



Pearson

Mark Scheme (Results)

Summer 2017

Pearson Edexcel GCSE
In Design and Technology (5GR02)
Paper 1 Graphic Products

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Summer 2017

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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 | D | (1) |
| Question Number | Answer | Mark |
| 2 | D | (1) |
| Question Number | Answer | Mark |
| 3 | B | (1) |
| Question Number | Answer | Mark |
| 4 | A | (1) |
| Question Number | Answer | Mark |
| 5 | D | (1) |
| Question Number | Answer | Mark |
| 6 | D | (1) |
| Question Number | Answer | Mark |
| 7 | A | (1) |
| Question Number | Answer | Mark |
| 8 | A | (1) |
| Question Number | Answer | Mark |
| 9 | C | (1) |
| Question Number | Answer | Mark |
| 10 | B | (1) |

| Question Number | Answer | Mark | | | | | | | | | | | | | | | |
|-----------------|---|--|------|-----|----|--|--|-----|--|--|------|--|--|-----|--|--|------------|
| 11. (a) | <table border="1"> <thead> <tr> <th></th> <th>Name</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td>ai</td> <td></td> <td>To measure distances / things / marking / setting out (1) (Do not accept anything related to drawing lines unless straight or joining points)</td> </tr> <tr> <td>aii</td> <td></td> <td>To protect your eyes / stop bits/ chemicals/substances going / flying into your eyes (1)</td> </tr> <tr> <td>aiii</td> <td>Pillar drill / pedestal drill (1) <i>Do not accept drill on it's own.</i></td> <td></td> </tr> <tr> <td>aiv</td> <td></td> <td>To apply a layer/cover of polythene / plastic to paper and card / to encapsulate / trap paper / posters (1) <i>Do not accept laminating paper on it's own</i></td> </tr> </tbody> </table> <p style="text-align: right;">4 x 1</p> | | Name | Use | ai | | To measure distances / things / marking / setting out (1) (Do not accept anything related to drawing lines unless straight or joining points) | aii | | To protect your eyes / stop bits/ chemicals/substances going / flying into your eyes (1) | aiii | Pillar drill / pedestal drill (1) <i>Do not accept drill on it's own.</i> | | aiv | | To apply a layer/cover of polythene / plastic to paper and card / to encapsulate / trap paper / posters (1) <i>Do not accept laminating paper on it's own</i> | (4) |
| | Name | Use | | | | | | | | | | | | | | | |
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| aiii | Pillar drill / pedestal drill (1) <i>Do not accept drill on it's own.</i> | | | | | | | | | | | | | | | | |
| aiv | | To apply a layer/cover of polythene / plastic to paper and card / to encapsulate / trap paper / posters (1) <i>Do not accept laminating paper on it's own</i> | | | | | | | | | | | | | | | |

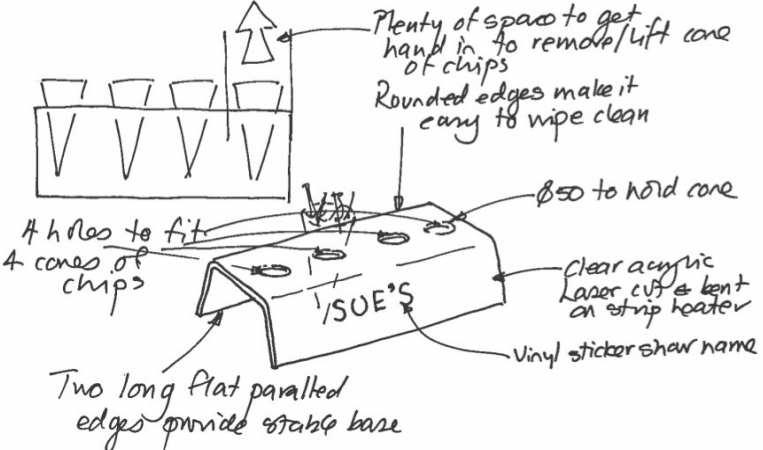
| Question Number | Answer | Mark |
|--------------------|---|------------|
| 11. (b) (i) | <p>Two reasons given from:</p> <ul style="list-style-type: none"> ▪ Lower unit costs / cost effective (1) ▪ Set up costs / furnace / moulds are expensive so have to make and sell a lot (1) ▪ Fast / quick / efficient production times (1) ▪ Expensive process to make a one-off / batch (1) ▪ They will all be the same size / consistent in shape (1) ▪ Cheaper to bulk buy materials / economies of scale (1) ▪ Meet demand (1) <p>Do not accept 'fast', 'quick' or 'cheap' as a single word answer</p> <p style="text-align: right;">2 x 1</p> | (2) |

| Question Number | Answer | Mark |
|---------------------|--|------------|
| 11. (b) (ii) | <p>Two other properties given from:</p> <ul style="list-style-type: none"> ▪ Can be made clear / transparent / coloured / optical properties (1) ▪ Inert material / will not react to contents (1) ▪ Will not stain / fade in colour over time (1) ▪ Resistant to mechanical shock (1) ▪ Stiff in this shape once cooled (1) ▪ Durable / long lasting (1) ▪ UV resistant (1) ▪ Waterproof/water tight (1) ▪ Chemical resistant (1) ▪ Malleable at high temperatures (1) <p>(Do not accept recyclable)</p> <p style="text-align: right;">2 x 1</p> | (2) |

| Question Number | Answer | Mark |
|----------------------|--|------------|
| 11. (b) (iii) | <p>Any three benefits given from:</p> <ul style="list-style-type: none"> ▪ Reduces waste / less waste being sent to landfill (1) ▪ Reduces the need to produce new / virgin material / preserves resources (1) ▪ Reduces energy consumption in comparison to making new glass / less pollution overall / reduces emissions (1) ▪ Safer on the streets as less will be broken / dumped / fewer cuts / injuries to wildlife (1) <p style="text-align: right;">3 x 1</p> | (3) |

| Question Number | Answer | Mark |
|--------------------|---|------------|
| 11. (c) (i) | <p>Two advantages explained from:</p> <ul style="list-style-type: none"> ▪ More durable than MDF (1) therefore it will last longer (1) ▪ Attractive grain (1) therefore more aesthetically pleasing (1) ▪ Can be coloured / stained / branded / pyrography (1) which leaves the natural grain on show / exposed (1) ▪ Can be glued / hold nails / screws better than MDF (1) meaning the box will be more likely to last / MDF likely to split (1) ▪ No edge finishing needed on pine (1) unlike MDF which has exposed edge / fibres (1) ▪ Pine has greater resistance to moisture / oil (1) whereas MDF will soak it up / stain / expand (1) ▪ Pine does not contain any horrible glues unlike MDF (1) so safer to use in the factory (1) ▪ Makes it look like a quality item (1) so more suitable / likely to be purchased as a gift (1) <p style="text-align: right;">2 x 2</p> | (4) |

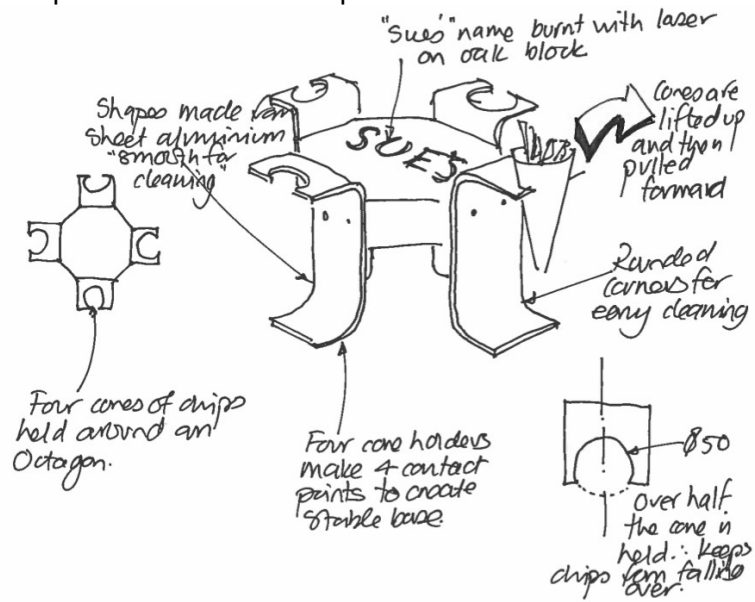
| Question Number | Answer | Mark |
|---------------------|---|------------|
| 11. (c) (ii) | <p>Two reasons explained from:</p> <ul style="list-style-type: none"> ▪ Acrylic is a lightweight material (1) therefore it is easier to carry/transport / reduces transportation costs (1) ▪ You can see the product inside (1) therefore more likely to sell / appeal / identify brand (1) ▪ Easy to cut / shape / drill (1) therefore quicker / cheaper to manufacture / process (1) ▪ It will fracture / break if dropped / hit (1) but it will not leave shards / splinters (1) ▪ Can be laser cut (1) so that it leaves a clean/smooth edge(1) ▪ Available in thin sheets (1) so that it will run in a groove (1) <p style="text-align: right;">2 x 2</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 12. | <p>Design idea 1</p> <p>Candidates may answer any specification point in either graphical form or by annotation.</p> <p>No marks are awarded for the quality of graphical communication.</p> <ul style="list-style-type: none"> ▪ Hold four cones of chips (1) <p>e.g. side by side in a row / 2 x 2 / use of dimensions</p> <ul style="list-style-type: none"> ▪ Stop the cones from falling over (1) <p>e.g. held in holes (40-60mm dia) / cut outs / two holding points / rings / pegs</p> <ul style="list-style-type: none"> ▪ Have a stable base (1) <p>e.g. large surface area / number of contact points</p> <ul style="list-style-type: none"> ▪ Be easy to wipe clean (1) <p>e.g. shape / material selection / no internal sharp corners</p> <ul style="list-style-type: none"> ▪ Be easy to get cones in and out of (1) <p>e.g. space around each cone of chips / clearance to lift out</p> <ul style="list-style-type: none"> ▪ use a display method to show the name 'Sue's' (1) <p>e.g. engraved / vinyl transfer / permanent marker</p> <ul style="list-style-type: none"> ▪ be produced from materials readily available (1) <p>e.g. specific name material</p> <ul style="list-style-type: none"> ▪ be manufactured using processes available in school (1) <p>e.g. specific named process that relates to the named material above</p> <p>Example of candidate response:</p>  <p>The diagram shows a perspective view of a rectangular acrylic holder. It has four holes along one long edge, each containing a cone of chips. The holder has rounded corners and a vinyl sticker on the front face that says 'SUE'S'. Annotations include: 'Plenty of space to get hand in to remove/lift cone of chips' with an arrow pointing to the top; 'Rounded edges make it easy to wipe clean' with an arrow pointing to the corners; 'Ø50 to hold cone' with an arrow pointing to a hole; '4 holes to fit 4 cones of chips' with an arrow pointing to the holes; 'Two long flat parallel edges provide stable base' with an arrow pointing to the bottom edges; and 'Clear acrylic Laser cut & bent on strip heater' and 'Vinyl sticker show name' with arrows pointing to the material and the sticker respectively.</p> | (8) |

Design idea 2

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

Example of candidate response:



(8)

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 13. (a) (i) | <p>Two properties given from:</p> <ul style="list-style-type: none"> ▪ Good impact resistance / tough / durable (1) ▪ Lightweight (1) ▪ Low water absorption (1) ▪ Plasticity / softens with the application of heat / moulded easily (1) ▪ Recyclable (1) ▪ Transparent (1) <p>Do not accept 'rigid'</p> <p style="text-align: right;">2 x 1</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 13. (a) (ii) | <p>One advantage explained from:</p> <ul style="list-style-type: none"> ▪ Relatively easy to make moulds to fit the brushes (1) which means they are held securely (1) ▪ Lightweight / hollow products can be formed (1) which is ideal for packaging (1) ▪ Surface textures / ribs can be moulded into forms (1) which can increase the stiffness of the material (1) ▪ Low temperatures involved (1) reducing energy costs/emissions (1) ▪ Ideal for batch production (1) which means short runs can be made / machines easily reset if more required / moulds can be reused (1) <p style="text-align: right;">2 x 1</p> <p>One disadvantage explained from:</p> <ul style="list-style-type: none"> ▪ Large amounts of materials wasted (1) which increases overall costs (1) ▪ Products need to be trimmed (1) which increases production time (1) ▪ Material can thin too much / be inconsistent thickness (1) which can result in popping / bursting / weak points (1) ▪ Moulds need to be accurate / well laid out (1) otherwise webbing can occur and forming wasted (1) ▪ High set up costs (1) due to expensive machinery requirements (1) <p>Only allow 'cost' if relating to manufacturing (e.g. materials, processing)</p> <p style="text-align: right;">2 x 1</p> | (4) |

| Question Number | Answer | Mark |
|--------------------|---|------------|
| 13. (b) (i) | <p>One reason explained from:</p> <ul style="list-style-type: none"> ▪ There is a hollow created in the package / blister pack (1) which the brushes fit precisely into (1) ▪ The blister pack is folded round the brushes (1) which keeps them held tight (1) <p>Do not accept a repeat of the stem</p> <p style="text-align: right;">2 x 1</p> | (2) |

| Question Number | Answer | Mark |
|---------------------|--|------------|
| 13. (b) (ii) | <p>One reason explained from:</p> <ul style="list-style-type: none"> ▪ There is a small hole cut in the blister pack / euro slot (1) which means it can be hung up on a peg / pole / different rack designs (1) ▪ The brushes are balanced equally in the package which means they hang vertically down (1) <p>Do not accept a repeat of the stem</p> <p style="text-align: right;">2 x 1</p> | (2) |

| Question Number | Answer | Mark | | | | | | | | |
|---|--|-----------|-----------|---|---|-----------|-----------|---|--|------------|
| 13. (c) QWC | <p>Evaluation to address the following issues:</p> <p>Scale of production How does the design allow for scale of production?</p> <table border="1"> <thead> <tr> <th>Package A</th> <th>Package B</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> ▪ Vacuum formed blister pack can be made in batches so stock control can be controlled ▪ Different retailers can use the same basic blister pack and 'brand' it themselves with the addition of inserted sleeves </td> <td> <ul style="list-style-type: none"> ▪ Simple printing methods onto boxboard means faces can be changed / fashions incorporated ▪ Simple shape ▪ Could be laser cut / die cut net ▪ boxboard can be printed using offset lithography/flexography making it suitable for mass/batch production </td> </tr> </tbody> </table> <p>Sustainability How does the design take environmental considerations into account?</p> <table border="1"> <thead> <tr> <th>Package A</th> <th>Package B</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> ▪ Several brushes are sold together therefore reducing overall packing materials ▪ Plastic is made from oil which needs to be extracted from the ground / energy rich in terms of production therefore not very environmentally friendly ▪ Vacuum forming produces quite a bit of waste materials </td> <td> <ul style="list-style-type: none"> ▪ Boxboard is easily recycled unlike PS ▪ Minimal single material is used ▪ Hole in brush would be used to display it in the shop ▪ Materials could be sourced from renewable sources </td> </tr> </tbody> </table> | Package A | Package B | <ul style="list-style-type: none"> ▪ Vacuum formed blister pack can be made in batches so stock control can be controlled ▪ Different retailers can use the same basic blister pack and 'brand' it themselves with the addition of inserted sleeves | <ul style="list-style-type: none"> ▪ Simple printing methods onto boxboard means faces can be changed / fashions incorporated ▪ Simple shape ▪ Could be laser cut / die cut net ▪ boxboard can be printed using offset lithography/flexography making it suitable for mass/batch production | Package A | Package B | <ul style="list-style-type: none"> ▪ Several brushes are sold together therefore reducing overall packing materials ▪ Plastic is made from oil which needs to be extracted from the ground / energy rich in terms of production therefore not very environmentally friendly ▪ Vacuum forming produces quite a bit of waste materials | <ul style="list-style-type: none"> ▪ Boxboard is easily recycled unlike PS ▪ Minimal single material is used ▪ Hole in brush would be used to display it in the shop ▪ Materials could be sourced from renewable sources | (6) |
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| Level | Mark | Descriptor |
|---------|------|---|
| | 0 | No rewardable material |
| Level 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 |
| Level 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 | 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. |

| Question Number | Answer | Mark |
|--------------------|--|------------|
| 14. (a) (i) | <p>One reason given from:</p> <ul style="list-style-type: none"> ▪ Easier to print on flat and then wrap round tube (1) ▪ Labels can be printed in colour to reflect contents (1) ▪ Easier to update a small label rather than a whole batch of printed tubes which cannot be edited (1) ▪ Label can be removed and aluminium tube / label recycled separately (1) ▪ Allows tube to be bulk purchased and customised with a label (1) ▪ Standard tube can be used for any colour (1) ▪ Easier to print onto paper than aluminium (1) <p style="text-align: right;">1 x 1</p> | (1) |

| Question Number | Answer | Mark |
|---------------------|---|------------|
| 14. (a) (ii) | <p>Two explanations from:</p> <ul style="list-style-type: none"> ▪ Aluminium is ductile / malleable /flexible (1) which means it will be able to be squeezed / rolled up to get the paint out (1) ▪ Aluminium will not rust or react (1) which means it will stay the same colour /not spoil or interfere with the paint inside (1) ▪ Aluminium is lightweight (1) which means that the paint tubes will not be too heavy to carry around / add the excess / unnecessary weight (1) ▪ Aluminium is airtight (1) meaning the paint will not dry out (1) <p style="text-align: right;">2 x 1 2 x 1</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 14. (b) | <p>Two explanations from:</p> <ul style="list-style-type: none"> ▪ The colour of the pigment can be changed when moulding (1) therefore it can match the colour of the paint inside (1) ▪ Small complex shapes can be achieved / textures included (1) which means great detail can be added to the screw caps (1) ▪ Thousands of tubes of paint are made (1) and injection moulding is a mass production process which can meet the demand (1) ▪ High levels of accuracy can be achieved (1) which is important as a screw thread is moulded into the cap (1) ▪ Little surface finishing is required (1) which saves production time / difficult to carry out on small parts (1) ▪ Identical components are formed each time (1) which is important as the tubes will be identical and so will fit (1) ▪ The caps are quite small (1) and therefore several can be moulded at once in the same mould (1) ▪ Textures can be included (1) so the cap is easier to grip (1) <p>Do not accept reference to 'speed' or 'cost'</p> <p style="text-align: right;">2 x 1 2 x 1</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 14. (c) | <p>Two reasons explained from:</p> <ul style="list-style-type: none"> ▪ It will give a quality feel to the product / gloss finish (1) therefore improve perception / increase sales (1) ▪ It make the colours on the box more shiny (1) making it look like real paint / more realistic look(1) ▪ It will help protect the printed colour (1) making the box more durable / resistant to scratching (1) ▪ The varnish can be applied in 'spots' (1) so as to make certain areas more attractive / stand out (1) <p style="text-align: right;">2 x 1 2 x 1</p> | (4) |

| Question Number | Answer | Mark |
|------------------------------|---|------------|
| 14. (d) QWC | <p>Indicative content Discussion to address the following issues:</p> <p>Advantages</p> <ul style="list-style-type: none"> ▪ Can be used for a one-off and is cost effective as such ▪ Stencils are easily produced, can be cut by hand from paper or photo-emulsion technique ▪ It is a versatile process in that it can print on a variety of surfaces / media and can be used to print on circular objects ▪ Can be fully automated for long production runs ▪ The inks used are very durable ▪ the colours are extremely vivid/precise <p>Disadvantages</p> <ul style="list-style-type: none"> ▪ Requires quite a long time for inks to dry ▪ Difficult to achieve fine photographic detail ▪ Requires several screens, one for each colour ▪ Can be difficult to ensure correct registration when using numerous colours and so some blurred or fuzzy edges can occur ▪ takes a long time to set up a job ▪ screens have limited lifespan ▪ difficult to mix colours accurately to simulate smooth gradients and other effects. | (6) |

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|---------|------|--|
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