

Mark Scheme Summer 2016

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

Paper 01: Knowledge and Understanding



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 No alternatives | (1) |
| Question Number | Answer | Mark |
| 2 | C No alternatives | (1) |
| Question Number | Answer | Mark |
| 3 | A No alternatives | (1) |
| Question Number | Answer | Mark |
| 4 | C No alternatives | (1) |
| Question Number | Answer | Mark |
| 5 | B No alternatives | (1) |
| Question Number | Answer | Mark |
| 6 | C No alternatives | (1) |
| Question Number | Answer | Mark |
| 7 | B No alternatives | (1) |
| Question Number | Answer | Mark |
| 8 | C No alternatives | (1) |
| Question Number | Answer | Mark |
| 9 | D No alternatives | (1) |
| Question Number | Answer | Mark |
| 10 | D No alternatives | (1) |

| Question Number | Answer | | Mark |
|--------------------|--------|----------------------------------------------------------------------------------------------------------------------------------|------|
| 11. (a) | | | |
| | Use | Repeating curves without having to construct them / joining up points / creating curves / constructing ellipses / drawing curves | |
| | Name | Adjustable (set) square (1) | |
| | | (Only answer) | |
| | Name | Surform / surform plane (1) | |
| | | (Only answer) | |
| | | (DO NOT accept 'plane' on its own) | |
| | Use | Attached to products for security / identification / tracking / anti-theft purposes / defect / store information | |
| | | (1) | (4) |

| Question Number | Answer | Mark |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 11 (b) (i) | Two reasons given from: 1. Available in many colours (1) 2. Comes in flat sheets (1) 3. Resistant to cleaning chemicals / easily cleaned (1) 4. Is easily machined / cut / drilled / laser cut/ shaped (1) 5. Self-finishing / does not need any surface finish applied (1) 6. Durable/ long lasting (1) 7. lightweight so easy to attach to wall (1) 8. rigid (1) 9. shiny aesthetic look (1) 10. smooth surface that vinyl will stick to very well (1) 11. waterproof / corrosion resistant (1) | (2) |

| Question | Answer | Mark |
|------------|--------------------------------------------------------|------|
| Number | | |
| 11(b) (ii) | Three reasons given from: | |
| | 1. Overcomes a language barrier (1) | |
| | 2. Does not use a specific written language (1) | |
| | 3. People from other countries / nationalities will be | |
| | able to understand what the sign means (1) | |
| | 4. Some people cannot read / easier to read if have | |
| | bad vision(elderly) (1) | |
| | 5. Easy to identify for young children (1) | |
| | 6. Standard international conventions can be used / | |
| | pictograms (1) | |
| | 7. Easier to see/read / recognise from a distance | |
| | (1) | |
| | 8. Can recognise intent faster/ quicker and easier | |
| | to understand (1) | |
| | 9. Symbol can represent message that would | |
| | require too many words for size of sign (1) | |
| | 3 x 1 | |
| | | (3) |

| Question Number | Answer | Mark |
|--------------------|----------------------------------------|-----------------------|
| 11(b) (iii) | Two methods given from: | |
| (5) () | 1. Screen printing (1) | |
| | 2. Glue on pieces / components | s (1) |
| | 3. Hand painted / sign writing | 7 7 |
| | 4. Intaglio printing (1) | |
| | 5. Transfer printing (1) | |
| | 6. Etching (1) | |
| | 7 . Engraving (1) | |
| | 8. Laser cut (1) | |
| | 9. Pad printing (Tampography) | (1)/ stamping (1) |
| | 10. Colour sublimation print | . • |
| | 11. Spray paint and stenci | (2) |
| | 12. could hand cut vinyl w | rith scalpel/scissors |
| | (1) | · |
| | 13. Flexography (1) | |
| | | 2 x 1 |

| Question | Answer | Mark |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Number 11 (b) (iv) | Two advantages explained from: 1. The file can be saved (1) which means it can be recalled and cut again (1) 2. The file can be sent electronically (1) which will save time and money / no need for anyone to visit / can be posted (1) 3. The file can be easily modified (1) which means the font can be changed / size increased / decreased (1) 4. The file can be cut time after time (1) therefore it will be identical (1) 5. The file will be cut faster on the machine (1) which means it will be cheaper / more viable than cutting it or painted it by hand /more cost efficient as lower labour costs (1) 6. Ideal for one-off/batch/small scale production (1) because all the parameters such as spacing and size will be set up by the CAD software (1) 7. Customers can design their own signs on line (1) which means they can email them / reduce design costs (1) 8. Images / logos can be printed in complex colours onto vinyl (1) which means effects / colour gradients can be achieved that would be difficult / time consuming by hand (1) 9. Once set running the vinyl cutter can be left to its own devices (1) which means time can be spent doing other things / more efficient use of time (1) 10. Vinyl cutter provides a cleaner / more precise cut (1) improving the quality/ more accurate of the final outcome (1) 11. The symbol matches the design exactly (1) therefore it will be more accurate (1) | (4) |
| | 2 x 1 | |

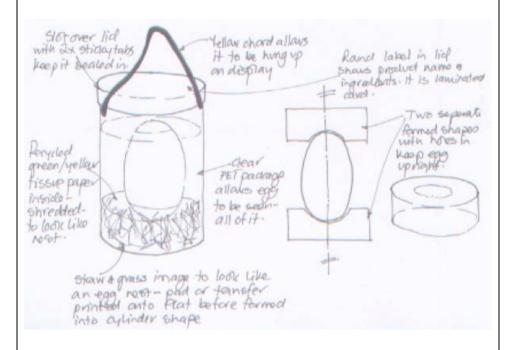
| Question Number | Answer | Mark |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 11. (c) | Two advantages described from: 1. They can try different colours / fonts (1) to reflect brand / identity (1) 2. They can change size (1) to suit the space available (1) 3. They can design / edit their own sign anywhere (1) which means they can do it in their own time (1) 4. It will be cheaper for them (1) as they are not having to pay for a specialist to design it / as the website contains all the tools they need to design it (1) 5. They can update their own design (1) once they have taken user feedback / views of others (1) 6. They can import their own logos (1) so that their sign will be unique (1) 7. They will get an immediate price (1) which will allow them to compare prices / make a decision / shop around suppliers (1) 8. They will be able to make signs in native languages (1) which some companies might not be able to do / get spellings wrong / not have letters on keyboards (1) 9. They will be able to use their own mobile device /iPad/ mobile (1) so they can design it wherever they like (1) 10. They will be able to upload their own design / do not have to incur postage costs (1) which means it can be made and sent in the post / they will see the final design instantly (1) 11. Reduced lead time for the signs (1) as the design is sent directly to the manufacturer (1) (Do not accept anything related to 'Fast/speed of connection') | (4) |
| | 2 x 1 | |

| Question | Answer | Mark |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <u>Number</u> 12. | Design idea 1 | |
| 12. | Candidates may answer any specification point in either graphical form or by annotation. | |
| | No marks are awarded for the quality of graphical communication. | |
| | Hold the egg upright | |
| | e.g. vacuum formed tray / discs with holes in | |
| | Allow the egg to be seen | |
| | e.g. window in box / carton / clear box/ hole | |
| | Have a closable lid | |
| | e.g. tab on box lid / separate lid that slots over | |
| | Show a graphic image to reflect an egg theme | |
| | e.g. chicken / egg / nest | |
| | Allow it to be hung up on display in a shop | |
| | e.g. string / cut out hole/ tab | |
| | Use a recyclable material | |
| | e.g. specific named material carton board , shredded paper / named thermoplastic | |
| | Use a commercial method of printing | |
| | e.g. offset lithography / flexography / pad / transfer | |
| | Use a commercial finishing technique | |
| | e.g. varnishing / hot foil blocking / laminating | |
| | Idea 1 | |
| | The chicken wings have back for an main lack to seal it closed to make to seal it closed to make them standow allows easy to be ason. Chicken graphic with flaggraphy cost out so it can be hung up an a stisplay printed an evide of box. Box is made from | |

8 x 1

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

(16)

| Question Number | Answer | Mark |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 13. (a) | Two properties given from: Plasticity / fluidity (1) Flexibility (1) Inert (1) Weather resistant / does not rot (1) Chemical resistant / does not corrode / does not rust (1) Lightweight (1) Tough / impact resistant (1) Durable / robust (1) Range of colours available (1) | (2) |
| | (Do not accept can be recycled or moulded) (Do not accept strong) 2 x 1 | |

| Questio | Answer | Mark |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| n | | |
| Number | | |
| 13. (b) | One reason described from: Lighter (1) which makes it easier to carry (1) Will not rust (1) unlike steel which contains iron (1) Can be injection or blow moulded (1) which you cannot do making it very difficult to manufacture (1) Self-finishing material (1) but steel will need a surface finish applying to stop it rusting (1) More comfortable to hold in cold (or hot) weather (1) as PVC is a better insulator of heat (1) More ergonomic container can be produced (1) as steel would have sharp corners/edges (1) More cost effective (1) as material and processing costs are cheaper than steel (1) | (2) |
| | 2 x 1 | |

| | Question Number | Answer | Mark |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 13. (c) 1. Model can be emailed / exported (1) straight to a 3D printer / prototype / output devices / manufacturer / for other opinions (1) 2. Design can be edited (1) reducing the need to start new drawings / so changes can be made to shape / size / colour (1) 3. 3D model / image (1) can give / create a much better visual representation (1) 4. Virtual model (1) can be tested on screen / simulated tests to destruction / manufacture time (1) 5. Surface textures can be added (1) allowing a client to get a better idea of what it looks like (1) 6. Standard components parts / lid (1) can be imported from library bank from previous projects (1) 7. Design/editing tools in software make certain tasks quicker (1) as accurate dimensions can be entered / can zoom in to work on details (1) | 13. (c) | 3D printer / prototype / output devices / manufacturer / for other opinions (1) 2. Design can be edited (1) reducing the need to start new drawings / so changes can be made to shape / size / colour (1) 3. 3D model / image (1) can give / create a much better visual representation (1) 4. Virtual model (1) can be tested on screen / simulated tests to destruction / manufacture time (1) 5. Surface textures can be added (1) allowing a client to get a better idea of what it looks like (1) 6. Standard components parts / lid (1) can be imported from library bank from previous projects (1) 7. Design/editing tools in software make certain tasks quicker (1) as accurate dimensions can be entered / can zoom in to work on details (1) | (2) |

| Question Number | Answer | Mark |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 13. (d) (i) | One explanation from: 1. Collection box is sealed (1) only allows money to exit through the top if held upside down and shaken (1) 2. Collection box opening is small (1) making it difficult for a hand to enter/money to fly out (1) 3. Material is tough / impact resistant / durable (1) to protect money inside if it is dropped (1) to stop the box being broken into/ will not break if it is dropped (1) | |
| | 4. Sealed container / lid (1) will stop the money falling out (1)(Do not accept any repeat of the stem) | (2) |
| | 2 x 1 | |

| Question Number | Answer | Mark |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| | One explanation from: Anthropometrics / ergonomics (1) are used to determine size of collection box(1) Average hand measurements (1) are used to determine the size/shape/ergonomics/design of the collection box (1) Smooth / conical / cylindrical tapered shape (1) fits into the grip / shape of the hand / makes it easy to hold (1) Narrow centre section (1) allows the weight of the container to rest on the hand (1) | (2) |
| | (Do not accept any repeat of the stem) 2 x 1 | |

| Question | Answer | | Mark |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Number 13. (e) QWC | Evaluate container A and confollowing specification criter Performance requirements Form – why is the product seemed and conformation of the product seemed and conformation | ia Form and its | |
| | Container A Tapered shape so it fits in the hand easily / comfortably Can be shaken to make a noise with coins inside to draw attention to collector Has a chord attached so it can be hung up Base will be heavy with coins in so it is stable Small space taken up if left on a counter top Easily recognised as a collecting tin for charity Shape of inset lid means coins will fall down into the container Stickers or graphics can be added around the diameter of the container | Can be sent flat pack in the post and assembled at destination Shaped like a house perhaps for a housing charity (in this case for animals) Larger flat base for stability Large surface area for advertising Slot in roof top to put money in Graphics could be edited to suit any sort of housing charity | |
| | Performance requirements considerations that must be product? | | |
| | Container A Money must be kept safe and secure inside the container Must not fall over if it gets too heavy Must retain money if shaken to make a noise | Container B Flat packed so it can be sent in the post easily Must be easily assembled and must keep the money inside without falling out | (6) |

| lid off once the collection is over • Waterproof so that it can be used outside • Must not break if dropped | size easier / cheaper than container A Must be recyclable Less easy to access the money |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|

| Level | Mark | Descriptor |
|----------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 0 | No awardable 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 the rules of grammar with limited accuracy. |
| 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. |

^{*[}Level 3 answers must refer to both form **and** performance requirements]

| Question | Answer | Mark |
|-------------|-----------------------------------------------------------------------------------|------|
| Number | | |
| 14. (a) (i) | Two advantages given from: | |
| | 1. Can be worked easily with hand and power tools | |
| | / can be laser cut (1) | |
| | Can be joined with PVA / other glues / nails and screws (1) | |
| | Can be painted / stained / varnished/ achieve high quality (1) | |
| | Can take a variety of patterned paper surface finishes (1) | |
| | 5. Straight grained / fine textured / few knots (1) | |
| | 6. Resists warping or twisting (1) | |
| | 7. Durable material (1) | (2) |
| | 8. Lightweight (1) | |
| | 2 x 1 | |

| Question Number | Answer | Mark |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 14 (a) (ii) | Two advantages described from: 1. Quick to cut / shape (1) which means profiles / curves can be achieved (1) 2. Can be cut on band saw / hot wire cutter (1) which results in a smooth surface (1) 3. Can be shaped / smoothed easily with glass paper (1) which creates rounded shapes / profiles (1) 4. Available in a range of thicknesses (1) which means larger blocks / shapes can be achieved (1) 5. Stable / will not warp / twist (1) which means it will keep its shape (1) 6. Surface finishes can be applied (1) which means realistic finishes / aesthetics (1) 7. Lightweight / low density (1) which means it is easily moved / transported (1) 8. Can be joined / glued with PVA (1) which means shapes / profiles can be achieved (1) | (4) |

| Questio | Answer | Mark |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| n | | |
| Number | | |
| 14(b)(i | Three disadvantages given from: | |
|) | They are time consuming to make / wait a long time (1) – including to repair/ replace They require specialist skills / highly skilled operatives to make them (1) They are quite expensive to make / time / skills (1) | |
| | 4. They are difficult to adapt / update given feedback (1) 5. They are labour intensive to make (1) | |
| | 3 x 1 | (3) |

| Question Number | Answer | Mark |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 14(b)(ii) | Two advantages explained from: Can be produced quickly (1) therefore models can be sent out to client faster (1) Can be left to run overnight / 24/7 without human supervision (1) which means the process is more cost effective in comparison to having a model made by hand / reducing the need for skilled model makers (1) time effective Parts can be printed individually (1) which means that small parts can be sent to the client and assembled to make a bigger model (1) Many parts can be printed from the same file (1) therefore they will be the same size / more accurate than being made by hand (1) Different colours can be used for different parts (1) so trees / bushes are more realistic/ repeatability (1) Files can be sent anywhere (1) for client to print on their own machine (1) The model will be accurate /match CAD file perfectly (1) because a 3D printer can print complicated / intricate shapes (1) hollow Reduced material costs (1) as 3D printers produce little or no wastage (1) additive process | (4) |

| Questio | Answer | Mark |
|---------|--------------------------------------------------------------------------------------------------------------------------------|------|
| n | | |
| Number | | |
| 14(c) | Indicative content | |
| | Discussion to address the following issues: | |
| | Advantages: | |
| | More realistic impression / photo realistic that can be walked through | |
| | Allows them to see how the building would react to wind testing / simulations heat flow / flood patterns | |
| | 3. They can model fire evacuation routes | |
| | 4. Can be easily modified and manipulated | |
| | 5. Different designers can be working on different parts that can be added together | |
| | 6. Models can be emailed as files for others to work / comment on | |
| | 7. Files can be output to CAM / 3D printers to make models | |
| | 8. Light and shadows can be applied | |
| | Components can be added from data libraries such as stair cases/doors | |
| | 10.Models can be imported onto Google Maps to see what impact it will have on the surrounding area | 4.53 |
| | 11. Software can be used to generate heating / building costs | (6) |
| | 12. Models can be animated | |
| | 13.Can zoom in to see very fine detail | |
| | 14.Able to generate floor plans / building / construction plans | |
| | 15. can view room/design from any angle | |
| | 16. no need to make a model saving time and money | |
| | 17. possible to edit previous jobs rather than starting from scratch | |
| | 18.no making skills required just a knowledge of CAD | |
| | 19.can show different options/materials easily | |

| Level | Mark | Descriptor |
|---------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 0 | No awardable material |
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| | 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. |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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