

# Mark Scheme (Results)

June 2014

Pearson Edexcel GCSE  
Design & Technology (5GR02/01)

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Summer 2014

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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</b>	B No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>2</b>	C No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>3</b>	B No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>4</b>	B No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>5</b>	C No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>6</b>	A No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>7</b>	A No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>8</b>	B No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>9</b>	<b>B</b> No alternatives	<b>(1)</b>
Question Number	Answer	Mark
<b>10</b>	<b>A</b> <b>No alternatives</b>	<b>(1)</b>

Question Number	Answer	Mark	
<b>11. (a)</b>	Name	<ul style="list-style-type: none"> <li>Ruler or rule. (1)</li> </ul>	<b>(4)</b>
	Use	<ul style="list-style-type: none"> <li>Used to draw ellipses/oval. For drawing circles in isometric. (1)</li> </ul>	
	Name	<ul style="list-style-type: none"> <li>Trimmer, guillotine, rotatrim, cutter. (1)</li> </ul>	
	Name	<ul style="list-style-type: none"> <li>Drawing board, parallel motion. (1)</li> </ul>	

Question Number	Answer	Mark
<b>11. (b) (i)</b>	<p><b>Two</b> properties given from:</p> <ul style="list-style-type: none"> <li>Lightweight (1)</li> <li>Malleable/ easily pressed into shape/ moulded when heated (1)</li> <li>Good surface to apply colour/graphics (1)</li> <li>Good strength to weight ratio (1)</li> <li>Can be coloured/transparent (1)</li> <li>Rigid/ strong when cooled (1)</li> <li>Thermoplastic (1)</li> </ul> <p>Do not accept 'strong/cheap' unless qualified</p> <p style="text-align: right;">1 x 1 1 x 1</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>11.(b) (ii)</b>	<p><b>Two</b> methods given from:</p> <ul style="list-style-type: none"> <li>Screen printing (1)</li> <li>Glue on graphic form a standard printer (1)</li> <li>Apply vinyl that has been thermally/ glued/ printed/ cut (1)</li> <li>CAM cut dies for block printing (1)</li> <li>Directly hand painted/sprayed/air brushed (1)</li> <li>Intaglio printing (1)</li> <li>Dye/colour sublimation (1)</li> <li>Pad printing (1)</li> <li>Intaglio printing (1)</li> </ul> <p style="text-align: right;">2 x 1</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>11. (c)</b>	<p><b>One</b> explanation given from:</p> <ul style="list-style-type: none"> <li>• To allow the mould to be withdrawn from the plastic (1) so that it is not damaged (1)</li> <li>• Smooth side reduce marks on the product (1) so that a better/high quality visual appearance is achieved (1)</li> </ul>	<b>(2)</b>

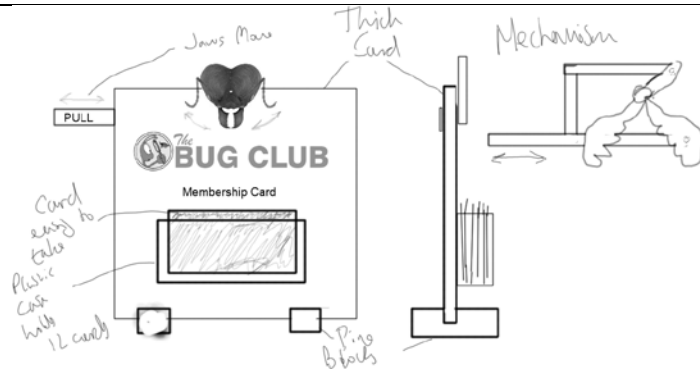
Question Number	Answer	
<b>11. (d)</b>	<p><b>Three</b> properties given from:</p> <ul style="list-style-type: none"> <li>• Must have a high/softening/melting temperature (1)</li> <li>• Ridgid/ Must hold its shape under pressure (1)</li> <li>• Must have the ability to be shaped/machined/sanded/polished/drilled (1)</li> <li>• Must have good thermal insulation properties (1)</li> <li>• Durable for repeated use (1)</li> </ul>	<b>(3)</b>
	1 x 3	

Question Number	Answer	Mark
<b>11. (e)</b>	<p><b>Describe</b> an alternative method from:</p> <ul style="list-style-type: none"> <li>• Rapid prototyping (1) using stereolithography/3D printing (1) by building up the model from layers (1)</li> <li>• 3D CAD model (1) with an applied rendered/textured surface (1)</li> <li>• CNC/CAM/laser machining (1) to produce accurate detail (1)</li> </ul>	<b>(2)</b>
	2 x 1	

Question Number	Answer	Mark
11.(f)	<p><b>Two</b> explanations from:</p> <ul style="list-style-type: none"> <li>• Cost effective for a mass produced product (1) because it can run 24/7/ less labour required (1)</li> <li>• Fewer mistakes (1) automated process (1)</li> <li>• Fewer mistakes (1) less human error (1)</li> <li>• Accurate/intricate design (1) repeatability/ mould is reusable (1) minimum waste (1)</li> <li>• Fast production (1) mean more products can be produced in a shorter time (1)</li> </ul> <p style="text-align: right;">2 x 1 2 x1</p>	<b>(4)</b>

Question Number	Answer	Mark
12.	<p><b>Design idea 1</b></p> <p>Candidates may answer any specification point in either graphical form or by annotation.</p> <p><b>No marks are awarded for the quality of graphical communication.</b></p> <ul style="list-style-type: none"> <li>• Must have a bug theme (1) e.g. Can be graphic drawn, card cut into a shape or 3D of a bug</li> <li>• fit on a surface 500 x 500 mm (1) e.g. dimensions shown or statement in annotation</li> <li>• be stable in use (1) e.g. drawn 3D free standing design, or 2D with supporting stand</li> <li>• hold at least 20 membership cards (100 x 80 mm) (1) e.g. Design/annotation/dimensions showing method of holding cards</li> <li>• allow easy removal of membership cards (1) e.g. design/annotation showing ease of card removal</li> <li>• use a method of applying the bug club logo (1) e.g. a named method of applying the logo</li> <li>• use manufacturing processes suitable for one off production (1) e.g. graphically shown with dimensions or by statement in annotation</li> <li>• use appropriate materials available in a school workshop. (1) e.g. cutting, joining and graphic of design to be suitable for manufacture with school equipment</li> </ul> <p>Example of candidate response:</p>	



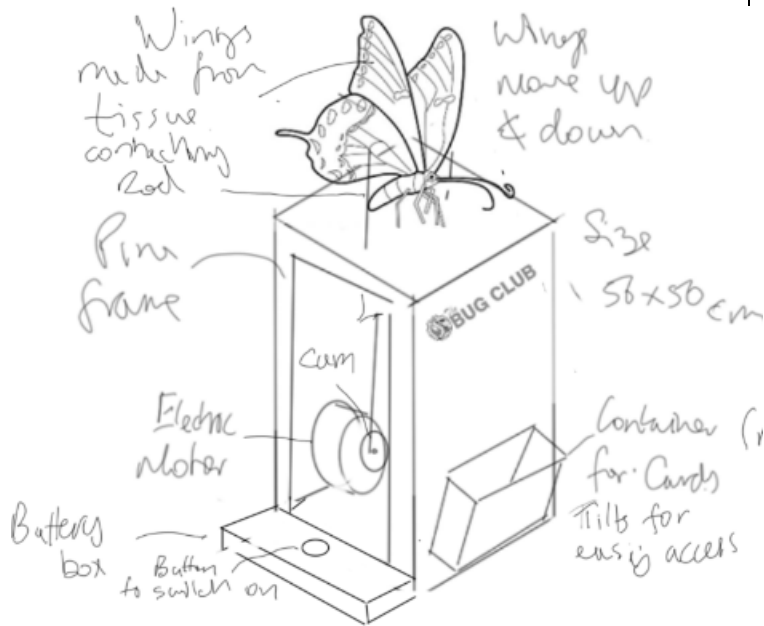


8 x 1

8

**Design idea 2**

Marks for design idea 2 can only be awarded where specification points are resolved differently than in design idea 1.



8 x 1

(8)

(16)

Question Number	Answer	Mark
<p><b>13.</b> <b>(a)</b></p>	<p>Two properties given and linked justification from:</p> <ul style="list-style-type: none"> <li>• Property: Good impact resistance/tough (1)</li> <li>• Justification: Protection of contents/withstand internal pressure (1)</li> <li>• Property: Plasticity (1)</li> <li>• Justification: can be easily blow moulded/formed (1)</li> <li>• Property: Lightweight (1)</li> <li>• Justification: Making product portable/easy to carry around/user friendly/reduce transport costs (1)</li> <li>• Property: Nonporous (1)</li> <li>• Justification: Does not allow carbon gas to migrate out of bottle (1)</li> <li>• Property: Transparent (1)</li> <li>• Justification: Visually see content level</li> <li>• Property: inert (1)</li> <li>• Justification: Does not flavour the contents (1)</li> </ul> <p style="text-align: right;">2 x 1 2 x 1</p>	<p style="text-align: center;">(4)</p>

Question Number	Answer	Mark
<b>13. (b)</b>	<p>One reason explained from:</p> <ul style="list-style-type: none"> <li>• To show if the bottle is cold/warm (1) ready or not to drink (1)</li> <li>• Change in colour (1) shows temperature of drink (1)</li> <li>• Change in colour (1) will indicate where it is safe to open/avoid spillage from fizzing drink (1)</li> <li>• Change in colour (1) change label graphics/enhances aesthetics/ sell more drinks (1)</li> </ul> <p><i>Do not accept 'fast/quick/cheap unless qualified'</i></p> <p style="text-align: right;">2 x 1</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>13. (c) (i)</b>	<p><b>One</b> explanation from:</p> <ul style="list-style-type: none"> <li>• Plastic bottle is lighter (1) allows for more bottles per lorry/container load (1)</li> <li>• Lighter weight (1) more fuel efficient (1)</li> <li>• Plastic bottle is more robust (1) so less breakage (1)</li> </ul> <p style="text-align: right;">2 x 1</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>13. (c) (ii)</b>	<p><b>One</b> explanation from:</p> <ul style="list-style-type: none"> <li>• Ribbed top (1) so easy to grip (1)</li> <li>• Textured bottle (1) allow firm grip (1)</li> <li>• Multiple thread on cap (1) allows for quick removal (1)</li> <li>• Vented thread on cap (1) allows gas to escape (1)</li> <li>• Size of cap/bottle (1) allows easy gripping (1)</li> </ul> <p style="text-align: right;">2 x 1</p>	<b>(2)</b>

Question Number	Answer	Mark				
<p><b>13. (d)</b> <b>QWC</b></p>	<p>Compare and evaluate container A against container B in terms of the following specification criteria <b>“User requirements”</b> and <b>“environmental impact (the 3Rs)”</b>: <i>No more than 3 marks from each section</i></p> <table border="1"> <thead> <tr> <th>Picture A</th> <th>Picture B</th> </tr> </thead> <tbody> <tr> <td> <p><b>User Requirements:</b></p> <ul style="list-style-type: none"> <li>• Once only open facility, drink will go “flat” if not consumed in a short period of time</li> <li>• Tough, but will show dents from knocks</li> <li>• Able to drink from can but has hygiene issues/open to germs</li> <li>• If a can is shaken/knocked when opening no control over carbon gas escaping /violent reaction/spillage</li> </ul> <p><b>Environmental impact (3Rs):</b></p> <ul style="list-style-type: none"> <li>• Has limited/no opportunity for Reduce or Reuse but can be fully recycled</li> <li>• Aluminium container can be crushed to reduce volume/space to transport for recycling</li> <li>• Raw material is abundant/plentiful but is expensive to extract using electrolysis. However, demand</li> </ul> </td> <td> <p><b>User Requirements:</b></p> <ul style="list-style-type: none"> <li>• Bottle can be re-sealed for later consumption. Able to drink from bottle; no hygiene issues as mouth piece is covered by cap</li> <li>• Strong and able to withstand knocks without evidence of damage</li> <li>• If shaken/knocked when opening, control over carbon gas escaping /violent reaction/spillage can be achieved by regulating/twisting the screw cap</li> <li>• The bottle is contoured for it to be easily held/used</li> </ul> <p><b>Environmental impact (3Rs):</b></p> <ul style="list-style-type: none"> <li>• Has limited/no opportunity to Reduce but can be Reused by the user as drinks container/store other liquids, or by the manufacturer after sterilization. It also can be fully recycled</li> </ul> </td> </tr> </tbody> </table>	Picture A	Picture B	<p><b>User Requirements:</b></p> <ul style="list-style-type: none"> <li>• Once only open facility, drink will go “flat” if not consumed in a short period of time</li> <li>• Tough, but will show dents from knocks</li> <li>• Able to drink from can but has hygiene issues/open to germs</li> <li>• If a can is shaken/knocked when opening no control over carbon gas escaping /violent reaction/spillage</li> </ul> <p><b>Environmental impact (3Rs):</b></p> <ul style="list-style-type: none"> <li>• Has limited/no opportunity for Reduce or Reuse but can be fully recycled</li> <li>• Aluminium container can be crushed to reduce volume/space to transport for recycling</li> <li>• Raw material is abundant/plentiful but is expensive to extract using electrolysis. However, demand</li> </ul>	<p><b>User Requirements:</b></p> <ul style="list-style-type: none"> <li>• Bottle can be re-sealed for later consumption. Able to drink from bottle; no hygiene issues as mouth piece is covered by cap</li> <li>• Strong and able to withstand knocks without evidence of damage</li> <li>• If shaken/knocked when opening, control over carbon gas escaping /violent reaction/spillage can be achieved by regulating/twisting the screw cap</li> <li>• The bottle is contoured for it to be easily held/used</li> </ul> <p><b>Environmental impact (3Rs):</b></p> <ul style="list-style-type: none"> <li>• Has limited/no opportunity to Reduce but can be Reused by the user as drinks container/store other liquids, or by the manufacturer after sterilization. It also can be fully recycled</li> </ul>	<p><b>(6)</b></p>
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	and cost is stable.	<ul style="list-style-type: none"> <li>• Oil based raw material has high demand leading to variable cost. Finite resource.</li> <li>• It takes years to decay.</li> </ul>	
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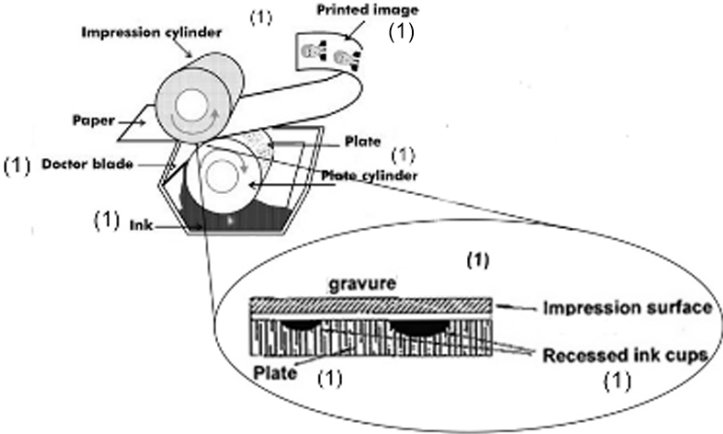
Level	Mark	Descriptor
	0	No rewardable material
Level 1 Identifies one area of comparison (1) develops one area of comparison (1)	1-2	Candidate identifies the area(s) of comparison with no development OR identifies and develops one area. Shows limited understanding of the comparison. Writing communicates ideas using everyday language but the response lacks clarity and organisation. The candidate spells, punctuates and uses the rules of grammar with limited accuracy.
Level 2 Identifies two areas of comparison (2) develops two areas of comparison (2)	3-4	Candidate identifies some areas of comparison with associated developments showing some understanding of the comparison. Writing communicates ideas using D&T terms accurately and showing some direction and control in the organising of material. The candidate uses some of the rules of grammar appropriately and spells and punctuates with some accuracy, although some spelling errors may still be found.
*Level 3 Identifies three areas of comparison (3) develops three areas of comparison (3)	5-6	Candidate identifies a range of areas of comparison with associated developments showing a detailed understanding of the comparison. Writing communicates ideas effectively, using a range of appropriately selected D&T terms and organising information clearly and coherently. The candidate spells, punctuates and uses the rules of grammar with considerable accuracy.

\*[Level 3 answers must refer to both 'user requirements' **and** 'sustainability'.]

Question Number	Answer	Mark
<b>14. (a)</b>	<p>Explain <b>two</b> advantages from:</p> <ul style="list-style-type: none"> <li>• Page layout can be manipulate/flexible (1) to enable adjustments to be made easily (1)</li> <li>• Colours can be adjusted/changed easily (1) to allow clients different choice/experiment with combinations (1)</li> <li>• Many versions can be saved to disk (1) to help secure many hours of work (1)</li> <li>• Work can be transmitted over the internet (1) to allow collaboration with other designers/get quick response from clients/ manufacturers for printing to safe costs (1)</li> <li>• Templates can be created (1) to help with future developments (1)</li> <li>• A selection of tools (1) for editing/ spell checker/ ability to combine documents (1)</li> </ul> <p><i>Only accept 2 advantages and 2 reasons</i></p> <p style="text-align: right;">1 x 2 1 x 2</p>	<b>(4)</b>

Question Number	Answer	Mark
<b>14. (b)</b>	<p><b>One</b> health and safety issues given from:</p> <ul style="list-style-type: none"> <li>• Problems of eye strain/ headache (1) due to long/extended time looking at the monitor/screen/adjustable (1)</li> <li>• back/neck strain (1) due to poorly adjusted chair/no wheel on chair/no foot rest (1)</li> <li>• Fatigue (1) due to lack of breaks/poor ventilation (1)</li> <li>• RSI (1) caused by repeated movements (1)</li> </ul> <p style="text-align: right;">1 x 2</p>	<b>(2)</b>

Question Number	Answer	Mark
14. (c)	<p><b>One</b> advantage described from:</p> <ul style="list-style-type: none"> <li>• High quality / visual appearance (1) gives it an increased value/ enhanced user experience (1)</li> <li>• Ability to change colour (1) gives more scope for designers / enhances interest / can change the mood of the card (1)</li> <li>• Ability to have rolling/flashing/interactive message (1) increases the client's satisfaction (1)</li> <li>• Possibility of having personal messages /photos/graphics/animation (1) may increase sales / have novelty factor (1)</li> <li>• Can be read in any light (1) at any angle (1)</li> </ul> <p style="text-align: right;">2 x 1</p>	<b>(2)</b>

Question Number	Answer	Mark
<p><b>14. (d)</b></p>	<p><b>Detailed</b> explanation:</p> <p>Plate cylinder is immersed in the ink(1) filling the recessed cells(1) rotating action draws ink onto the plate(1) doctor/dog plate scrapes excessive ink from the plate(1) before making contact with the paper(1) paper passes between the plate and impression/ roller cylinder(1) that applies force(1) which ensures even coverage of the ink(1)</p>  <p>Only award a maximum of 3 marks to either the sketch or description 1 x 5</p>	<p>(5)</p>



Question Number	Answer	Mark
<p><b>14 (e)</b> <b>QWC</b></p>	<p><b>Discussion to address the following issues:</b></p> <p><b>Advantages of electronic greeting cards:</b></p> <ul style="list-style-type: none"> <li>• Quick, easy and convenient means of sending card</li> <li>• Less overall cost, usually an annual subscription covers many cards sent.</li> <li>• Cheaper to send around the world</li> <li>• Environmentally friendly, saves paper, ink and recycling.</li> <li>• Saves time as information is transferred digitally and makes it unnecessary to visit card shop.</li> <li>• Visual information can be animated/tailored for a better experience.</li> <li>• Customer can choose from a selection to suit a particular occasion.</li> <li>• Has an element of individuality.</li> <li>• Can be processed at work no special visit needed to post office.</li> </ul> <p><b>Disadvantages of electronic greeting cards:</b></p> <ul style="list-style-type: none"> <li>• Presents cannot be included such as money or gift cards.</li> <li>• Web based electronic greeting cards are lost after a set time so cannot be kept.</li> <li>• Need access to a computer.</li> <li>• Cannot be put on show/display for others to see.</li> <li>• Might be perceived as a lazy method and having lower status to a paper card/ impersonal.</li> <li>• Open to internet insecurity/ viruses/ spam/ identity theft.</li> </ul>	<p><b>(6)</b></p>

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