

Mark Scheme (Results)

Summer 2015

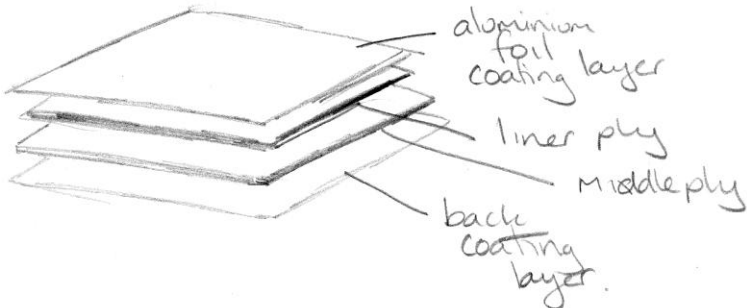
Pearson Edexcel
GCE in Graphic Products
6GR02/01

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) | One of the following: <ul style="list-style-type: none"> • Fire extinguisher (1) • Location of fire equipment (1) • Fire fighting equipment (1) • Location of fire fighting equipment (1) <p style="text-align: right;">(1 x 1)</p> | (1) |
| 1(b) | Award one mark for each different property. Properties must be appropriate for the heading <p>Functional properties</p> <ul style="list-style-type: none"> • Can be printed on (1) • Waterproof (1) • Durable / does not wear easily (1) • Can be fixed to a wall with mechanical fixings (1) • Can be drilled (1) • Can be laminated (1) • Can be engraved (1) • Lightweight (1) • Easy to clean (1) <p>Do not award a mark for 'rigid'</p> <p>Aesthetic properties</p> <ul style="list-style-type: none"> • Available in a range of colours (1) • Range of surface finishes possible, eg matte/gloss etc.(1) • Smooth (1) • Can be laminated (1) • Can be engraved (1) • Shiny (1) • Self finishing (1) • Can be printed on (1) <p>Do not award mark for duplicated answers.</p> <p style="text-align: right;">(2 x 1)</p> | (2) |

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| 1(c) | Award one mark for each valid point <ul style="list-style-type: none"> • Pigments allow the sign to glow in the dark (1) • Light energy is absorbed/charged during daylight (1) • Absorbed energy/light is released when it is dark (1) • Means no further illumination is needed (1) • Signage becomes more visible in low light conditions (1) • Still visible during a power cut or in emergency lighting conditions (1) <p style="text-align: right;">(3 x 1)</p> | (3) |
| Total for question | | 6 |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 2(a) | <div style="text-align: center;">  </div> <p>Award 1 mark for each of the following:</p> <ul style="list-style-type: none"> • Sketch showing at least three flat layers (1) • Liner and/or middle ply labelled (1) • Outer foil shown and backing layer/board labelled (1) <p>Do not award marks if only 1 layer is shown and annotated as 'foil'</p> | (3) |

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| 2(b) | <p>To gain full marks, both cartridge and layout paper need to be considered. If only one, award a maximum of 3 marks. If no examples of uses are suggested, award a maximum of 3 marks.</p> <p>Cartridge paper</p> <ul style="list-style-type: none"> • Ideal for drawing / sketching (1) • printing (1) • Accepts a wide range of media / paint / markers etc(1) • Could be used for making lightweight, simple models (1) • Suitable for presentation / final design work (1) <p>Layout paper</p> <ul style="list-style-type: none"> • Used for overlays / copying images / transposing images (1) • Can be used for tracing an amending existing designs (1) • Ideal for initial/outline sketch work (1) • Suitable for formal layout/orthographic/engineering /architectural drawings (1) • Can be used with most media / pens / markers / rendering pens (1) <p style="text-align: right;">(2x2) (3+1)</p> | (4) |
| Total for question | | 7 |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 3(a) | <p>Award one mark for one point, and a further mark for justification.</p> <ul style="list-style-type: none"> • Relatively easy to cut/shape/work with (1) with simple tools and equipment / therefore faster/cheaper (1) • Can have a very smooth surface if shaped with hot wire cutter (1) which gives a higher quality model (1) • Relatively low cost in comparison to other materials (1) allowing different ideas to be modelled/edit ideas/ trial options which keeps development costs low (1) • Does not need specialist equipment (1) which minimizes cost (1) • Waste offcuts can be used to model smaller components (1) which minimizes waste (1) • Allows block models to be produced quicker (1) compared to other materials (1) <p>Do not accept lightweight</p> <p style="text-align: right;">(2 x 1)</p> | (2) |

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3(b)(i-iv)

Award 1 mark for each correct answer in each section (maximum 4 marks)

Points must be relevant for the application

| Material | Purpose | Advantages | Disadvantages |
|----------|---------------------------------------|---|---|
| Jelutong | For making the main body of the model | (i) <ul style="list-style-type: none">• Straight grain (1)• Smooth texture for modelling (1)• Easy to cut / work (1)• Can be machined (1)• Durable (1)• Can apply a range of finishes (1) (1) | (ii) <ul style="list-style-type: none">• Sap can blunt tools (1)• Fine detail not always possible (1)• Relatively expensive(1)• Non renewable timber (1)• High transport costs/carbon footprint (1) (1) |
| PVC | For making the lid for the model | (iii) <ul style="list-style-type: none">• Can be vacuum formed (1)• Can be shaped/formed using heat (1)• Range of colours available (1)• Self finishing/ Smooth/ Shiny (1)• Relatively inexpensive (1)• Waterproof (1) (1) | (iv) <ul style="list-style-type: none">• Can be brittle (1)• Requires formers to be made (1)• Produced from fossil fuels/non-renewable sources (1)• Can be easily scratched (1)• Difficult to recycle (1)• Pollution can be caused during production (1) (1) |

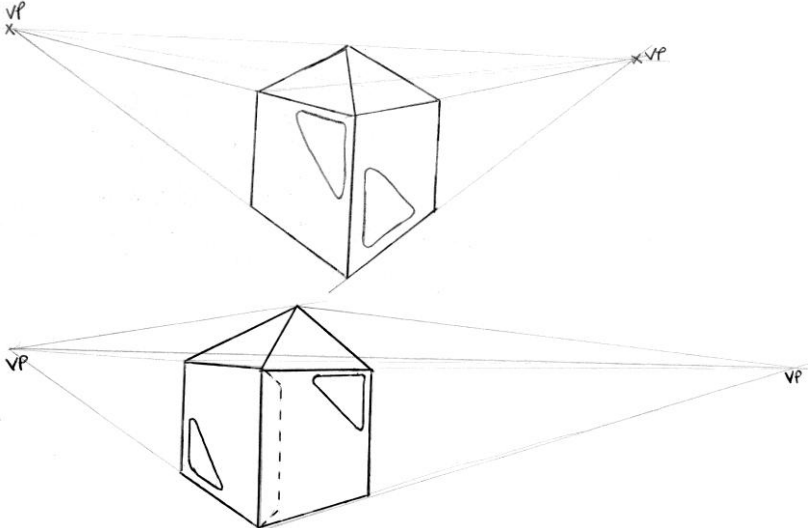
(4)

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| 3(c) | <p>Award one mark for each appropriate named method, and further marks for expansion.</p> <ul style="list-style-type: none"> • Use of rapid prototyping (1) which converts a computer design into a 3D outcome (1) • 3D printing (1) which builds up a model in layers /from melted polymers (1) • Stereolithography (1) ultraviolet (UV) laser moves through a tank of resin which hardens when exposed to UV light (1) • Laminated object modelling (1) is created by gluing together many layers of card or plastic sheet (1) • Selective laser sintering (1) uses a high-power carbon dioxide laser to fuse powder into the finished model (1) • CAM/CNC machines (1) has a cutting tool which removes material from a solid block (1) • Laser cutter (1) to cut parts out to allow a model to be made (1) <p>Do not accept CAM unless a specific piece of equipment is named. Do not accept virtual or CAD modelling – these do not produce block models.</p> <p style="text-align: right;">(2x2)</p> | (4) |
| Total for question | | 10 |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 4(a) | <p>Award one mark for each valid point, up to a maximum of 4 marks:</p> <ul style="list-style-type: none"> • Low power use reduces need for large batteries/battery will last a long time (1) • Low energy use/low power consumption/only needs a small current (1) • Very wide range of colours can be displayed (1) • High quality/more vibrant colour (1) • Lack of flicker with images/Higher quality image/better graphics/ sharper images/higher resolution / smaller pixels (1) • Allows for miniaturisation of entire product (1) • Thin display allows for thinner/smaller console (1) • Reduced weight allows consoles to be hand-held (1) • Widespread availability has reduced cost of LCD screens (1) • Wider viewing angles possible (1) • Improved visibility for outdoor use (1) <p style="text-align: right;">(4 x 1)</p> | (4) |

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| <p>4(b)</p> | <p>Award 1 mark for each valid point:</p> <ul style="list-style-type: none"> • Simpler/quicker than other named forms of binding (1) • Pages are stapled through the fold in the booklet which allows booklet to lie flat (1) • Does not add significant cost to the booklet/inexpensive process (1) • Suitable for booklets with an even number of sheets(1) • Suitable for booklets with an limited number of sheets(1) • Can be produced by an automated/computerised process (1) • Can be printed and bound by the same equipment (1) • booklet not designed to last a long time /does not have to be particularly durable (1) <p>Give a mark for a relevant comparison to a named example of other bindings eg perfect/treasury tags etc.</p> <p style="text-align: right;">(3 x 1)</p> | <p style="text-align: right;">(3)</p> |
| <p>4(c)</p> | <p>To gain full marks, both thermoplastics and recycled board need to be considered. If only one, award a maximum of three marks</p> <p>Thermoplastics:</p> <p>Pros</p> <ul style="list-style-type: none"> • Can be formed into complex shapes (1) • Can mould to the specific contours of the console (1) • Absorbs some impact (1) • Will not degrade over time (1) • Available in a range of colours and finishes (1) • Provides a strong/durable/rigid structure to hold the console (1) • Can be moulded into thin walled inserts making it lightweight (1) • Can be reheated/reformed/recycled and used again (1) <p>Cons</p> <ul style="list-style-type: none"> • Made from finite resources (1) • Contributes to landfill (1) • Large amounts of energy used in production (1) • Production causes pollution/fumes to be released (1) • Not easy to recycle (1) • Brittle (1) <p>Recycled board</p> <p>Pros</p> <ul style="list-style-type: none"> • Often carbon neutral (1) • Can be formed into simple shapes (1) • Absorbs impact well/has some strength (1) • Will biodegrade (1) • Does not use finite resources/more sustainable source/renewable (1) • Is seen as environmentally/eco friendly (1) • Can be recycled again after use (1) | <p style="text-align: right;">(4)</p> |

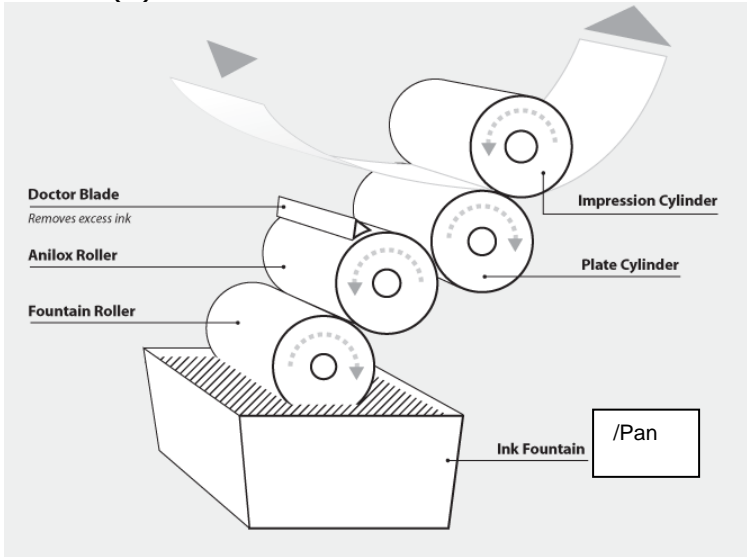
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| | <ul style="list-style-type: none">• Lightweight (must be qualified) (1) <p>Cons</p> <ul style="list-style-type: none">• Over time it will degrade (1)• Perceived low quality(1)• Single grey colour/low aesthetic appeal (1)• Harder to create precise shapes (1) <p>Do not accept reference to cost of material as too variable.</p> | |
| | Total for question | 11 |

| Question Number | Answer | Mark |
|--------------------|---|-------------------|
| <p>5(a)</p> | <p>Award 1 mark for each of the following:</p> <ul style="list-style-type: none"> • 2 point perspective drawing showing construction details (1) • Correct shape and proportion of the packaging (1) • Pyramid top <i>or</i> closed bottom (as perspective dictates) (1) <p>Then award further marks for the following:</p> <ul style="list-style-type: none"> • Windows - correct location and orientation (1) • Windows - correct shape and size (1)  <p>If the drawing is not a 2 point perspective drawing, award a maximum of two marks.</p> <p style="text-align: right;">(5 x 1)</p> | <p>(5)</p> |
| <p>5(b)</p> | <p>Award one mark for each valid point, up to a maximum of 3 marks:</p> <p>Pros</p> <ul style="list-style-type: none"> • Excellent printing qualities (1) • Very strong/rigid (1) • Able to protect the product (1) • Will not contaminate products (1) • Can be die cut – fast production (1) • Adds to quality of the product (1) • Light weight in comparison to other types of packaging (1) <p>Cons</p> <ul style="list-style-type: none"> • Expensive to buy (1) • Made from virgin / bleached pulp (1) • Hard to bend so difficult to form the pyramid(1) <p style="text-align: right;">(3 x 1)</p> | <p>(3)</p> |

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| <p>5(c)</p> | <p>Any point (1), with development (1). Maximum of two statements without any justifications.</p> <ul style="list-style-type: none"> • Only economical for short runs of up to 100 (1) making it inefficient for large scale production (1) • Screen printing leaves a thick layer of ink (1) and so is unable to print fine detail (1) • Slow process as different screens needed for different colours (1) which is very labour intensive (1) • More efficient methods (1) such as lithography (1) are available • Once the nets have been tessellated (1), very difficult to achieve accurate alignment of the photo images (1). • The ink does not dry quickly/takes a long time to dry (1), therefore cannot be handled immediately/image is prone to bleeding (1). • Expensive to produce stencils (1), quality of image will deteriorate (1). • It isn't a continuous process (1), it would take a lot of time to produce the packaging (1). • The colour(s) can become inconsistent (1), therefore the images will not be a high quality throughout/inconsistent (1). <p style="text-align: right;">(2 x 2)</p> | <p>(4)</p> |
| Total for question | | 12 |

| Question Number | Answer | Mark |
|--------------------|--|------------|
| <p>6(a)</p> | <p>To gain full marks four valid points must be noted.</p> <ul style="list-style-type: none"> • Tin is used as a protective layer for steel (1) • Chances of corrosion are reduced /does not rust(1) • Does not react with liquid inside (1) • Does not change flavour of the contents (1) • Non-toxic (1) • Does not significantly add to the weight of the product /lightweight material (1) • Can be recycled (1) • Adds an attractive / shiny layer to the can (1) • Barrier to air/moisture/chemicals / contamination(1) • Tin is readily available (1) <p style="text-align: right;">(4 x 1)</p> | (4) |

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| <p>6(b)</p> | <p>In order to gain full marks, there should be a consideration of the validity of continuous production for cans for baked beans.</p> <p>Pros:</p> <ul style="list-style-type: none"> • Allows for constant production 24/7 (1) • Company can meet the market demands/continuous demand for products (1) • Uses automated equipment for the manufacturing (1) • Automated systems check quality (for holes etc) (1) • Materials used are compatible with continuous production methods (1) • Materials are readily available (1) • All cans will be the same size/shape/identical (1) • Low unit costs/economies of scale (1) • High/consistent quality products produced/reduces human error (1) • Reduces labour costs (1) • Set up costs are recovered quickly (1) <p>Cons:</p> <ul style="list-style-type: none"> • Requires a high capital investment/high set up cost (1) • Reduces employment possibilities (1) • Only offers low paid, unskilled jobs (1) • Cannot quickly respond to changes in demand (1) • Cannot be used for alternative products (1) • Changes to the can design cannot be made easily (1) • Break downs/faults would halt production (1) <p>Reference to at least one pro and one con for maximum marks.</p> <p style="text-align: right;">(6 x 1)</p> | <p style="text-align: right;">(6)</p> |
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| <p>6(c)</p> | <p>Award marks as follows (maximum 3 marks):</p> <ul style="list-style-type: none"> • Accurate drawing showing 4 cylinders (1) • Media shown passing between impression cylinder and plate cylinder (1) • Ink pan/fountain (sources ink for fountain roller) (1) <p>Then award marks as follows for features being identified or described (maximum 2 marks):</p> <ul style="list-style-type: none"> • Anilox roller (1) • fountain roller (1) • Plate roller (1) • impression cylinder (1) • Doctor blade (1)  <p style="text-align: right;">(5 x 1)</p> | <p>(5)</p> |
| Total for question | | 15 |

| Question Number | Answer | Mark |
|--------------------|---|------------|
| <p>7(a)</p> | <p>Award one mark for each valid point</p> <ul style="list-style-type: none"> • Sets international standards for product testing(1) • Sets company standards/quality assurance such as ISO9000 family (1) • National standards are based on ISO standards (1)/ BSI standards are created collaboratively with ISO (1) • Provides compatibility of consumer products between countries throughout the world (1) • Sets the standards which, if met, ensure products are safe/fit for purpose (1) • Technical standards are often applied to products globally (1) • Produces technical reports, guides and specialist publications to communicate quality standards (1) <p style="text-align: right;">(3 x 1)</p> | (3) |

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| <p>7(b)</p> | <p>A balanced response should be put forward. Candidates may respond in the negative, if so they should be rewarded accordingly.</p> <p>Pros</p> <ul style="list-style-type: none"> • Aim is to make products 'right first time' (1) • Reduces cost of wastage from faulty goods (1) • Covers all aspects of the design and manufacturing (1) • Records are kept of all production stages (1) • Raw materials are only sourced if they meet standards /high quality material used (1) • Suppliers of materials should also be reputable / approved (1) • Equipment is monitored to make sure it functions correctly (1) • Increases customer satisfaction (1) • Regular checking/inspections / quality is monitored throughout design and manufacture (1) • Improved product quality improves reputation of the business (1) • Improved reputation leads to increased sales (1) • Process can be transferred across to other products (1) • Improved job satisfaction for employees (1) • Staff receive more training (1) • Shorter production times / more efficient/reduced lead time (1) <p>Cons</p> <ul style="list-style-type: none"> • Increases costs in development of flawless product (1) • Employees can be resistant to changes (1) • Time consuming/slow process to introduce (1) • Testing/inspections can be expensive (1) • Cost of introduction may outweigh the savings made (1) <p style="text-align: right;">(6 x 1)</p> | <p style="text-align: right;">(6)</p> |
| | <p>Total for question</p> | <p>9</p> |