

Mark Scheme (Results)

Summer 2010

GCE

GCE Design and Technology (AS)
6RM02
Paper 01 Design and Technology
in Practice

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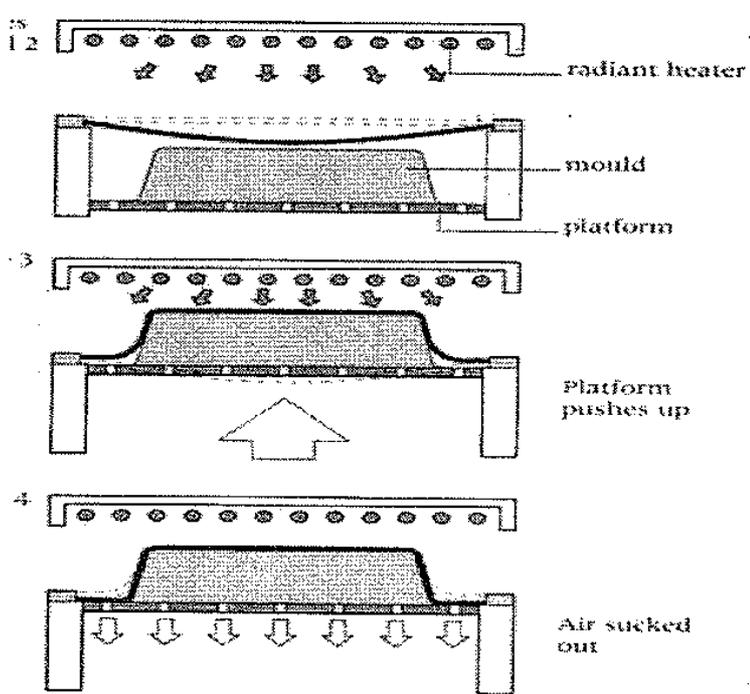
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General Marking Guidance

- 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.

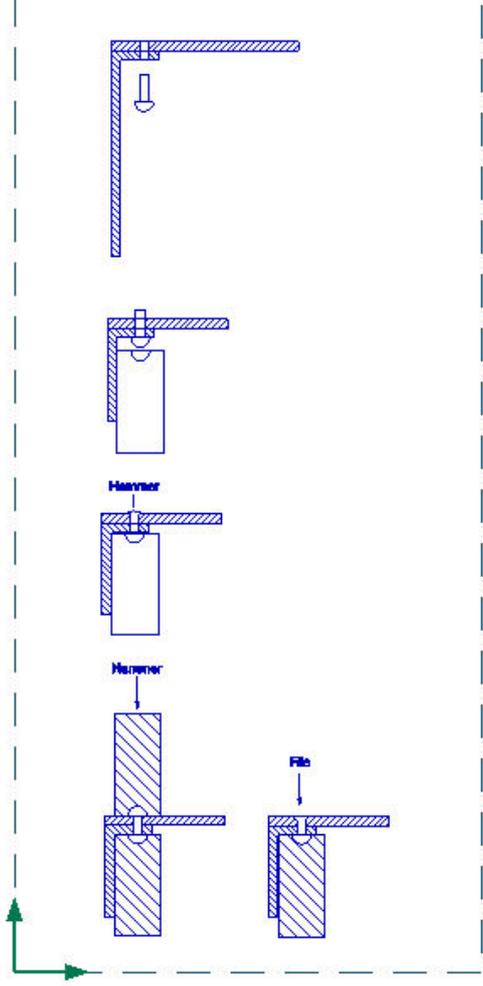
Question Number	Answer	Mark
1(a)	<p>Four Features:</p> <ul style="list-style-type: none">• Draft angle/tapers (1)• Rounded/radiused corners/edges (1)• Vent holes (1)• Depth of draw (1)• Internal draws must have vent holes (1)• Positioning of features to avoid webbing (1)• No undercuts (1)• High quality surface finish (1)• Resistance to heat (1)• Durable mould (1) <p style="text-align: right;">(4x1)</p>	(4)

Question Number	Answer	Mark
1(b)	 <p>Award 1 mark per point shown on a diagram:</p> <ul style="list-style-type: none"> • Mould • Clamp • Heater • Platform movement • Air blown in • Air drawn out • Forming removed • Mould is placed on platform and lowered (1) • Plastic sheet is placed into machine and clamped (1) • Plastic is heated (1) • Platform is raised (1) • Air is blown in to raise plastic from mould (1) • Air is drawn out to form plastic over mould (1) • Allowed to cool (1) <p><i>Do not award a mark for trimming the mould/forming.</i></p>	(6)
	Total for question	(10)

Question Number	Answer	Mark
2(a)	<ul style="list-style-type: none"> • The surfaces to be brazed are cleaned with an abrasive (1) • The two surfaces are fluxed (1) • The components are place together and wired/clamped in place(1) • The metal is heated (1) evenly (1) to allow the flow of brazing spelter around the whole joint (1) • Brazing spelter is applied to the joint (1) • The joint is allowed to cool until the brazing spelter is set (1) 	(4)
2(b)i	<ul style="list-style-type: none"> • Instant/rapid bond (1) therefore saving time on assembly (1) • Ideal for curved surfaces which are awkward to apply pressure to (1) therefore avoiding the need for costly jigs/formers (1) • Ideal for large surface areas (1) therefore avoiding the need for large and expensive presses (1) • Contact adhesives can be applied to a wide range of materials (1) therefore making the joining of dissimilar materials possible (1) <p style="text-align: right;">(1X2) (1X2)</p>	(4)
2(b)ii	<ul style="list-style-type: none"> • Adhesive is applied to both surfaces to be bonded (1) • The adhesive is allowed to dry until tacky/touch dry (1) • The surfaces are brought together forming an instant bond (1) • The surface can be 'hammered' using a veneer hammer to smooth out any imperfections (1) <p style="text-align: right;">(2X1)</p>	(2)
	Total for question	(10)

Question Number	Answer	Mark
3(a) i	<p><i>The answer must relate the hazard to the control.</i></p> <p>Wood turning</p> <p>Hazard:</p> <ul style="list-style-type: none"> • Flying debris / work comes loose (1) • Dust inhalation (1) • Eye damage (1) • Entanglement of hair/clothes (1) • Trapped fingers / chisel (1) <p>Control measure:</p> <ul style="list-style-type: none"> • Ensure work is properly mounted (1) • Extraction/mask (1) • Goggles/Guard (1) • Ensure no loose clothing/hair (1) • Ensure minimum gap between tool rest and work is maintained (1) • Tools kept sharp (1) <p style="text-align: right;">(1X1) (1X1)</p>	(2)
3(a) ii	<p>Metal casting</p> <p>Hazard:</p> <ul style="list-style-type: none"> • Fumes (1) • Burns / hot metal (1) • Risk of explosion (1) • Chemical irritant from sand additives (1) <p>Control measure:</p> <ul style="list-style-type: none"> • Use suitable extraction (1) • Wear protective clothing/goggles / use of tongs (1) • Make sure sand moisture is at correct level/use of oil-based sand (petrobond) (1) • Wear protective gloves/use barrier cream (1) <p style="text-align: right;">(1X1) (1X1)</p>	(2)

3(a) iii	<p>CAD</p> <p>Hazard:</p> <ul style="list-style-type: none"> • Eye strain (1) • Repetitive strain injury (1) • Bad back/neck (1) <p><i>Do not award a mark for loose / damaged wires.</i></p> <p>Control measure:</p> <ul style="list-style-type: none"> • Use protective screen cover (1) • Adequate lighting (1) • Lower intensity of screen resolution (1) • Sit at correct distance from screen (1) • Take regular breaks (1) • Adjustable keyboards (1) • Use an ergonomic chair (1) <p style="text-align: right;">(1X1) (1X1)</p>	(2)
3(b)i	<ul style="list-style-type: none"> • retain a sharp edge (1) • harder than the material to be cut (1) • reduce wear (1) <p style="text-align: right;">(2X1)</p>	(2)
3(b)ii	<ul style="list-style-type: none"> • It is tempered to remove some of the brittleness / hardness / to increase the toughness of the blade (1) making the blade more flexible / reduce the chances of it snapping / withstand impact (1) 	(2)
3(b)iii	<p>Tempering</p> <ul style="list-style-type: none"> • The metal is heated (Not to 'red hot') (1) • The temperatures are signified by the changing colour of the metal when heated (1) • The metal is then quenched in water (1) <p>Give NO marks for an answer which is NOT about tempering e.g. Hardening or Forging.</p> <p style="text-align: right;">(2X1)</p>	(2)
Total for question		(12)

Question Number	Answer	Mark
4(a)	 <p>Look for:</p> <ul style="list-style-type: none"> • Holes in the metal with suitable rivet • Support under the rivet head • Being hit with a hammer • Finishing of the rivet, e.g. rounding with a rivet set or filing if countersunk <p>1 mark for either option</p> <ul style="list-style-type: none"> • Holes are drilled to suit rivet diameter (1) • Rivet cut to correct length (1) • The head is supported in a 'rivet set' (dolly) (1) • The rivet set squashes the two pieces of metal together removing any gap (1) • The end of the rivet is rounded over (1) using the ball pein of the hammer (1) • Surplus rivet is either filed off (if countersunk) (1) or rounded using a 'rivet set' (dolly) (1) <p style="text-align: right;">(4X1)</p>	(4)
4(b)	<ul style="list-style-type: none"> • Pop rivets could be used as it is a quick process (1) therefore saving assembly time/money/labour (1) • Pop rivets are applied from one side (1) so can be used in situations where there is access to one side only/restricted access/difficult access (1) • Pop rivets are sometimes used to tack work together prior to welding (1) because they are quick/cheap/easy to remove (1) <p>Give NO marks for Aesthetics</p> <p style="text-align: right;">(1X2) (1X2)</p>	(4)
Total for question		(8)

Question Number	Answer	Mark
5(a)	<ul style="list-style-type: none"> • Blockboard • Laminboard • Battenboard • plywood • MDF • Sterlingboard <p style="text-align: right;">(1X1) (1X1)</p>	(2)
5(b)	<ul style="list-style-type: none"> • A single piece of board can be manufactured as required (1) with uniform thickness and quality (1) which is not limited by the size of natural timber boards (1) • Manufactured boards tend to be of equal strength in all directions (1) therefore reducing the chances of short grain (1) • Manufactured boards do not warp/shrink/twist/cup/split as much as natural timber (1) therefore making the boards more stable in large sizes (1) • The cost of manufactured boards tends to be less than natural timber (1) making the cost of the final product lower (1) • Reduction of knots (1) affecting aesthetics (1) • An expensive appearance (1) can be gained by using a limited amount of expensive material (1) <p style="text-align: right;">(1X2) (1X2) (1X2)</p>	(6)
5(c)	<p>1 mark per correct option</p> <p>Wood, metal and plastic options possible</p> <ul style="list-style-type: none"> • one mark for a lipping. • One mark for how it is applied e.g. glue / pinned. <p><i>Do not except painting/varnishing etc.</i></p> <div style="display: flex; align-items: flex-start; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 100px; height: 20px; margin-right: 10px;"></div> <div>Veneer glued/ironed to the edge</div> </div> <div style="display: flex; align-items: flex-start; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 100px; height: 20px; margin-right: 10px; position: relative;"> <div style="position: absolute; right: -10px; top: 50%; transform: translateY(-50%); width: 10px; height: 20px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> </div> <div>Lipping glued / pinned / nailed to the edge</div> </div> <div style="display: flex; align-items: flex-start; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 100px; height: 20px; margin-right: 10px; position: relative;"> <div style="position: absolute; right: -10px; top: 50%; transform: translateY(-50%); width: 10px; height: 20px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> </div> <div>Tongue and grooved lipping for extra strength</div> </div> <div style="display: flex; align-items: flex-start;"> <div style="border: 1px solid black; width: 100px; height: 20px; margin-right: 10px; position: relative;"> <div style="position: absolute; right: -10px; top: 50%; transform: translateY(-50%); width: 10px; height: 20px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> </div> <div>Wrap-a-round lipping for extra strength</div> </div>	(2)
Total for question		(10)

Question Number	Answer	Mark
6(a)	<ul style="list-style-type: none"> • A block model can be used to test ergonomic properties (1) which cannot be done on CAD models (1) • A block model can be shown to/tested by potential customers (1) to gain feed back (1) • Block models can be made much more cheaply (1) than producing the final product (1) • A 3d block model allows the scale/proportions of the product to be evaluated (1) so that it can be evaluated within its intended environment/use (1) all design features have been considered and are correct/alterd before costly production starts (1) <p style="text-align: right;">(1X2) (1X2)</p>	(4)
6(b)	<ul style="list-style-type: none"> • RPT can be done extremely quickly compared to traditional methods (1) therefore saving lead time/money (1) • RPT models can be made extremely accurately (1) with out the need for highly skilled craftsmen (1) • RPT models can be made as hollow formings (1) due to tool-less technology (1) • RPT models can be made with intricate detail (1) allowing more realistic prototypes to be produced (1) <p style="text-align: right;">(1X2) (1X2) (1X2)</p>	(6)
Total for question		(10)

Question Number	Answer	Mark
7(a)	<ul style="list-style-type: none"> • Having systems in place to assure quality / customer satisfaction (1) in which cost and quality are in 'harmony' / products are designed and produced to a standard / consumer guarantees (1) <p style="text-align: right;">(1X2)</p>	(2)
7(b)	<ul style="list-style-type: none"> • ISO 9000 approved companies only buy components/materials from other approved suppliers (1) • gives control over raw materials (1) • Gives a record at every stage to aid product/process improvement (1) • reduces waste / increases efficiency (1) • improves customer satisfaction / feedback (1) • quality is monitored at every stage (1) • Enables products to be made 'right first time' (1) • It means the companies reputation remains high (1) • It often leads to repeat orders (1) • It ensures that identical products are manufactured on time (1) • TQM helps to deliver on budget (1) • TQM helps to develop a team mentality (1) • TQM facilitates ongoing product improvement (1) <p style="text-align: right;">(8X1)</p>	(8)
Total for question		(10)

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