

# Mark Scheme (Pre-standardisation)

Summer 2014

GCE D&T (6GR02/01)

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## General Marking Guidance

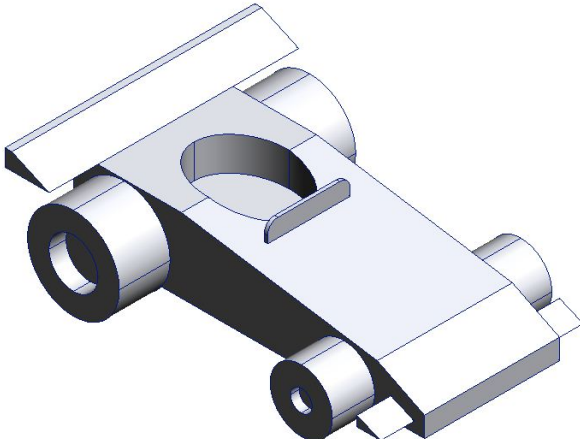
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should 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(a)	<p>Any <b>one</b> aesthetic property and any <b>one</b> functional property for 2 marks</p> <p>Aesthetic:</p> <ul style="list-style-type: none"> <li>• available in variety of colours <b>(1)</b></li> <li>• shiny finish <b>(1)</b></li> <li>• available as translucent, opaque and transparent <b>(1)</b></li> <li>• high quality finish <b>(1)</b></li> <li>• smooth <b>(1)</b></li> <li>• has a luxury feel/appearance <b>(1)</b></li> <li>• can be engraved <b>(1)*</b></li> </ul> <p>Functional:</p> <ul style="list-style-type: none"> <li>• impermeable to liquids/chemicals/waterproof <b>(1)</b></li> <li>• wipe clean <b>(1)</b></li> <li>• hygienic <b>(1)</b></li> <li>• self finishing <b>(1)</b></li> <li>• rigid/durable/sturdy <b>(1)</b></li> <li>• lightweight <b>(1)</b></li> <li>• provides a stable base <b>(1)</b></li> <li>• can be engraved <b>(1)*</b></li> </ul> <p>* - can only award 'can be engraved' once</p> <p><i>The responses must be written under the appropriate heading, i.e. aesthetic or functional.</i></p> <p><i>Must have one from aesthetic and one from functional for max marks.</i></p> <p style="text-align: right;"><b>(2x1)</b></p>	<b>(2)</b>
1(b)	<p>Any <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>• lack of physical contact produces a clean edge <b>(1)</b></li> <li>• acrylic self-finishes <b>(1)</b></li> <li>• reduces human error/increased accuracy (due to computer controlled) <b>(1)</b></li> <li>• easy to setup <b>(1)</b></li> <li>• can be repeated easily for multiple copies <b>(1)</b></li> <li>• no work holding issues <b>(1)</b></li> <li>• no wear and tear on tools <b>(1)</b></li> <li>• could incorporate engraving/etching within the same operation <b>(1)</b></li> <li>• labour saving compared to traditional methods <b>(1)</b></li> <li>• complex/intricate shapes can be cut easily <b>(1)</b></li> </ul> <p><i>[Do not except fast/quick or reference to cost]</i></p> <p style="text-align: right;"><b>(2x1)</b></p>	<b>(2)</b>

<b>1(c)</b>	<p>Justified responses only: Award <b>one</b> mark for the reason, with a further mark for expansion.</p> <ul style="list-style-type: none"> <li>• Need specialist machine <b>(1)</b> so cannot be done anywhere <b>(1)</b></li> <li>• If used incorrectly can crease/wrinkle/cause bubbles <b>(1)</b> and therefore waste menu <b>(1)</b></li> <li>• Cannot change menu <b>(1)</b> as encapsulation heat seals menu in <b>(1)</b></li> <li>• It is not possible to edit the menu <b>(1)</b> therefore a new one needs to be made each time <b>(1)</b></li> <li>• Need to be trained in how to operate the machine <b>(1)</b> and so not everyone can use <b>(1)</b></li> <li>• Specialist machine expensive/cost of pouches <b>(1)</b> so is another cost to business <b>(1)</b></li> <li>• The menu cannot be recycled <b>(1)</b> as plastic is bonded to the card/the card is contaminated <b>(1)</b></li> <li>• Uses heat during the process <b>(1)</b> therefore has a negative environmental impact <b>(1)</b></li> <li>• Time consuming process <b>(1)</b> as each menu needs to be fed in one at a time <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(2x1)</b></p>	<p style="text-align: center;"><b>(2)</b></p>
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<b>1(d)</b>	<p>Any <b>four</b> of the following:</p> <p><b>Inhalation of vapours</b></p> <ul style="list-style-type: none"> <li>• use in well-ventilated area/extraction system <b>(1)</b></li> <li>• replace lid after use <b>(1)</b></li> <li>• use with appropriate supervisor <b>(1)</b></li> <li>• wear face mask/respirator <b>(1)</b></li> <li>• if dizziness/nausea vacate area <b>(1)</b></li> </ul> <p><b>Storage</b></p> <ul style="list-style-type: none"> <li>• storage in metal cupboard / should be locked away when not in use <b>(1)</b></li> <li>• cupboard easily identifiable/yellow <b>(1)</b></li> <li>• cupboard/container must have signs/warning signs <b>(1)</b></li> <li>• regular checks by technician/trained staff <b>(1)</b></li> <li>• staff training <b>(1)</b></li> <li>• store in an unbreakable container <b>(1)</b></li> <li>• store in an air tight container <b>(1)</b></li> <li>• store in cool/dry conditions <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(4x1)</b></p>	<p style="text-align: center;"><b>(4)</b></p>
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<b>1(e)</b>	<p>Any <b>two</b> from the following:</p> <ul style="list-style-type: none"> <li>• measuring using (mechanical/optical) probe/laser scanner/white light / sensor <b>(1)</b></li> <li>• data linked to computer for accurate measurement and comparison <b>(1)</b></li> <li>• data can be used to create 3D model from coordinates <b>(1)</b></li> <li>• probe controlled in three axis (X-Y-Z) <b>(1)</b></li> <li>• scanner can be free standing/portable/hand held <b>(1)</b></li> <li>• provides immediate feedback <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(2x1)</b></p>	<p style="text-align: right;"><b>(2)</b></p>
<b>Total for question</b>		<b>12</b>

Question Number	Answer	Mark
2(a)	<ul style="list-style-type: none"> <li>• isometric view (1)</li> <li>• proportion of body / Car body sloping (1)</li> <li>• at least two wheels are correctly orientated ellipses (1)</li> <li>• correct fin front / back (1)</li> <li>• correct windscreen (1)</li> <li>• correct shape and position on centreline of drivers' seat/cockpit (1)</li> </ul>  <p><i>If the drawing is not isometric, award a maximum of 4 marks. Orientation of the drawing is not critical to the award of marks The drawing needs to be 75% complete.</i></p> <p style="text-align: right;"><b>(5x1)</b></p>	(5)
2(b)	<p>Justified responses:</p> <p>Award <b>one</b> mark for the reason, with a further mark for expansion.</p> <ul style="list-style-type: none"> <li>• soft/easy to cut/work with (1) due to low density (1)</li> <li>• relatively strong (1) allowing thin/ fine detail modelling (1)</li> <li>• readily glued (1) allowing ease of joining without specialist adhesive (1)</li> <li>• lightweight (1) allowing ease of transport/production (1)</li> <li>• easy to machine/shape (1) using a CNC router/hand tools/ (1)</li> <li>• straight/close/fine grain (1) allows for accurate modelling/details to be added / Able to be sanded/painted/varnished (1)</li> </ul> <p style="text-align: right;"><b>(2x1)</b></p>	(2)
<b>Total for question 2</b>		<b>7</b>

Question Number	Answer	Mark
3a	<p>Any <b>two</b> from the following:</p> <ul style="list-style-type: none"> <li>• Strong/rigid/durable <b>(1)</b></li> <li>• High quality printing surface/smooth surface <b>(1)</b></li> <li>• Readily creased and formed into shape <b>(1)</b></li> <li>• Holds its shape/does not deform easily <b>(1)</b></li> <li>• Easy to cut/die cut <b>(1)</b></li> <li>• Lightweight <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(2x1)</b></p>	<b>(2)</b>
3b	<p><b>One</b> explanation from:</p> <ul style="list-style-type: none"> <li>• Market demand <b>(1)</b> determines the quantity of books required / size of batch within a specific time period <b>(1)</b></li> <li>• Flexibility of manufacture techniques <b>(1)</b> allows the same production line to be used for a number of titles/allows response to market demands <b>(1)</b></li> <li>• Can involve methods of flexible manufacture/CIM <b>(1)</b> allows reprints at a later date according to demand/reduce the need to carry large stocks/reduces cost of holding stock <b>(1)</b></li> <li>• Good economies of scale <b>(1)</b> materials can be shared between a number of titles <b>(1)</b></li> <li>• The process is the most cost effective <b>(1)</b> as there is less risk of over production <b>(1)</b></li> </ul> <p><i>[Do not expect fast/quick or reference to cost/cheap]</i></p> <p style="text-align: right;"><b>(2x1)</b></p>	<b>(2)</b>



<p><b>3c</b></p>	<p>Justified responses:</p> <ul style="list-style-type: none"> <li>• glue may come unstuck/may not be strong <b>(1)</b> allowing pages to fall out/making the book less durable <b>(1)</b></li> <li>• thick glue layer on spine <b>(1)</b> prevents book from opening flat <b>(1)</b></li> <li>• glued spine may crease/break <b>(1)</b> leaving the book looking tatty <b>(1)</b></li> <li>• cannot withstand constant handling <b>(1)</b> due to poor glue penetration <b>(1)</b></li> <li>• expensive binding process/high cost of machinery <b>(1)</b> that adds to the cost of the book / compare to other (named) binding process <b>(1)</b></li> <li>• slow/time consuming process <b>(1)</b> as the glue needs to dry <b>(1)</b></li> <li>• The book cannot be laid flat <b>(1)</b> making it harder to read <b>(1)</b></li> <li>• Cannot add or remove pages <b>(1)</b> making it difficult to repair if damaged/cannot replace pages which fall out <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(2x1) + (2x1)</b></p>	<p style="text-align: center;"><b>(4)</b></p>
<p><b>3d</b></p>	<p>Any <b>three</b> from the following:</p> <ul style="list-style-type: none"> <li>• replaces need for regular stock management/inventory control <b>(1)</b></li> <li>• reduces labour costs due to ability of self-scanning <b>(1)</b></li> <li>• can improve stock forecasting <b>(1)</b></li> <li>• reduces theft/allows link to store security <b>(1)</b></li> <li>• allows for easier stock/product identification <b>(1)</b></li> <li>• reduces re-stocking/JIT stocking of products <b>(1)</b></li> <li>• allows product tracking <b>(1)</b></li> <li>• allows for sales analysis/track how many are being sold <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(3x1)</b></p>	<p style="text-align: center;"><b>(3)</b></p>

3e	<p><b>Preparation:</b></p> <ul style="list-style-type: none"> <li>• Check lithographic/printing plates (1)</li> <li>• Check inks (1)</li> <li>• Check quality of card/material (1)</li> <li>• Check guillotine/die cutter (1)</li> <li>• Check for impurities (1)</li> </ul> <p><b>Printing/Production:</b></p> <ul style="list-style-type: none"> <li>• Check colour density during print run (1)</li> <li>• Check registration during print run (1)</li> <li>• Check for unwanted dust/ hickies / dust (1)</li> <li>• Check set-off during printing/unwanted ink transfer (1)</li> <li>• Check for smudging/bleeding of ink (1)</li> <li>• Check guillotine/die cut during process-ensure registration (1)</li> </ul> <p><b>Folding/assembly:</b></p> <ul style="list-style-type: none"> <li>• Check accuracy/alignment of folds (1)</li> <li>• Check to see if images and folds are aligned (1)</li> <li>• Check books fit /meet tolerances(1)</li> <li>• Check thickness quality of glue (1)</li> <li>• Check parts are glued correctly (1)</li> <li>• Check that glue nozzles are clean and clear (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)
	<b>Total for question 3</b>	<b>14</b>

Question Number	Answer	Mark
4(a)	<p>Justified responses:</p> <ul style="list-style-type: none"> <li>• Ability to combine files <b>(1)</b> meaning great control over document <b>(1)</b></li> <li>• Changes/editing <b>(1)</b> made using various tools <b>(1)</b></li> <li>• Files can be exported/emailed <b>(1)</b> meaning offsite printing/design/customer approval <b>(1)</b></li> <li>• Grids/rulers/fonts/typefaces <b>(1)</b> allow short design time/enhance design capability <b>(1)</b></li> <li>• templates <b>(1)</b> allow ready made layouts/remove design aspects <b>(1)</b></li> <li>• pictures and files can be imported/copied and pasted from other documents <b>(1)</b> allowing personalised design <b>(1)</b></li> <li>• cost effective software <b>(1)</b> that doesn't need specialised computer/multiple different programs <b>(1)</b></li> <li>• Able to zoom in and out/pan/scroll <b>(1)</b> allowing greater control of fine details <b>(1)</b></li> </ul> <p>Must relate to the use of desk top publishing, rather than CAD in general.</p> <p style="text-align: right;"><b>(2x1) + (2x1)</b></p>	<b>(4)</b>
4(b)	<p>Any <b>three</b> from the following:</p> <ul style="list-style-type: none"> <li>• movement/vibration caused by electrical field <b>(1)</b></li> <li>• reverse piezoelectric effect <b>(1)</b></li> <li>• piezoelectric crystal acts as tiny speaker / releases sound energy <b>(1)</b></li> <li>• movement of card removes insulating tongue <b>(1)</b></li> <li>• contacts on module allowed to touch <b>(1)</b></li> <li>• plays pre-programmed sound (stored in integrated circuit) <b>(1)</b></li> <li>• requires battery <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(3x1)</b></p>	<b>(3)</b>

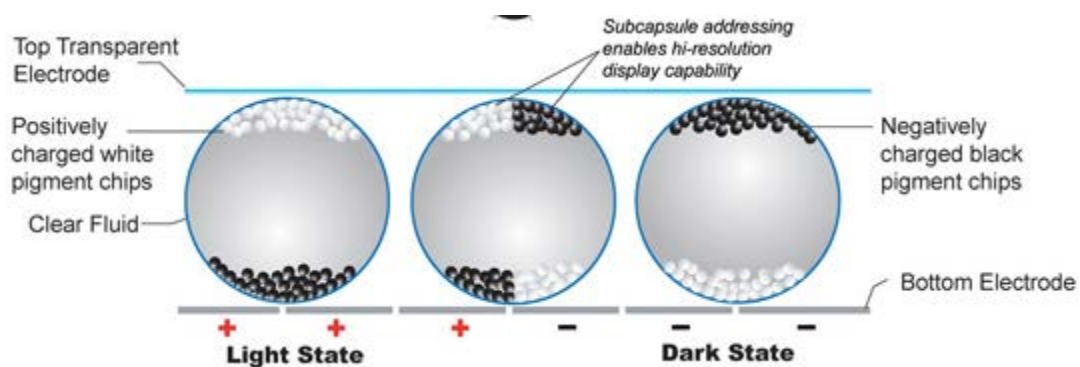
4(c) Award **one** mark for each of the following

- Top transparent electrode **(1)**
- Bottom electrode **(1)**

**Then** award up to **two** further marks for any **two** of the following:

- Clear fluid **(1)**
- Negatively charged black pigment/beads **(1)**
- Positively charged white pigment/beads **(1)**
- Labels for +/- charges on bottom electrode **(1)**

Up to a max of 3 for accurate sketch with no annotation or a written answer without sketches

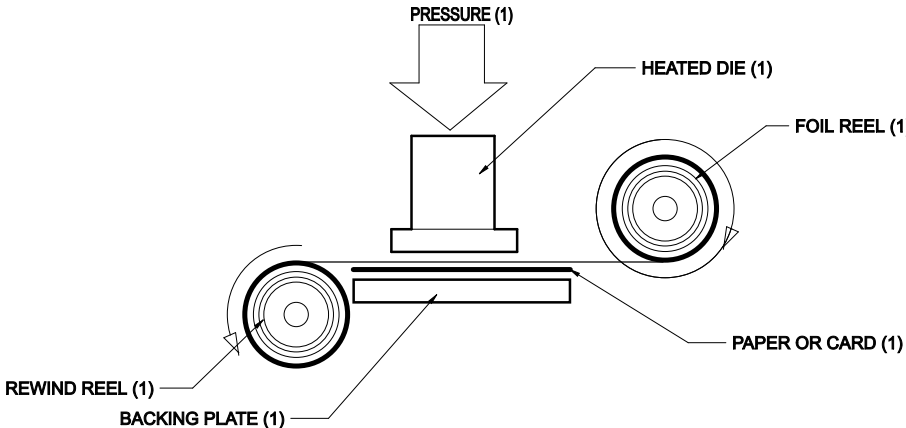


**(4x1)**

**(4)**

**Total for question 4**

**11**

Question Number	Answer	Mark
5(a) (i)	<p><b>Parison:</b></p> <ul style="list-style-type: none"> <li>• The parison is molten / flexible because it is heated (1)</li> <li>• The parison/tube is placed inside a split mould (1)</li> <li>• Air is blown into parison (tube) (1)</li> <li>• the parison is expands to create bottle shape (1)</li> <li>• The mould seals the bottom of the parison (1)</li> </ul> <p><i>[focus must be on parison and not whole blow moulding process]</i></p> <p style="text-align: right;">(2x1)</p>	(2)
5(a) (ii)	<p><b>Cooled mould:</b></p> <ul style="list-style-type: none"> <li>• Freezes polymer on contact/can set/solidify ( 1) retain its shape (1)</li> <li>• Allowing high speed production/faster removal from mould (1) because the polymer sets quickly (1)</li> <li>• Enables the bottle to be removed more easily (1) without deforming (1)</li> </ul> <p style="text-align: right;">( 2x1)</p>	(2)
5(b)	<p>Award <b>one</b> mark for each of the following</p> <ul style="list-style-type: none"> <li>• Pressure /force indicated(1)</li> <li>• Heated die (1)</li> <li>• Backing plate (1)</li> <li>• Foil reel / Rewind reel (1)</li> <li>• Paper/card (1)</li> </ul> <div style="text-align: center;">  </div> <p><b><i>To gain full marks, the sketch must show Heated Die otherwise a maximum of 3 marks.</i></b></p> <p><i>Max 3 marks for accurate sketch with no annotation</i>  <i>Max 3 marks written answers without sketches</i></p> <p style="text-align: right;">(4x1)</p>	(4)

<p><b>5(c)</b> <b>QWC</b></p>	<p>A response that identifies any six of the following marking points. There must be both sides of the argument: points for and points against.</p> <p>Max 5 marks if only one side of discussion put forward.</p> <p><b>For (max five)</b></p> <ul style="list-style-type: none"> <li>• lightweight so will not increase weight of product/good strength to weight ratio <b>(1)</b></li> <li>• strong/tough/durable/rigid <b>(1)</b></li> <li>• generally water resistant <b>(1)</b></li> <li>• formed well/form intricate shapes <b>(1)</b></li> <li>• easily printed on <b>(1)</b></li> <li>• inexpensive (must be clarified in comparison to other materials) <b>(1)</b></li> <li>• speed of production (must be clarified in comparison to other materials) <b>(1)</b></li> <li>• shock absorbent / impact resistant <b>(1)</b></li> <li>• recyclable <b>(1)</b></li> <li>• can be transparent so contents can be seen <b>(1)</b></li> <li>• inert/does not affect flavour of the contents/does not contaminate food or drink <b>(1)</b></li> <li>• self finishing <b>(1)</b></li> <li>• available in a wide range of colours <b>(1)</b></li> <li>• chemically resistant / able to retain gases in fizzy drinks <b>(1)</b></li> </ul> <p><b>Against (max five)</b></p> <ul style="list-style-type: none"> <li>• consume large amounts of energy in conversion/production <b>(1)</b></li> <li>• use up non-renewable earth resources /made from oil <b>(1)</b></li> <li>• slow degrading/pollute environment/cause rubbish/pollution <b>(1)</b></li> <li>• uneconomical / labour intensive for recycling/ <b>(1)</b></li> <li>• add to land fill <b>(1)</b></li> <li>• can be hazardous to health <b>(1)</b></li> <li>• creates toxic fumes when burnt <b>(1)</b></li> <li>• Some plastics cannot be recycled <b>(1)</b></li> </ul> <p style="text-align: right;"><b>(6x1)</b></p>	<p><b>(6)</b></p>
<b>Total for question 5</b>		<b>14</b>

Question Number	Answer	Mark
<b>6(a)</b> <b>QWC</b>	<p>Justified responses:</p> <ul style="list-style-type: none"> <li>• heavier than polymer <b>(1)</b> giving feeling of quality <b>(1)</b></li> <li>• equal strength in all directions/isotropic/structurally tough/rigid <b>(1)</b> giving product protection <b>(1)</b></li> <li>• does not warp/distort <b>(1)</b> allowing the box to retain its shape <b>(1)</b></li> <li>• sustainable material <b>(1)</b> so doesn't use non renewable resources (1)</li> <li>• surface capable of taking various finishes <b>(1)</b> due to no grain/smooth finish <b>(1)</b></li> <li>• decomposes quicker than polymer <b>(1)</b> so doesn't affect landfill <b>(1)</b></li> <li>• not commonly used <b>(1)</b> so adds to gimmick value <b>(1)</b></li> <li>• easily laser cut/machined using CNC equipment <b>(1)</b> enabling batch production <b>(1)</b></li> <li>• durable <b>(1)</b> therefore has a long lifespan <b>(1)</b></li> <li>• does not have a grain <b>(1)</b> therefore easy to work with/make into complex shapes/does not split when being cut<b>(1)</b></li> <li>• relatively inexpensive compared to similar materials <b>(1)</b> as it can be bought in large sheets/is readily available/made from recycled materials / does not add to cost of final product <b>(1)</b></li> </ul> <p><i>Justified responses relevant to presentation box</i></p> <p style="text-align: right;"><b>(3x2)</b></p>	<b>(6)</b>

<p><b>6(b)</b> <b>QWC</b></p>	<p>A response that identifies any six of the following marking points.</p> <p>There must be both sides of the argument: advantages and disadvantages.</p> <p>Max 5 marks if only one side of discussion put forward.</p> <p><b>Advantages (max 5)</b></p> <ul style="list-style-type: none"> <li>• produces an accurate quality prototype <b>(1)</b></li> <li>• allows for evaluation by designer/user (1)</li> <li>• reduces time in manufacture of quality prototype in comparison to traditional methods (1)</li> <li>• gives the designer a good idea of the final look/3D look of the product (1)</li> <li>• allows communication between designer and user <b>(1)</b></li> <li>• gives the designer the opportunity to show the user a product for an active participation in the design process <b>(1)</b></li> <li>• allows design flaws to be seen in early stages of development (1)</li> <li>• reduces costs for designer in development as resources are used more efficiently<b>(1)</b></li> <li>• gives designer a high quality product for development <b>(1)</b></li> <li>• allows testing of product/materials <b>(1)</b></li> <li>• reduces design time to market/development time <b>(1)</b></li> <li>• allows direct link between CAD and CAM <b>(1)</b></li> <li>• helps refine product <b>(1)</b></li> <li>• produces scale prototype for marketing <b>(1)</b></li> <li>• reduces material costs due to less wastage compared to traditional methods <b>(1)</b></li> <li>• allows designer to start another job while printer produces prototype (greater productivity) <b>(1)</b></li> <li>• safer as no need to use tools/machines to make traditional model. <b>(1)</b></li> <li>• can produce intricate /fine detail not possible by hand (1)</li> </ul>	
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	<p><b>Disadvantages (max 5)</b></p> <ul style="list-style-type: none"> <li>• expensive process may be passed onto customer through increased costs <b>(1)</b></li> <li>• May cause the designer to constantly redevelop the product for perfection <b>(1)</b></li> <li>• May slow the development process <b>(1)</b></li> <li>• Regular upgrading of software <b>(1)</b></li> <li>• Prototype limited by size of machine/may have to be scaled down in size <b>(1)</b></li> <li>• Consumables can be expensive <b>(1)</b></li> <li>• Prototypes maybe fragile <b>(1)</b></li> <li>• Cost of maintenance could be high <b>(1)</b></li> <li>• Training maybe required <b>(1)</b></li> <li>• Cost of equipment can be high <b>(1)</b></li> <li>• If power goes off there is a need to set up and start again <b>(1)</b></li> </ul> <p>Answers must be focused clearly on RPT not general benefits of CAD.</p> <p style="text-align: right;"><b>(6x1)</b></p>	<b>(6)</b>
<b>Total for question 6</b>		<b>12</b>