



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2016

Marking Scheme

Materials Technology Wood

Higher Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.



Junior Certificate Examination 2016




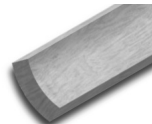


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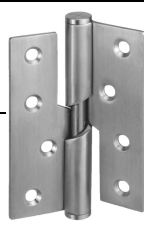
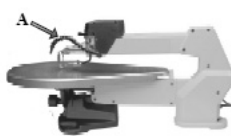
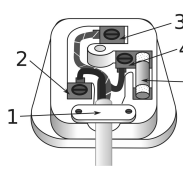


*The Sample solutions shown are presented as example answers.
All other valid solutions are acceptable and are marked accordingly.*

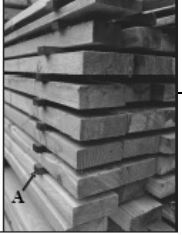





June 2016

SECTION A

Mark for best 16 answers. Disallow marks for any questions/parts of questions in excess of 16 as per Instructions to Examiners

QUESTION	ANSWER	MARKS
1. (i)	Correct name for the power tool... <i>Orbital Sander</i>	 3 marks
(ii)	Specific use for this power tool... <i>To sand material, to give a smooth surface...</i>	2 marks
2. (i)	Correct name for the woodworking tool... <i>Sliding Bevel/Bevel</i>	 3 marks
(ii)	Specific use for this tool... <i>To mark/measure angles on material...</i>	2 marks
3.	Tree identification...  <i>Oak Willow Horse Chestnut Ash Lime</i>	5 x 1 mark
4. (i)	CAM... <i>Computer Aided Manufacture</i>	3 x 1 mark
(ii)	Advantage of a 3D printer... <i>Time saving, economical, accurate models/prototypes, environmentally friendly towards traditional methods, fast, can produce models where they are required...</i>	2 marks
5. (i)	Distortion... <i>Cupping/Cupped</i>	 3 marks
(ii)	Cause... <i>Unequal shrinkage, poor seasoning, poor stacking...</i>	2 marks
6. (i)	Technique... <i>Laminating/Lamination</i>	 3marks
(ii)	Advantage... <i>Wood is stronger, curves can be formed, enables variation in design...</i>	2 marks
7. (i)	Identify part... <i>Rib/Back//Strip/Backing</i>	 3 marks
(ii)	Function... <i>Strengthens, improves rigidity, keeps straight, adds weight, stiffens...</i>	2 marks

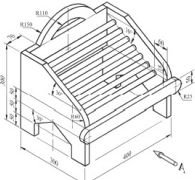
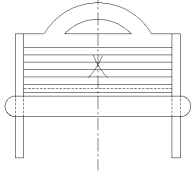
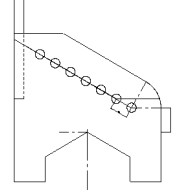
8.	(i)	Force... Compression		3 marks										
	(ii)	Other force... Tension, Torsion, Shear, Gravitational, Magnetic...		2 marks										
9.	(i)	Direction... Anti-clockwise (indicated on the answerbook)		3 marks										
	(ii)	Rotational speed... 20 rpm		2 marks										
10.	(i)	Name of tool... Countersink/Rose bit		3 marks										
	(ii)	Use... Countersinking/Tapers the end of a hole to accept the head of a screw...		2 marks										
11.	(i)	Name of fitting... Hinge Lift-off/Rising/Butt hinge		1 mark 3 marks										
	(ii)	Where it used... In a door. To allow a door to self close. To lift a door off/over an uneven surface as it opens.		2 marks										
12.	(i)	Name of woodworking machine Scroll saw/Fret saw		2 marks										
	(ii)	Advantage... Cut intricate curves, safer...		2 marks										
	(iii)	Function of tube... To blow sawdust away from workpiece		1 mark										
13.		Terminals... <table border="1" data-bbox="558 1321 997 1523"> <tbody> <tr><td>1.</td><td>Cable grip/clamp/holder</td></tr> <tr><td>2.</td><td>Neutral</td></tr> <tr><td>3.</td><td>Earth</td></tr> <tr><td>4.</td><td>Live</td></tr> <tr><td>5.</td><td>Fuse</td></tr> </tbody> </table>	1.	Cable grip/clamp/holder	2.	Neutral	3.	Earth	4.	Live	5.	Fuse		5 x 1 mark
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14.		Steps in painting... 1. Filler 2. Sanding 3. Primer 4. Undercoat 5. Finish coat		5 x 1 mark										
15.		Reasons for applying a surface finish ... Protects wood Enhances appearance Improves durability Resistant to moisture Improves resistance to heat and chemicals...		1 x 3 marks 1 x 2 marks										


16.	(i) Item A... <i>Sticker /Spacer</i>		2 marks																																								
	(ii) Two Methods of Seasoning... <i>Kiln/Artificial/Progressive Seasoning</i> <i>Air/Natural Seasoning</i>		1 x 2 marks 1 x 1 mark																																								
17.	(i) Categories of Plastic... <i>Thermosetting</i> <i>Thermoplastic</i>		2 x 2 marks																																								
	(ii) Remouldable plastic... <i>Thermoplastic</i>		1 mark																																								
18.	Softwood or Hardwood... <table border="1" data-bbox="338 689 1193 1021"> <thead> <tr> <th>Softwood</th> <th>Trees</th> <th>Hardwood</th> </tr> </thead> <tbody> <tr> <td></td> <td>Oak</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>Sitka Spruce</td> <td></td> </tr> <tr> <td></td> <td>Beech</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>Douglas Fir</td> <td></td> </tr> <tr> <td></td> <td>Maple</td> <td>✓</td> </tr> </tbody> </table>	Softwood	Trees	Hardwood		Oak	✓	✓	Sitka Spruce			Beech	✓	✓	Douglas Fir			Maple	✓		5 x 1 marks																						
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19.	Carving methods...  <i>Chip /Incised</i> <i>Sculpting/Carving in the round/3D carving</i> <i>Relief Carving</i>		2 x 2 marks 1 x 1 mark																																								
20.	Cutting list...  <table border="1" data-bbox="338 1487 1232 1917"> <thead> <tr> <th>Description</th> <th>Quantity</th> <th>Length</th> <th>Width</th> <th>Thickness</th> </tr> </thead> <tbody> <tr> <td>Front Legs</td> <td>2</td> <td>500</td> <td>50</td> <td>30</td> </tr> <tr> <td>Back Legs</td> <td>2</td> <td>900</td> <td>50</td> <td>30</td> </tr> <tr> <td>Cross Rails (front and back)</td> <td>4</td> <td>680</td> <td>50</td> <td>30</td> </tr> <tr> <td>Side Rails (left and right)</td> <td>4</td> <td>360</td> <td>50</td> <td>30</td> </tr> <tr> <td>Worktop Bench</td> <td>2</td> <td>1</td> <td>800</td> <td>450</td> </tr> <tr> <td>Curved Back Piece</td> <td>1</td> <td>800</td> <td>200</td> <td>30</td> </tr> <tr> <td>Dowels</td> <td>2</td> <td>740</td> <td colspan="2">∅15</td> </tr> </tbody> </table>	Description	Quantity	Length	Width	Thickness	Front Legs	2	500	50	30	Back Legs	2	900	50	30	Cross Rails (front and back)	4	680	50	30	Side Rails (left and right)	4	360	50	30	Worktop Bench	2	1	800	450	Curved Back Piece	1	800	200	30	Dowels	2	740	∅15			5 x 1 mark
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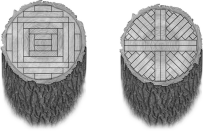

Running total of allowed questions for this section to be recorded and shown as indicated at the marking conference.

SECTION B

Mark for best 3 answers. Check all stationery and indicate running total and disallowed marks as indicated at the marking conference.

QUESTION	ANSWER	MARKS
<p>1 (i)</p>  <p>(ii)</p>  	<p>Preparation of working drawing ...</p> <p>Elevation -</p> <ul style="list-style-type: none"> <i>Setting out overall height (300 without curve)</i> <i>Showing overall width (400)</i> <i>Showing thickness of legs (20)</i> <i>Showing position and width of front rail (50)</i> <i>Showing rail curve either end (r25)</i> <i>Position and width of any dowel</i> <i>Locating end point of curve (r150)</i> <i>Locating centre</i> <i>Drawing each curve</i> <p>End Elevation -</p> <ul style="list-style-type: none"> <i>Setting out/transferring height (without curve)</i> <i>Setting out depth(300)</i> <i>Location of top of triangular cut out</i> <i>Locating bottom ends of triangle</i> <i>Locating bottom of cut out (both sides)</i> <i>Location of centre of fillet (r60)</i> <i>Drawing of fillet</i> <i>Drawing of 30° line</i> <i>Horizontal Intersection and 30° line</i> <i>Position and thickness of back (20)</i> <i>Position and thickness of front rail</i> <p>General -</p> <ul style="list-style-type: none"> <i>Scale</i> <i>Draughtsmanship, presentation...</i> <p>NOTE:</p> <ol style="list-style-type: none"> 1. If isometric drawing presented, mark as per scheme and divide by 2 at end 2. If the wrong scale is used, no marks for height or width in elevation and loss of scale mark 3. If sketched, mark as per instructions at conference 	<p>1 mark</p> <p>1 mark</p> <p>2 x 1 mark</p> <p>2 x 1 mark</p> <p>1 mark</p> <p>2 x 1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>2 x 1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>2 marks</p> <p>2 marks</p> <p>2 marks</p> <p>5 marks</p> <p>13</p> <p>13</p> <p>7</p>
<p>(iii)</p>	<p>Jointing back to side of unit ...</p> <ul style="list-style-type: none"> <i>Mortice and tenon, Lap joint</i> <i>Finger or dovetail joints</i> <i>Dowelling/Biscuits, Domino</i> <i>Screws, sunk and plugged/concealed</i> <i>Description/name only</i> 	<p>5 + 2 marks</p> <p>2 marks</p> <p>7</p>

QUESTION	ANSWER	MARKS
2. (i)	<p>Explanation of steps in design process...</p> <p>Analysis of Brief -</p> <p><i>Examining the given brief to identify the stated requirements. Listing the problems to be overcome in order to create the project. Explaining keywords contained in the brief.</i></p> <p>Sketches/Working Drawings -</p> <p><i>Dimensioned drawings to include plan, elevation and end elevation and/or a pictorial view of the proposed artefact and sketches relating to its manufacture. Appropriate detailing and a materials list should be included.</i></p>	<p>5 marks</p> <p>5 marks</p>
(ii)	<p>Design solution for wooden storage unit...</p> <p><i>Basic unit/box without any design features (sketch only)</i></p> <p><i>Fair attempt to store items in an attractive, suitable, portable unit. (Must include notes)</i></p> <p><i>Good, well balanced, well sketched design, showing some innovation and creativity. (Must be in 3D or 2 orthographic views and include notes)</i></p> <p><i>A <u>quality</u> 3D sketch of an original innovative and creative design. The sketch must be rendered or shaded and include relevant notes</i></p> 	<p>↓</p> <p>6 marks</p> <p>↓</p> <p>9 marks</p> <p>↓</p> <p>12 marks</p> <p>↓</p> <p>16 marks</p>
(iii)	<p>Two specific requirements ...</p> <p><i>Any two relevant requirements to the design Access, portable, safety, appearance, function, stability, size, shape, proportion, suitability...</i></p>	<p>2 x 3 marks</p>
(iv)	<p>Incorporation of design requirements...</p> <p><i>Notes and sketches must relate to part (iii)</i></p>	<p>2 + 2 marks</p> <p>2 + 2 marks</p>
		<p>10</p> <p>16</p> <p>6</p> <p>8</p>

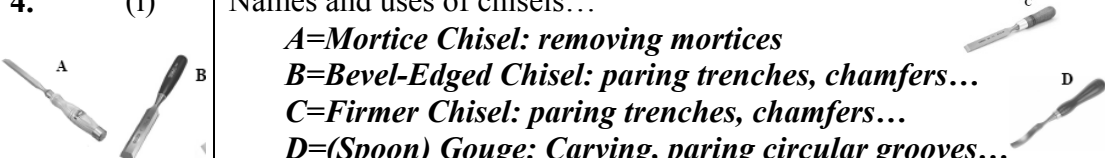

QUESTION	ANSWER	MARKS									
<p>3. (i)</p> 	<p>Methods of conversion shown in the diagrams...</p> <p style="text-align: center;"><i>Tangential Sawing</i> <i>Quarter or Radial sawing</i></p> <p>Advantages/Disadvantages of conversion methods ...</p> <table border="1" data-bbox="316 421 1104 922"> <thead> <tr> <th></th> <th>ADVANTAGES</th> <th>DISADVANTAGES</th> </tr> </thead> <tbody> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">TANGENTIAL SAWING</td> <td> <i>Separate sapwood and heartwood</i> <i>Reveals a figure grain</i> <i>Wide boards</i> <i>Strong boards</i> </td> <td> <i>High labour cost</i> <i>More waste wood produced</i> <i>Prone to cupping</i> </td> </tr> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">QUARTER SAWING</td> <td> <i>Stable boards produced, all have ring lengths approx. equal</i> <i>Hardwearing board surface</i> <i>Silver grain effect</i> </td> <td> <i>More manipulation and handling of the log required</i> <i>More waste produced</i> <i>Smaller boards</i> <i>More expensive</i> </td> </tr> </tbody> </table>		ADVANTAGES	DISADVANTAGES	TANGENTIAL SAWING	<i>Separate sapwood and heartwood</i> <i>Reveals a figure grain</i> <i>Wide boards</i> <i>Strong boards</i>	<i>High labour cost</i> <i>More waste wood produced</i> <i>Prone to cupping</i>	QUARTER SAWING	<i>Stable boards produced, all have ring lengths approx. equal</i> <i>Hardwearing board surface</i> <i>Silver grain effect</i>	<i>More manipulation and handling of the log required</i> <i>More waste produced</i> <i>Smaller boards</i> <i>More expensive</i>	<p>2 x 3 marks</p> <p>8 x 1 mark</p>
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(ii)	<p>Other conversion method...</p> <p style="text-align: center;"><i>Through and Through/Plain/Slash conversion</i></p>	<p>4 + 2 marks</p>									
(iii)	<p>Conditions necessary for dry rot...</p> <p style="text-align: center;"><i>Spores</i> <i>Food (wood)</i> <i>Heat</i> <i>Moisture (20%)</i> <i>Poor ventilation/Still air</i> <i>Warmth (indoors)</i></p> 	<p>4 x 2 marks</p>									
(iv)	<p>Types of Wood Preservative...</p> <p style="text-align: center;"><i>Water-based</i> <i>Solvent-based</i> <i>Tar Oil</i></p> <p>Application...</p> <p style="text-align: center;"><i>Brushing, rolling, spraying, immersion, pressure treatment</i></p>	<p>2 x 3 marks</p> <p>3 x 2 marks</p>									

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6

8

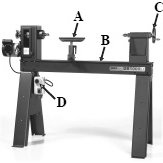
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QUESTION	ANSWER	MARKS
<p>4. (i)</p> 	<p>Names and uses of chisels...</p> <p><i>A=Mortice Chisel: removing mortices</i> <i>B=Bevel-Edged Chisel: paring trenches, chamfers...</i> <i>C=Firmer Chisel: paring trenches, chamfers...</i> <i>D=(Spoon) Gouge: Carving, paring circular grooves...</i></p>	<p>4 x 2 marks 4 x 1 mark</p>
<p>(ii)</p> 	<p>Resharpenering the chisel...</p> <ul style="list-style-type: none"> • <i>Grind chisel square.</i> • <i>Grind the blade on the grindstone to an angle of 25°</i> • <i>Apply oil to the oilstone.</i> • <i>Sharpen the blade to and angle of 30° on the oilstone by moving back and forth or in a figure of eight pattern, using a guide if necessary.</i> • <i>Back off chisel on an oilstone.</i> • <i>Remove the burr from the edge of the chisel using a strop</i> • <i>Clean the blade with a cloth.</i> 	<p>8 + 4 marks</p>
<p>(iii)</p>	<p>Marking out of mortice...</p> <p><i>Measure and mark width of mortice.</i> <i>Square lines the width of the wood across the wood</i> <i>Return lines across each edge.</i> <i>Set mortice gauge spurs to required width of the mortice and then to the distance it is in from the edge.</i> <i>With the gauge stock against the face side, gauge between pencil lines marked for the end of the mortice on both edges.</i> <i>Mark waste.</i></p> <p>Removing the mortice...</p> <p><i>Secure wood in a vice/bench hook.</i> <i>Holding the chisel vertically drive it 3-6mm into the wood between the gauge lines.</i> <i>Move the chisel along the mortice in stages driving it into the wood as you proceed.</i> <i>Stop 2mm or so from the end of the squared line and rotate the chisel 180°, proceeding along the mortice to the other squared line.</i> <i>Repeat this process until approximately halfway through the mortice.</i> <i>Shake out the loose chippings, turn over the wood and repeat the process from the other side.</i> <i>Vertical pare the remaining waste from the ends of the mortice.</i></p> <p style="text-align: center;"><i>Or</i></p> <p><i>Ensure the correct chisel is inserted in the morticer.</i> <i>Clamp timber onto morticer bed.</i> <i>Align the chisel to the mortice on the wood.</i> <i>Switch on machine and pull handle to insert chisel into wood.</i> <i>Move timber along by turning wheel pulling handle each time until mortice is complete.</i> <i>Rotate piece and repeat the process from other side if required.</i></p>	<p>6 + 2 marks</p> <p>6 + 2 marks</p>

12

12

16

QUESTION	ANSWER	MARKS	
5A . (i) 	Lathe parts... <i>A-Toolrest: to support tools while turning.</i> <i>B-Bed: Supports all parts of the lathe, providing a stable and firm base.</i> <i>C-Handwheel/Tailstock: Allows the centre in the tailstock to be adjusted so as to tighten or release the spindle/the adjustable end of the lathe which houses a centre and secures piece for spindle turning</i> <i>D-Switch/On-off button: For stopping and starting the motor.</i>	4 x 2 marks 4 x 1mark	12
(ii)	Three safety precautions... <i>Wear face shield, tie up hair, no loose clothing, remove jewellery, remove toolrest when sanding, secure work before commencing, rotate work before starting to ensure free movement ...</i>	3 x 3 marks	9
(iii)	Forming the hole for an electrical cable... <i>Mount the spindle on a tailstock using a hollow cup centre</i> <i>Pass a long hole boring auger through the hollow tailstock and hollow centre until contact is made with the end of the wood.</i> <i>Bore the hole halfway through the spindle.</i> <i>Reverse the piece on the lathe, and using a counter bore drive to support the spindle at the headstock, repeat the process until the hole is through the spindle,</i> <i>Augers must be used carefully and slowly, frequently removed to clear parings and prevent the auger from overheating.</i> Or <i>Groove two pieces in the centre using a router or appropriate tool.</i> <i>Glue the two pieces together with the groove down the middle to form the blank for turning....</i>	3 + 6 marks	9
(iv)	Selection of a suitable finish... <i>Wax, oil, varnish, lacquer, shellac, French polish, friction polish</i> Application of chosen finish... <i>While the artefact is turning at a slow speed apply a number of coats using a rubber (for French polish), brush (for varnish, French polish and oil) a cloth for (French polish, varnish, oil and wax), or wire wool or wax stick (for wax)</i> <i>Lacquer should be applied by removing the artefact from the lathe and brushing or spraying in a ventilated area.</i> Burnishing... <i>Oil and wax finishes should be burnished with wire wool or a cloth</i>	4 marks 6 marks	10

QUESTION	ANSWER	MARKS
5B. (i)	<p>Transferring design to wood ...</p> <p><i>Tape the drawing to one edge of the wood.</i></p> <p><i>Insert a sheet of carbon paper underneath the drawing.</i></p> <p><i>Trace over the design.</i></p> <p><i>Check all lines are visible on the wood before removing sheets.</i></p>	3 x 3 marks
	<p>(ii) Cutting the veneers ...</p> <ul style="list-style-type: none"> • <i>Apply tape to reinforce.</i> • <i>Cut the design accurately in a veneer.</i> • <i>Place this veneer over selected coloured veneers, ensuring grain is in right direction and cut shape accurately through the gap/window.</i> • <i>Tape the cut piece onto the gap.</i> • <i>Cut subsequent shapes in the same way and build up the picture fitting and taping pieces in place as you progress.</i> <ul style="list-style-type: none"> • <i>Apply tape to reinforce.</i> • <i>Place two veneers together and cut design accurately through both.</i> • <i>Swap shapes and tape together.</i> • <i>Repeat for subsequent shapes and build up the picture fitting and taping pieces as you progress.</i> 	4 + 6 marks
(iii)	<p>Adhesives...</p> <p><i>Animal Glue, Impact/Contact Adhesive, Synthetic Resin, Casein glue, PVA</i></p> <p>Application...</p> <p><i>Animal glue must be heated and applied with a brush, clamping is usually necessary.</i></p> <p><i>Impact adhesive are applied to both surfaces and the bond is formed once the surfaces are brought together.</i></p> <p><i>Synthetic resins including PVA are applied from the container directly or using a roller or brush.</i></p> <p><i>Clamping is usually necessary.</i></p>	3 x 2 marks 3 marks
(iv)	<p>Rotary cutting of veneers...</p> <p><i>Log is debarked and cut to length.</i></p> <p><i>It is softened using steam or boiling water.</i></p> <p><i>Mounted on a giant lathe and rotated against a knife.</i></p> <p><i>Veneer is peeled from the log.</i></p> <p><i>Veneer is then dried and trimmed.</i></p> <p>Flat slicing or plain slicing of veneers...</p> <p><i>Log is debarked and cut to length.</i></p> <p><i>It is softened using steam or boiling water..</i></p> <p><i>The log is cut in half and mounted on a sliding frame</i></p> <p><i>The frame moves across the knife edge which cuts off thin sheets of veneer.</i></p> <p><i>Veneer is then dried and trimmed.</i></p>	2 x 3 marks 3 + 3 marks

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