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# GCSE ENGINEERING

48503  
Mark scheme

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June 2014

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from [aqa.org.uk](http://aqa.org.uk)

		Expected answers					Mark	notes	
1		<b>name</b>		<b>What it is used for</b>			5		
		scriber		marking out on metal or plastic (1)					
		Odd leg callipers (1)		marking lines parallel to an edge on metal or plastic (1)					
		Callipers or Dividers (1)		scribing arcs/circles or checking measurement (1)					
								<b>Total (5 marks)</b>	
2	(a)		<b>Length</b>	<b>Width/DIA</b>	<b>Thickness</b>	<b>Material</b>	<b>Quantity</b>	5	
		<b>Legs</b>	<b>3000</b>	50	50	low carbon steel angle	4		
		<b>Rail</b>	1000	50	50	low carbon steel angle	<b>2</b>		
		<b>Seat</b>	600	220	20	<b>polypropylene</b>	1		
		<b>Seat Support Bracket</b>	690	<b>30</b>	2	low carbon steel	2		
		<b>Seat Rods</b>	1500	<b>Ø12</b>		low carbon steel	2		

2	(b)	A = Metric - accept mm (1) B = Diameter - accept width of bolt (1) C = Length (1) D = Hexagon head - accept Hex bolt or bolt type (1)	4	
2	(c)	<b>Any one of:</b> Cadmium plating Zinc plating – galvanising	1	
				<b>Total (10 marks)</b>
3	(a)	Exploded drawing accept Assembly drawing and Isometric drawing	1	
3	(b)(i)	<b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Correct shape</li> <li>• Located on centre line</li> <li>• Cross hatching</li> <li>• End of spigot correctly located on leg</li> </ul>	4	
3	(b)(ii)	Correct 3 <sup>rd</sup> angle symbol	1	
3	(c)	The tolerance allowed (1) Machined within 0.02 larger/smaller than 4mm (1) Acceptable variation in diameter part can be between 3.98 – 4.02 mm (1) State the symbol means diameter (1)	2	
3	(d)	Read out does not require interpretation (1) Less chance of human error (1) Accuracy (1) Faster to use than a device with scale (1)	2	
				<b>Total (10 marks)</b>
4	(a)	Award <b>One</b> mark for each of the following points: <ul style="list-style-type: none"> <li>• All three correct dimensions on drawing</li> <li>• Header line</li> <li>• Solid arrow heads</li> <li>• Dimensions central above line</li> </ul>	4	

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		<ul style="list-style-type: none"><li>• Diameter symbol</li></ul>		
<b>4</b>	<b>(b)</b>	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"><li>• Stamping</li><li>• Press formed</li><li>• Plasma cut</li><li>• CNC milling machine</li><li>• Detail of the operation of the process</li></ul>	2	





6	(c)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Toxic fumes</li> <li>• Irritation from fibres</li> <li>• Explosion/fire risk</li> <li>• Storage leaks/contamination</li> </ul>	2	
6	(d)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Use of a jig to ensure accuracy of alignment each time</li> <li>• Use of underside support to reduce risk of damage</li> <li>• Use of ring saw</li> <li>• Use of simple clamping system</li> <li>• Use of CNC drill</li> <li>• Appropriate form of protection to stop damage to the batch</li> </ul>	4	
				<b>Total (10 marks)</b>
7	(a)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Can import data</li> <li>• Electronic post</li> <li>• Rotate/enlarge view from a variety of angles</li> <li>• Quick and easy to modify drawings</li> <li>• More accurate than manual drawing</li> <li>• Can be linked to a CAM machine</li> </ul>	2	
7	(b)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• reduce over heads</li> <li>• less stock storage</li> <li>• Less time required to locate parts</li> <li>• Any other suitable point</li> </ul>	2	
7	(c)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Needs a highly coordinated work force</li> <li>• Sharing of data</li> <li>• Dependant on reliable supply chains</li> <li>• Production may stop due to stock shortages</li> <li>• Less flexibility if customers require customized items</li> </ul>	2	



		<ul style="list-style-type: none"> <li>• May reduce ability to respond quickly to new orders</li> </ul> <p><b>Additional mark for extended detail or describing the impact</b></p>		
7	(d)	<p>Award <b>One</b> mark for any of the following points:</p> <ul style="list-style-type: none"> <li>• Robots can be programmed directly from the CAD system</li> <li>• To carry out tasks such as; material handling, spot welding, machine loading, paint spraying, product assembly and quality control</li> <li>• Providing an example of an industrial application</li> </ul>	2	
7	(e)	<p>Award <b>One</b> mark for any of the following points:</p> <ul style="list-style-type: none"> <li>• Carrying out tasks in environments that are hazardous to humans examples of specific tasks include radioactive or paint spraying</li> <li>• Reduce risks of repetitive strain injuries</li> <li>• Support lifting of heavy weights</li> </ul>	2	
				<b>Total (10 marks)</b>

8	(a)	A metallic material consisting of two or more metals.	1	
8	(b)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Corrosion resistance</li> <li>• Improving material properties</li> <li>• fluidity</li> <li>• Improving machining characteristics</li> <li>• Hardness</li> <li>• Elasticity</li> <li>• Change melting point</li> </ul>	3	
8	(c)	Machining	1	
8	(d)	Award <b>One</b> mark for any of the following points: <ol style="list-style-type: none"> <li>1. Set up costs</li> <li>2. Machinery</li> <li>3. Rates/rents for a year</li> <li>4. Labour rates agreed for fixed periods of time</li> </ol>	2	
8	(e)	Award <b>One</b> mark for any of the following points: <ul style="list-style-type: none"> <li>• Change in materials based on supply and demand</li> <li>• Energy costs</li> <li>• Transport costs</li> <li>• Unforeseen maintenance costs</li> <li>• Unforeseen quality control issues</li> <li>• Improved performance due to experience</li> <li>• Describing the impact of any of the above points</li> </ul>	3	
				<b>Total (10 marks)</b>
				<b>Total marks for paper (75 marks)</b>