

Mark Scheme (Standardisation) Summer 2015

GCSE

GCSE Design & Technology (5GR02/01)



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

| Question | Answer | | Mark |
|----------|------------|---|------|
| Number | | | |
| 11.(a) | | | |
| | (i) Use | Used to cut curves/cut round shapes/thin sheet materials Accept specific sheet material (e.g. MDF/acrylic) NOT e.g. cut wood (1) | |
| | (ii) Name | Flexi Curve Also e.g. 'flexycurve' (1) | |
| | (iii) Name | Hot wire/ Polystyrene cutter Styrofoam cutter E.g. NOT foam cutter / slicer / burner (1) | (4) |
| | (iv) Name | Laser cutter Accept lazer/laser engraver (1) | |

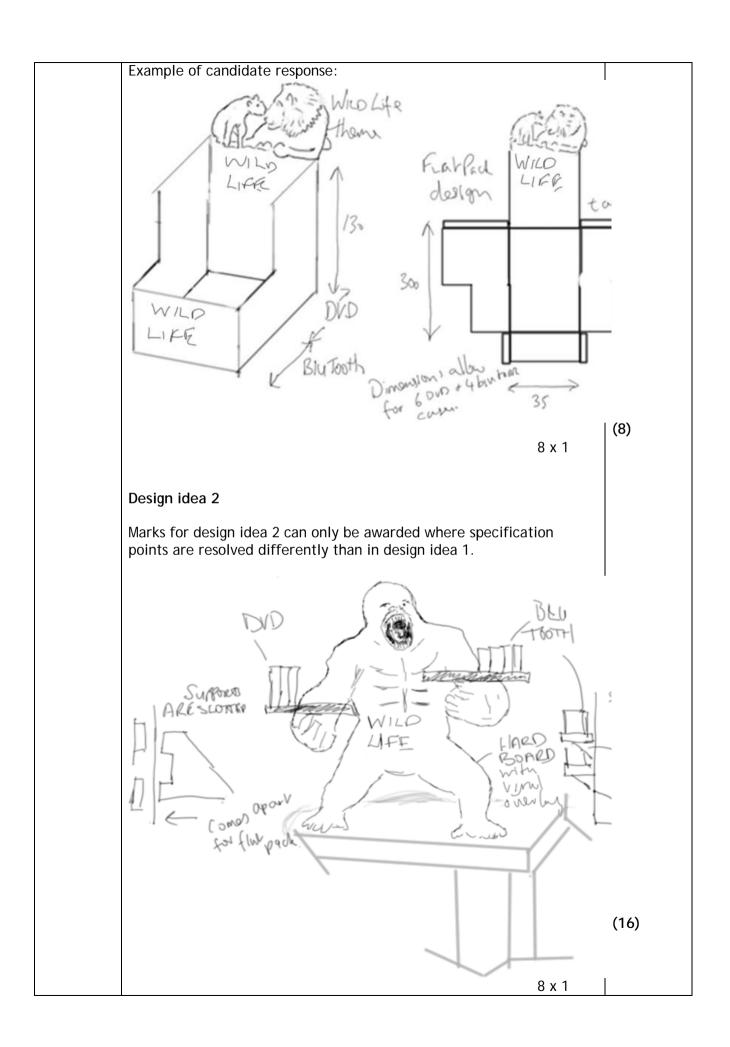
| Question | Answer | Mark |
|---------------------------------|--|----------|
| Question Number 11.(b)(i) | Two properties given from: Hard wearing/durable (1) Rigid (1) Keeps its shape/stable/flat surface (1) Good surface to apply colour/print/image/easily printed (1) Good strength to weight ratio (1) Tactile/has a nice feel (1) No grain/splinters (1) Consistent/uniform structure (1) Impact resistant/toughness (1) Do not accept 'strong' unless qualified Do not accept "can be laser cut" or similar | Mark (2) |
| | Do not accept e.g. easily cut 1 x 1 1 x 1 | |

| Question | Answer Ma | |
|-------------|--|-----|
| Number | | |
| 11.(b)(ii) | Accept correct answers which apply to any scale of production Two reasons given from: • Highly accurate/precise/ensure good fit for jig saw pieces (1) • Reduces waste (1) • Good repeatability (1) • Less/unskilled labour required/reduction of human error (1) • Good production rates (1) • No physical contact saves money on tooling/safer (1) • Adaptable/customisable (1) • Can be cut from CAD files/designed on CAD (1) Do not accept "fast" or speed related unless qualified i.e. compared to another method. Do not accept e.g. cheap | (2) |
| | 2 x 1 | |
| 11.(b)(iii) | Any One disadvantage given from: Expensive machine (1) so unit costs are high/requires frequent use (1) Leaves a burn mark on the edge when cutting wood (1) requiring cleaning/painting/further processing/spoils appearance (1) High maintenance/repair of machinery when cutting wood (1) as filters/mirrors need frequent cleaning (1) When cutting wood can catch fire (1) needs to be supervised/can be dangerous/damages puzzle/equipment (1) Dangerous fumes (1) requiring extraction/damage health (1) Accept slow only if related to batch or mass/high volume production (1) increases costs/limited output (1) | (2) |
| 11.(b)(iv) | Prepare screen (1). Put the stencil/template onto the screen (1) then place screen onto jigsaw (1). Apply the ink to the screen (1) and squeeze ink through mesh (1). Remove screen/allow to dry. (1) Apply further colours using same process (1) Cure (1) Accept references to photo emulsion process e.g. Coat screen - Expose Screen - Rinse | (3) |

| Question Number | Answer | | |
|--------------------|--|-----|--|
| 11.(c) | Any two advantages described from: Designs can be saved electronically (1) for future use (1) Direct link to CAM/copies can be printed if original is lost (1) so that more than one identical product can be produced/so that an exact replica is made of what is on the screen (1) Modifications/edits can be made easily (i.e. size/dimensions/colour) (1) use parts libraries/a range of tools/to meet clients preferences/needs/correct errors/meet specification/faster development/lead time (1) Designs can be sent over the internet (1) to enable collaboration with other designers/customers/faster feedback/development (1) 3D views can be generated (1) to help with final adjustments/present many designs to clients/get a better idea of final design (1) | | |
| | Ideas can be simulated/tested (1) reducing number of faulty products/preventing costly errors (1) Creation of virtual prototype (1) meaning less waste/environmental impact/in order to test (1) Do not accept other references to speed or accuracy Accept any appropriate combination | (4) | |
| | 2 x 2 | | |

| Question Number | Answer | Mark |
|--------------------|---|------|
| 11.(d) | One effect given from: Less workers required (1) so people can lose their job/redundancy (1) Different/less skills required (1) re-training of workforce/ difficulty to adapt/uncertain of change (1) Less specialism/more team work (1) emotional effects on work force/new skills needed (1) Workers need to be more flexible (1) which makes them more employable/can result in better salaries/job satisfaction (1) Safer/cleaner technology than traditional methods (1) less accidents/better working conditions (1) | (2) |
| | 2 x 1 | |

| Question | Answer | Mark |
|----------|---|------|
| Number | Design idea 4 | |
| 12. | Design idea 1 | |
| | Candidates may answer any specification point in either graphical | |
| | form or by annotation. | |
| | | |
| | No marks are awarded for the quality of graphical | |
| | communication. | |
| | Hold 6 DVD appearand 4 Plu Poy appear | |
| | Hold 6 DVD cases and 4 Blu Ray cases e.g. drawing shows appropriate space/volume through | |
| | dimension(s) or annotations | |
| | Do not just accept 6+4 unsupported rectangles – must | |
| | explain/show graphically how it's held e.g. | |
| | recesses/shelves/racks/box/pouches/compartments | |
| | Accept exact sizes | |
| | Clearly displays the front cover for both formats a generate compartments/shalf/pauch for each format | |
| | e.g. separate compartments/shelf/pouch for each format DVD/Blu-Ray covers should be facing forward, clearly visible | |
| | or able to face forward e.g. rotation | |
| | Alternative methods e.g. poster of front covers | |
| | second idea must have different arrangement/method | |
| | Allow easy removal and replacement of the cases | |
| | e.g. one side of compartment open/finger cut outs or | |
| | holds/remove back to restock/angle display | |
| | Be stable e.g. flat bottom/wide base/weighted/centre of gravity over the | |
| | middle of base | |
| | Be easy to assemble | |
| | e.g. large simple pieces/push fit/glue/fold together from one | |
| | piece - draw a net | |
| | accept reference to e.g. slot together/tabs or similar | |
| | Have a wild life theme A discussion above an inval/plant above drawn/out out. | |
| | e.g. drawing shows animal/plant shapes drawn/cut out shapes, accept different animal pictures/shapes with no | |
| | technical detail | |
| | Accept non-specific e.g. applied graphic and shaped/formed | |
| | component | |
| | Use a commercial method of manufacture | |
| | e.g. name the commercial method to be used through | |
| | annotation Accept methods of printing, cutting or forming/laser/line bending | |
| | Be made from materials appropriate to the manufacturing | |
| | method | |
| | e.g. identify materials to be used e.g. box board, corrugated | |
| | card, aero ply, hard board, acrylic, etc. Material must be | |
| | appropriate to the method specified | |
| | Accept suitable material even if the process has not been | |
| | identified or is incorrect. Do not accept card/cardboard | |
| | Do not accept card/cardboard | |
| | | |
| | | (8) |
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| Question Number | Answer | Mark |
|--------------------|--|------|
| 13.(a) | Two properties given and linked justification from: Property: Good material for applying varnish (1) Justification: Protection of contents/non porous/gives a nice appearance (1) Property: good surface for printing (1) Justification: makes the packaging attractive (1) Property: Lightweight (1) Justification: Making product portable/easy to carry around/user friendly/reduce transport costs (1) Property: compostable/biodegradable/able to recycle (1) Justification: will not stay in landfill/making it an environmentally friendly material (1) Property: inert/non-toxic/hygienic (1) Justification: Does not flavour the contents (1) | (4) |
| | Do not accept durable. 2 x 1 2 x 1 | |

| Question Number | Answer | Mark |
|--------------------|--|------|
| 13.(b) | One reason explained from: Shape is ideal for die cutting process (1) high volume demand/keeps unit costs low/cost effective (1) High processing speeds (1) shortens turnaround of job (1) Non specialised equipment can be used/a common press or machine can be used (1) making the process cost effective/cheap (1) One action produces the complete net with scores (1) so ready for printing/immediate assembly (1) High level of demand (1) lots of burgers sold/not reused/thrown away (1) Allows high levels of automation (1) reduces labour costs/more profitable (1) Buy raw materials in bulk (1) reducing unit costs (1) Lower unit costs (1) because investment in machinery (1) Design rarely changes (1) so that identical designs can be used by many outlets (1) Disposable (1) more are needed (1) Do not accept fast/quick/cheap unless qualified | (2) |

| Question Number | Answer | Mark |
|--------------------|--|------|
| 13.(c)(i) | One explanation from: Corner tabs on the lid (1) fold into the slots on the base/no need for glue (1) Creased hinge (1) connect base and lid in one continuous pieces (1) | (2) |
| | Do not accept strong / cheap 2 x 1 | |
| 13.(c)(ii) | One explanation from: place disposal instructions (1) to help recycle (1) print ingredients information (1) to give dietary information (1) print bar code (1) to assist POS (1) print promotional material/competitions/special offers (1) for future sales (1) good printing surface (1) reference to specific property/specific type of information (1) large surface area/flat surfaces (1) easy to read (1) | (2) |
| | 2 x 1 | |

| Question Number | Answer | | Mark |
|--------------------|---|--|------|
| 13.(d) QWC | Evaluate Box A with Box B in terms of environmental impact: Full marks cannot be attained with parts and appropriate developmental marks for well presented points which demonstrate a good under (e.g. lists/bullets). Examples are indicated and the environmental impact: | points from one section only. Plopment to attract 2 marks. Ped, articulate but undeveloped erstanding of the arguments/subject ative and are often interchangeable. | |
| | Box A | Box B | |
| | User Requirements: Once only use facility Stronger, but will show dents from knocks Clicks shut to secure contents Excellent thermal properties, keeps contents warm Difficult to print on, plain packaging Not flat packed so takes more space to store/transport Stackable More rigid Barrier to liquid Can melt More ergonomic/rounded corners Lightweight Environmental impact (3Rs): Disposal attacks ozone layer/very unfriendly to the environment Polystyrene container can be crushed to reduce volume/space to transport for disposal Raw material is reliant on the oil industry an unsustainable resources and cost is unstable. Environmental groups put pressure not to be used Waste hazard/dangerous to animals Not widely/easily recycled | Once only use facility Hooks shut but not 100% secure Poor thermal insulation properties, contents need to be eaten quickly Easy to print on, makes packaging attractive Flat pack good for storage/transportation Goes soggy Weaker Lightweight Environmental impact (3Rs): Can be fully recycled Flat pack and compressed for disposal to reduce space for transportation/space to transport Renewable resource as raw material can come from managed forest classed as environmentally friendly as has a low carbon footprint best alternative to the polystyrene box compostable | (6) |
| | pressure not to be usedWaste hazard/dangerous to animals | | (6) |

| 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 |
|--------------------|--|------|
| 14.(a)(i) | One advantage from: Photographic quality printing (1) increases the scope for design/attractive appearance (1) Ideal for mass production (1) meet demand/reduce unit costs (1) High quality finish (1) adds value to product (1) Additional processes can be easily added e.g. spot varnishing/hot foil blocking etc. (1) to improve visual impact (1) Speed faster than (1) with justification Scalable (1) with justification Inexpensive due to low labour costs (if related to scale of production) (1) with justification Widely available process (1) with justification | (2) |
| 14 (2)(ii) | 1 x 2 One measure from: | |
| 14.(a)(ii) | densitometer (1) checking paper quality (1) correct colour (1) colour alignment (1) colour bleed (1) correct colour registration (1) greyscale check (1) correct information/bar code/spelling (1) visual check for imperfections e.g. hickies (1) | (1) |
| 14.(a)(iii) | 1 x 1 One reason from: | |
| | Only small quantity required e.g. prototypes/customised products/limited edition/homemade DVD/small organisation (1) photocopying becomes more economic/cheaper (1) Product is required in a hurry/very short lead time (1) quick easy and convenient means of reproduction (1) Modifications/new designs (1) can be produced more rapidly as new plates don't need to be made (1) | (2) |

| Question Number | Answer | Mark |
|--------------------|--|------|
| 14.(b) | Explain one aesthetic property from: Can give a fine/shiny/smooth/textured finish/feel/waxy (1) so that it has a nice appearance/tactile (1) Comes in a range of colours (1) which enhances visual appearance (1) Explain one functional property from: Has a low melting point/Thermoplastic (1) so it can be | |
| | injection moulded/easily moulded (1) Impact resistant/tough/robust/durable/rigid (1) so will not break easily from use/protection of the product (1) Good flexibility (1) so can form a hinge/fastening clip/integral hinge (1) Single moulding for complete product (1) so no assembly required/can be mass produced (1) Resistant to liquid penetration (1) protects from water/wipe clean (1) | |
| | Accept transparency/translucency as outer sleeve is PE in either property. | (4) |
| | Do not accept strong/lightweight | |
| | Only accept only 1 aesthetic and 1 functional property | |
| | 2 x 2 | |

| Question Number | Answer | Mark |
|--------------------|--|------|
| 14.(c) | Any explanation from: Indicates that the product can be recycled (1) which reduces landfill waste/reduces reliance on finite resources (1) Identifies the material (1) which allows it to be sorted correctly (1) 1 x 2 | (2) |

| Question | Answer | Mark |
|----------|--|------|
| Number | | |
| 14.(d) | Any one of the following: Need internet access/computer (1) which can be expensive (1) Need to provide personal information/credit card details (1) which can leave the consumer open to fraud/identity theft/unwanted promotional material (1) Cannot see the product before it is delivered (1) so cannot assure quality (1) Cannot directly/easily return unwanted/faulty products (1) which costs time/money Damage can occur during delivery (1) which prevents consumers from using products/have to post it back (1) Cannot talk directly to a person (1) which some people prefer/require (1) Does not have social health benefits (1) with justification (1) Products get lost (1) with justification (1) Negative effects on high street communities/town centres (1) with justification (1) Delivery charges (1) with justification (1) Have to be at home/go to postal depot (1) with justification (1) Have to wait for delivery (1) with justification (1) | (2) |
| | Do not accept reference to viruses/malware 2 x 1 | |

| Question Number | Answer | Mark |
|--------------------|---|------|
| 14.(e) | All points require an appropriate development to attract 2 marks. Maximum of 4 marks for well presented, articulate but undeveloped points which demonstrate a good understanding of the arguments/subject (e.g. lists/bullets). Examples are indicative and are often interchangeable. | |
| | Advantages: | |
| | Non-polluting/environmentally friendly to the surrounding environment as no fossil fuels are burnt to generate electricity from wind energy - which helps the government to meet its emissions targets/reduces CO2 emissions/reduces pressure on fossil fuel reserves Takes up less space than the average power station. Windmills only have to occupy a few square meters for the base, this allows the land around the turbine to be used for many purposes, for example agriculture. Renewable/The wind is free and will not 'run out', making running costs very low which in time makes electricity from wind inexpensive. Flexible-can generate energy in remote locations, such as mountain communities and remote countryside/scalable - you can have one or many - can be a range of different sizes in order to support varying population levels. Can be installed off shore to minimise visual impact and provide a steady, reliable supply of electricity from a constant breeze. Low maintenance - reduces costs over time Proven technology/has been used for many years - becoming more efficient and reliable Help government meet targets for emissions/increasing energy demands - helping reduce rate of global warming Disadvantages: The main disadvantage regarding wind power is down to the winds unreliability factor. In many areas, the winds strength is too low to support a wind turbine or wind farm. Wind turbines generally produce a lot less electricity than the average fossil fuelled power station, requiring multiple wind turbines to be built in order to make an impact. The noise pollution from commercial wind turbines is sometimes | |
| | similar to a small jet engine. This is fine if you live miles away, where you will hardly notice the noise, but what if you live within a few hundred meters of a turbine? This is a major disadvantage. Eyesore/Ugly/spoil landscape - so lower land values and make countryside less attractive/protests and/or petitions usually confront any proposed wind farm development/People feel the countryside should be left intact for everyone to enjoy its beauty. Negative effects on wildlife - habitat destruction/physical effects Sited on land which could be used for farming - eyesore/lower food production | |
| | High set up costs - expensive to build but offset by low running costs over time | (6) |

| Level Mark Descriptor |
|-----------------------|
|-----------------------|

| | 1 | |
|--|-----|--|
| | 0 | No rewardable material |
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| 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. |