• Is the website/product genuine/trustworthy? – risk of fraudulent activity <b>(1)</b></li> </ul> <p style="text-align: right;">(4 x 1)</p>	<p style="text-align: right;"><b>(4)</b></p>
<b>Total for question</b>		<b>12</b>

Question Number	Answer	Mark
7(a)	<p>Any four of the following statements in a sentence, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> <li>• Learner cannot be involved in any real accidents / no expensive repairs to cars <b>(1)</b></li> <li>• Reduces risk to learner and other road users <b>(1)</b></li> <li>• There is immediate feedback/allows playback of the simulation/lesson/experience <b>(1)</b></li> <li>• Allows learner to understand how to avoid situations where accidents could happen <b>(1)</b></li> <li>• Weather conditions can be simulated <b>(1)</b></li> <li>• Allows practise on different types of road e.g. motorways / rural / urban roads <b>(1)</b></li> <li>• Driving at different times of the day can be simulated e.g. rush hour / night time <b>(1)</b></li> <li>• Allows learner to practice alone own without any help <b>(1)</b></li> <li>• Helps identify strengths and weaknesses (see how driver would react), with the simulator pinpointing errors <b>(1)</b></li> <li>• Because the learner is familiar with the controls, they will be able to concentrate on what's going on around them rather than what they are doing with their hands and feet <b>(1)</b></li> <li>• Allows learner to gain basic driving skills before going out in a car <b>(1)</b></li> <li>• Allows hazardous / real life scenarios can be to presented to the learner <b>(1)</b></li> </ul> <p style="text-align: right;">(4 x 1)</p>	<b>(4)</b>
Question	Answer	Mark

Number		
<b>7(b)</b>	<p>Any eight of the following statements in a sentence, up to a maximum of 8 marks.</p> <ul style="list-style-type: none"> <li>• Software allows designers to work individually or in teams <b>(1)</b></li> <li>• CAD used throughout the design process allows for quick editing / modifying in light of client feedback <b>(1)</b></li> <li>• Detailed engineering drawings can be generated from 3D models / drawings and give manufacturing information very quickly <b>(1)</b></li> <li>• Computer modelling can visually test ideas / components on screen <b>(1)</b></li> <li>• CAD can virtually test designs under load and simulated operational conditions <b>(1)</b></li> <li>• CAD gives photorealistic images suitable for marketing / brochures <b>(1)</b></li> <li>• CAD reduces the need for labour intensive drawing offices <b>(1)</b></li> <li>• CAD data easily transferred electronically <b>(1)</b></li> <li>• Individual drawings can be stored in libraries on file and allows designers to call on them at any time <b>(1)</b></li> <li>• Allows for zoom in and out when drawing to scale <b>(1)</b></li> <li>• Allows for cut, paste, rotate, mirror images at speed so redrawing not needed <b>(1)</b></li> <li>• Mistakes and changes can be easily edited/do not require total redraw <b>(1)</b></li> <li>• CAD incorporates tools to add common manufacturing/engineering operations such as internal/external threads, knurling, chamfer, radius etc <b>(1)</b></li> <li>• Can add textures/rendering/shadows/materials to make it look realistic <b>(1)</b></li> <li>• CAD facilitates the use of rapid prototyping to facilitate the testing and evaluation of designs/gain client approval <b>(1)</b></li> <li>• CAD allows 3D virtual modelling that can be rotated and viewed from any angle <b>(1)</b></li> <li>• Software is integrated so changes to one part (or view) of the design automatically marks changes to corresponding parts (or views) of the design <b>(1)</b></li> <li>• Automatic dimensioning of the design <b>(1)</b></li> <li>• Virtual models can be superimposed onto photographic images to test the aesthetics of the product in its proposed environment <b>(1)</b></li> <li>• CAD can be used to produce simulations/virtual 'walkthroughs' or 'flypasts' for presentation to a client <b>(1)</b></li> <li>• Any appropriate specific cost advantage identified <b>(1)</b></li> </ul> <p style="text-align: right;">(8 x 1)</p>	<p style="text-align: right;"><b>(8)</b></p>
	<b>Total for question</b>	<b>12</b>

Question Number	Answer	Mark
8	<p>The <b>New Design Style</b> (post modernism). Both philosophy AND design style must be addressed.</p> <p><u>Philosophy</u></p> <ul style="list-style-type: none"> <li>• Started with architecture <b>(1)</b></li> <li>• Reaction against the blandness of Bauhaus <b>(1)</b></li> <li>• Designs should be individual <b>(1)</b></li> <li>• Put personality back into designs <b>(1)</b></li> <li>• Product need not follow conventional shapes / colours <b>(1)</b></li> <li>• Less is a bore <b>(1)</b></li> <li>• Better to produce a creative mistake than a stagnant piece of work in good taste <b>(1)</b></li> </ul> <p><u>Design style</u> NB. NO credit for examples.</p> <ul style="list-style-type: none"> <li>• Work described as vibrant / bright / colourful <b>(1)</b></li> <li>• Products often highly decorative <b>(1)</b></li> <li>• Designs taken from past movements / styles but updated <b>(1)</b></li> <li>• Modern materials used in designs <b>(1)</b></li> <li>• Often tries to satisfy trend to nostalgia/retro design re-invented <b>(1)</b></li> <li>• Surface structure of buildings distorted <b>(1)</b></li> <li>• Structure of buildings gives impression of controlled chaos <b>(1)</b></li> <li>• Humorous / fun <b>(1)</b></li> <li>• Form over function <b>(1)</b></li> <li>• Deconstruction <b>(1)</b></li> <li>• Features the inside on the outside <b>(1)</b></li> </ul>	<b>(8)</b>

**OR**

The **Art Deco Movement**.

Both philosophy AND design style must be addressed.

Philosophy

- Popular modernism **(1)**
- Eclectic / ideas come from a wide range of sources **(1)**
- Decorative / elegant / opulent / glamorous style **(1)**
- Primary purpose to be beautiful / ornamental **(1)**
- A response to human need for pleasure / a reaction against austerity **(1)**
- Both hand-crafted and machine-made items accepted **(1)**
- Affordable materials should be used **(1)**
- Opulent architectural and decorative arts style **(1)**

Design style

NB. NO credit for examples.

- Based on geometric shapes / stepped forms / chevron patterns / fan shaped motifs / sunburst **(1)**
- Influenced by primitive arts **(1)**
- Bright vibrant colours **(1)**
- Symmetry and repetition **(1)**
- Controlled chaos
- Designs based upon arts of Africa / Egyptian / Aztec influences **(1)**
- Modern materials / aluminium / Bakelite / steel / chrome inlaid woods used **(1)**
- Exotic materials / sharkskin / zebra skins used **(1)**
- Expensive materials ivory/bronze/polished stone used **(1)**

*[Max 5 marks if only philosophy or design style are discussed.]*

(8 x 1)

**Total for question**

**8**

